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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) socio-demographic 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. (Sarıçam, 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	
Stress	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 bath 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	β	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)

Jurnal ke-2 (Increase generalized anxiety, depression and disstress during the COVID-19 pandemic : a cross sectional study in germany)

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Increased generalized anxiety, depression and distress during the COVID-19 pandemic: a cross-sectional study in Germany

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ABSTRACT

Background Since the first cases of the novel coronavirus disease SARS-CoV-2 were reported in December 2019 in China, the virus has spread in most countries. The aim of the present study was to assess initial data on the mental health burden of the German public during the COVID-19 pandemic.

Methods A cross-sectional study was conducted in Germany and collected complete datasets from 15 704 German residents aged 18 years and over. Besides demographics, generalized anxiety (GAD-7), depression (PHQ-2) and psychological distress (DT) were assessed. Furthermore, COVID-19-related fear, trust in governmental actions to face COVID-19 and the subjective level of information regarding COVID-19 were covered.

Results Significantly increased symptoms were highly prevalent in all dimensions: generalized anxiety (44.9%), depression (14.3%), psychological distress (65.2%) and COVID-19-related fear (59%). Females and younger people reported higher mental burden. Trust in governmental actions to face COVID-19 and the subjective level of information regarding COVID-19 are negatively associated with mental health burden. However, the subjective level of information regarding COVID-19 is positively associated with increased COVID-19-related fear.

Conclusions The provision of appropriate psychological interventions for those in need and the provision of transparency and comprehensible information are crucial during the current pandemic.

Keywords COVID-19, COVID-19-related fear, depression, generalized anxiety, mental health

Introduction

In December 2019, the first cases of the novel coronavirus disease SARS-CoV-2 (COVID-19) were reported in Wuhan, China.[1] Since then, the virus rapidly spread across South East Asia and reached Central Europe, and nowadays infections are reported in almost all countries of the world.[2] In March 2020, the World Health Organization officially classified the spread of the virus as the first pandemic since H1N1 in 2009/2010 with now over 7.8 million reported infections.[2,3] So far, little is known about medications and vaccinations to effectively combat the virus[4]. Therefore, current priorities to face the pandemic lie on actions to slow down the spread of the virus.

These highly necessary actions 'to flatten the curve' are in most countries restrictive and thus a limitation to personal lives. In Germany, public facilities, educational institutions and borders to the neighboring countries were closed to prevent the emergence of infection chains. Furthermore, imposed contact prohibitions to enforce physical distancing and private quarantine affect most people in the country. However, these highly urgent measures to slow down the spread of the virus in order to prevent new infections have

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an enormous impact on the economy, public life and on each individual.

A recent review investigating the psychological burden caused by quarantine highlights the psychological strain on those who are not allowed to participate in social life.[5] The current literature on COVID-19 offers a wide range of different aspects of the pandemic, especially regarding the impact of the virus on people with chronic physical diseases.[6–8] In contrast, high-quality data concerning mental health issues in times of COVID-19 are still needed.[9,10] Already existing research focuses on mental health issues of frontline medical staff in China,[11,12] the impact of constant media coverage and its influence on peoples' mental health[13,14] and the change of the psychological burden over the course of time during the pandemic.[15] One recently published study investigates the impact of the COVID-19 pandemic on the mental health burden of the Chinese public.[16] More specific, this study shows high prevalence of generalized anxiety (35.1%), depression symptoms (20.1%) and poor sleep quality (18.2%) during the COVID-19 pandemic. It is worth noting that most research on mental health issues in times of COVID-19 is derived from Chinese samples and should be interpreted with caution when compared to Western populations. Given these circumstances, there is a strong need to collect high-quality data on the impact of the COVID-19 pandemic on the mental health of the Western population. Additionally, a recently published Lancet Psychiatry position paper highlighted this matter of public interest.[17] Therefore, the proposed study aims to fill this research gap.

The primary objective of the present study is to investigate the mental health burden of the German population during the COVID-19 pandemic. Subsequently, it is hypothesized that generalized anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear are increased. The secondary objectives refer to relations between peoples' trust in governmental actions to face COVID-19, the subjective level of information regarding COVID-19 and peoples' mental health burden. It is hypothesized that high level of trust in governmental actions to face COVID-19 and high subjective level of information regarding COVID-19 correlate negatively with generalized anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear.

The results of this study will provide important data on the mental health of the German population and on various factors related to mental health issues during the COVID-19 pandemic. Such data is relevant in order to build much needed evidence on current mental health issues and to provide important information regarding the need for targeted interventions to support the German public.

Methods

Study design and participants

Over the course of 8 weeks (10 March–5 May 2020), a cross-sectional online survey was distributed via online channels (e.g., online newspaper), social media and print media. The survey period covers different levels of governmental restrictions and their easing of those restrictions in public life in Germany.

The survey was accessed 18 895 times with a total of 15 704 participants completing the survey (83% completion rate). At the time of survey completion, a total of 15 037 respondents were residing in Germany and were at least 18 years old. Table 1 shows a summarized overview of the demographics included in the analysis. Of the 15 037 respondents included in this sample, 10 633 (70.7%) were female, 4353 (28.9%) were male and 51 (0.3%) were gender queer. 2076 (13.8%) of the participants were aged 18–24 years, 3725 (24.8%) were aged 25–34 years, 3 459 (23.0%) were aged 35–44 years, 2846 (18.9%) were aged 45–54 years, 2151 (14.3%) were aged 55–64 years and 780 (5.2%) were aged 65 year or older.

Ethics

Electronic informed consent was obtained prior to the start of the survey. Participation was voluntary, anonymous, and participants could withdraw from the study at any time. The proposed study was conducted in accordance with the Declaration of Helsinki, and the Ethics Committee of the University Hospitals Essen has approved the execution of the study (20-9307-BO).

Measures

The completion of the survey requires about 12 minutes. The survey consists of several modules, including demographic data, e.g., gender, age, marital status, having a child below the age of 18, educational level and occupational status.

Three validated measures were used in the survey to assess mental health burden, namely, Generalized Anxiety Disorder Scale-7 (GAD-7),[17] Patient Health Questionnaire-2 (PHQ-2),[18] and Distress Thermometer (DT).[19] The GAD-7 consists of seven items assessing the frequency of anxiety symptoms over the past 2 weeks on a 4-point Likert scale (0 = never to 3 = nearly every day). According to previous validation samples, sum scores of ≥5, ≥10 and ≥15 indicate mild, moderate and severe generalized anxiety symptoms.[18] The PHQ-2 consists of two items screening the frequency of depression symptoms over the past 2 weeks on a 4-point Likert scale (0 = never to 3 = nearly every day). A sum score of ≥3 points to major depression symptoms.[19] The

Table 1 Demographic characteristics

	N	%
Sex		
Female	10 633	70.7
Male	4353	28.9
Inter/diverse	51	0.3
Age		
18–24 years	2076	13.8
25–34 years	3725	24.8
35–44 years	3459	23.0
45–54 years	2846	18.9
55–64 years	2151	14.3
65–74 years	662	4.4
≥75 years	118	0.8
Marital status		
Single	4300	28.6
Married	6391	42.5
In a relationship	3129	20.8
Divorced/separated	922	6.1
Widowed	197	1.3
Other	98	0.7
Children		
Yes	4281	28.5
No	10 756	71.5
Educational level		
University education	6403	42.6
Higher education entrance qualification	4921	32.7
Secondary education	2767	18.4
Lower secondary education	655	4.4
No qualification	47	0.3
Other	244	1.6
City size (population)		
100 00 residents	8396	55.8
20 000 residents	3417	22.7
5000 residents	1645	10.9
<5000 residents	1 579	10.5
Occupation		
Not employed	1544	10.3
Healthcare-related job	2159	14.6
Other	11 298	75.1
Illnesses		
Yes	5553	36.9
No	9484	63.1
Total	15 037	100.0

DT involves one visual analogue scale 0 = no distress to 10 = extreme distress experienced in the past week. Here, a score ≥4 indicates elevated psychological distress.[20] All instruments were previously validated within the German population and are commonly used in clinical and scientific practice. Furthermore, one item assessing COVID-19-related fear on a 7-point Likert-scale (1 = very low to 7 = extremely high) was implemented.

Trust in governmental actions to face COVID-19 (I think Germany is well prepared to face COVID-19; I think all government measures are being taken to combat COVID-19; I have confidence in the governmental system in Germany) and the *subjective level of information regarding COVID-19* (I feel informed about COVID-19; I feel informed about measures to avoid an infection with COVID-19; I understand the health authorities' advice regarding COVID-19) were assessed using a 7-point Likert-scale (1 = complete disagreement to 7 = complete agreement). The reliability for both scales was tested using Cronbach's α as an indication of internal consistency. The scales trust in governmental actions to face COVID-19 and subjective level of information regarding COVID-19 showed high internal consistency with Cronbach's $\alpha = 0.825$ and Cronbach's $\alpha = 0.801$. The scale–scale correlation was $r = 0.464$, $P < 0.001$.

Statistical analysis

The data analysis was performed using SPSS Statistics 26 Software (IBM, Armonk, NY). First, sum scores for the GAD-7 and PHQ-2 and mean scores for the two scales were calculated. Descriptive statistics were conducted for characteristics of participants including socio-demographics and scores of psychometric tools. Considering the present sample size, a normal distribution of the variables was assumed, and *Pearson* correlations have been conducted. The level of significance was set at $\alpha = 0.05$ (two-sided tests).

Results

Prevalence of generalized anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear

The prevalence of general anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear, stratified by gender and age, is shown in Tables 2 and 3. Overall prevalence for elevated general anxiety symptoms (sum scores of ≥5) was reported from 44.9% ($N = 6748$) of the participants. Almost one-third (28.1%, $N = 4226$) of the respondents reached a sum score of ≥5. Moreover 9.8% ($N = 1476$) and 7% ($N = 1046$) reached a sum score of ≥10 and ≥15, respectively. Sum scores for depression symptoms of ≥3 were reported from 14.3% ($N = 2157$). A score of ≥4 for experienced psychological distress was reported from 65.2% ($N = 9799$) of the respondents. Participants

Table 2 Prevalence of generalized anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear stratified by gender

	Total	*Sex*		
	(N = 15 037)	*Female (N = 10 633)*	*Male (N = 4353)*	*Inter/diverse (N = 51)*
GAD-7				
<5	8289 (55.1%)	5413 (50.9%)	2853 (65.5%)	23 (45.1%)
≥5	4226 (28.1%)	3173 (29.8%)	1037 (23.8%)	16 (31.4%)
≥10	1476 (9.6%)	1199 (11.3%)	272 (6.2%)	5 (9.8%)
≥15	1046 (7.0%)	848 (8.0%)	191 (4.4%)	7 (13.7%)
PHQ-2				
<3	12 880 (85.7%)	9025 (84.9%)	3822 (87.8%)	33 (64.7%)
≥3	2157 (14.3%)	1608 (15.1%)	531 (12.2%)	18 (35.3%)
DT				
<4	5238 (34.8%)	3423 (32.2%)	1797 (41.3%)	18 (35.3%)
≥4	9799 (65.2%)	7210 (67.8%)	2556 (58.7%)	33 (64.7%)
COVID-19-related fear				
<5	6170 (41.0%)	3942 (37.1%)	2199 (50.5%)	29 (56.9%)
≥5	8867 (59.0%)	6691 (62.9%)	2154 (49.5%)	22 (43.1%)

Note: GAD-7 = Generalized Anxiety Disorder Scale-7, sum scores of ≥5, ≥10 and ≥15 indicate mild, moderate and severe generalized anxiety symptoms, respectively; PHQ-2 = Patient Health Questionnaire-2, sum scores of ≥3 indicate major depression symptoms; DT = Distress Thermometer, a score ≥4 indicates elevated psychological distress. COVID-19-related fear, ≥5 indicate elevated COVID-19-related fear.

COVID-19-related fear were studied using a 7-point Likert scale, while scores between 5 and 7 indicate elevated COVID-19-related fear. More respondents (59%, $N = 8867$) reported to have heightened COVID-19-related fear.

Associations of trust in governmental actions to face COVID-19 and subjective level of information regarding COVID-19 with mental health parameters

Participants' trust in governmental actions to face COVID-19 and subjective level of information regarding COVID-19 were studied using 7-point Likert scales. Each scale consists of three items. Almost half of the participants reported high trust in governmental actions to face COVID-19, and most participants felt well informed regarding COVID-19 (scores between 5 and 7), 48.2 and 90.4%, respectively. Considering trust in governmental actions to face COVID-19, we found significant negative correlations between generalized anxiety symptoms ($r = -0.153$, $P < 0.001$), depression symptoms ($r = -0.117$, $P < 0.001$) and psychological distress ($r = -0.154$, $P < 0.001$). No significant correlation between trust in governmental actions to face COVID-19 and COVID-19-related fear ($r = -0.013$, $P = 0.104$) was observed. Significant negative correlations between the subjective level of information regarding COVID-19 and generalized anxiety symptoms ($r = -0.102$, $P < 0.001$), depression symptoms ($r = -0.096$, $P < 0.001$) and psychological distress ($r = -0.097$, $P < 0.001$) were observed. Furthermore, a positive correlation between the subjective level of information regarding COVID-19 and COVID-19-related fear was observed ($r = 0.107$, $P < 0.001$).

Discussion

Main finding of this study

The present study is assessing the mental health burden during the COVID-19 pandemic in Germany. This study shows high prevalence of generalized anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear. Furthermore, trust in governmental actions to face COVID-19 and the subjective level of information regarding COVID-19 were negatively associated with generalized anxiety symptoms, depression symptoms and psychological distress. In contrast, trust in governmental actions to face COVID-19 is not associated with COVID-19-related fear, but the subjective level of information regarding COVID-19 is positively associated with COVID-19-related fear.

Table 3 Prevalence of generalized anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear stratified by age

	Total	Age—categories in years						
	(N = 15 037)	18–24 (N = 2076)	25–34 (N = 3725)	35–44 (N = 3459)	45–54 (N = 2846)	55–64 (N = 2151)	65–74 (N = 662)	≥75 (N = 118)
GAD-7								
<5	8289 (55.1%)	915 (44.1%)	2045 (54.9%)	1836 (53.1%)	1645 (57.8%)	1306 (60.7%)	461 (69.6%)	81 (68.7%)
≥5	4226 (28.1%)	618 (29.8%)	1026 (27.5%)	1035 (29.9%)	772 (27.1%)	593 (27.6%)	154 (23.3%)	28 (23.7%)
≥10	1476 (9.8%)	307 (14.8%)	377 (10.1%)	347 (10.0%)	262 (9.2%)	147 (6.8%)	29 (4.4%)	7 (5.9%)
≥15	1046 (7.0%)	236 (11.4%)	277 (7.4%)	241 (7.0%)	167 (5.9%)	105 (4.9%)	18 (2.7%)	2 (1.7%)
PHQ-2								
<3	12 880 (85.7%)	1 529 (73.7%)	3 202 (86.0%)	3 005 (86.9%)	2 520 (88.5%)	1 912 (88.9%)	606 (91.5%)	106 (89.8%)
≥3	2 157 (14.3%)	547 (26.3%)	523 (14.0%)	454 (13.1%)	326 (11.5%)	239 (11.1%)	56 (8.5%)	12 (10.2%)
DT								
<4	5 238 (34.8%)	676 (32.6%)	1282 (34.4%)	1024 (29.6%)	986 (34.6%)	831 (38.6%)	367 (55.4%)	72 (61.0%)
≥4	9799 (65.2%)	1400 (67.4%)	2443 (65.6%)	2435 (70.4%)	1860 (65.4%)	1320 (61.4%)	295 (44.6%)	46 (39.0%)
COVID-19-related fear								
<5	6170 (41.0%)	930 (44.8%)	1709 (45.9%)	1348 (39.0%)	1115 (39.2%)	795 (37.0%)	232 (35.0%)	41 (34.7%)
≥5	8867 (59.0%)	1146 (55.2%)	2016 (54.1%)	2111 (61.0%)	1731 (60.8%)	1356 (63.0%)	430 (65.0%)	77 (65.3%)

Note: GAD-7 = Generalized Anxiety Disorder Scale-7, sum scores of ≥5, ≥10 and ≥15 indicate mild, moderate and severe generalized anxiety symptoms, respectively; PHQ-2 = Patient Health Questionnaire-2, sum scores of ≥3 indicate major depression symptoms; DT = Distress Thermometer, a score ≥4 indicates elevated psychological distress. COVID-19-related fear, ≥5 indicate elevated COVID-19-related fear.

The prevalence of at least mild generalized anxiety symptoms was 44.9% within the investigated sample. 16.8% of the current sample had moderate generalized anxiety symptoms, which is strongly increased compared to previously published studies in Germany with 6.0 and 5.9% prevalence of moderate anxiety symptoms, respectively.[18,21] In fact, moderate anxiety symptoms (GAD-7 score of ≥10) were associated with a positive likelihood ratio for the presence of a generalized anxiety disorder of 5.1.[22] Moreover, severe generalized anxiety symptoms (GAD-7 score ≥15) were observed in 7% of the respondents. Compared to the normative sample (1%) and a new population-based study (1.2%), the prevalence of severe generalized anxiety symptoms is seven times higher.[18,21] Applying a cut-off score of ≥9, which was used in a recently published study in China, the German population shows a much lower prevalence of generalized anxiety symptoms than the Chinese population in times of COVID-19 (20 vs. 35.1%).[16] These results underline the importance of high-quality data from different populations to assess the impact of COVID-19 on the mental health in different countries. One explanation for these differences could be the significantly lower number of deaths caused by COVID-19 in Germany compared to China.[2] In addition, cultural peculiarities as well as available information on COVID-19 and its consequences may explain the different prevalence of generalized anxiety symptoms.

Compared to representative German samples, increased prevalence of depression symptoms (14.3 vs. 5.6%) as well as psychological distress (65.2 vs. 39%) was observed.[20,23] Additionally, more than half (59%) of the respondents reported elevated COVID-19-related fear. Considering the heightened prevalence, it is clear to say that the mental health burden is increased in the German public during the COVID-19 pandemic. Elevated generalized anxiety symptoms, depression symptoms and psychological distress were more likely to occur in females and younger people, which is consistent to existing literature regarding the prevalence of mental health burden in Germany.[18–20] In contrast, existing literature on the mental health burden in China during the COVID-19 outbreak, where similar psychometric instruments were used, no difference between genders could be observed, but younger people also reported more anxiety symptoms.[16]

Correlation analyses were carried out to assess whether a high level of trust in governmental actions to face COVID-19 and a high subjective level of information regarding COVID-19 are associated with reduced mental health burden. Less than half (48.2%) of our sample reported high trust in the government's actions to combat COVID-19,

and 90.4% felt well informed about COVID-19. Trust in governmental actions to face COVID-19 and the subjective level of information regarding COVID-19 were negatively associated with generalized anxiety symptoms, depression symptoms and psychological distress. These findings are consistent with previous published findings on the impact of governmental statements on mental health during the COVID-19 pandemic.[15] This points to the inevitable need and responsibility for the government and the media to provide clear and comprehensible information to the public.[13,14] No association between trust in governmental actions to face COVID-19 and COVID-19-related fear could be observed. Moreover, a positive correlation between the subjective level of information regarding COVID-19 and COVID-19-related fear occurred. This suggests that people who feel well informed about COVID-19 have an increased COVID-19-related fear. One possible explanation could be that COVID-19-related fear is not an anxiety in the pathological sense, but a more rational response that can be explained by the growing number of infection cases in the world. In-line with this, previous research suggested that a heightened frequency of risk-elevating news during the Ebola virus disease might contribute to public concerns in relations to infectious diseases.[24]

What is already known on this topic

Recently published literature on the psychological impact caused by the COVID-19 pandemic on people's mental health has shown increased depression and anxiety symptoms, poor sleep quality and distress.[9,11,12,16] Especially frontline medical staff in China report poor mental health during the ongoing pandemic.[11,12] A longitudinal study conducted in China revealed that the perceived psychological impact on mental health persists up to 1 month after the outbreak of the virus.[25] Still most of the studies investigating the mental health burden during the COVID-19 pandemic are derived from Asian samples.

What this study adds

This study offers first data on the mental health burden of the German public during the ongoing COVID-19 pandemic. The data suggest that the observed increased prevalence of generalized anxiety symptoms, depression symptoms and psychological distress in the German population is related to the ongoing pandemic and its consequences for the public. Therefore, appropriate interventions are crucial to support burdened people and prevent manifestations of mental illnesses. Such interventions should be implemented in public health strategies.[26] During the current pandemic, low-threshold tele-medical approaches offer great advantages in providing anonymous and effective support to many people.[27] Nevertheless, already existing e-mental health approaches to support burdened people in times of COVID-19 need to be further evaluated.[28]

The main strength of this study is that it is one of the largest to date to assess the mental health aspects of people during the COVID-19 pandemic in the Western hemisphere. In fact, this is the first study so far addressing the mental health issues in Germany during the COVID-19 pandemic. Furthermore, the completion rate (83%) is high when compared with the average completion rates in online survey studies.[29] This reflects the public interest in mental health during the COVID-19 pandemic.

Limitations of this study

However, limitations need to be considered. The data are driven from a cross-sectional study design. Therefore, it is inappropriate to draw causal conclusions from the data. In addition, an online survey was used to collect the data, which was distributed via online and analogue channels. Thus, the possibility of selection bias should be considered. It is important to note that two scales, namely, trust in governmental actions to face COVID-19 and the subjective level of information regarding COVID-19, could not be validated beforehand. Nevertheless, post hoc validation of the established scales showed high internal consistency.

Conclusion

To conclude, the results of this study suggest a high prevalence of generalized anxiety symptoms, depression symptoms, psychological distress and COVID-19-related fear during the ongoing pandemic in Germany. Despite significantly increased prevalence of generalized anxiety symptoms in the German population, data on anxiety symptoms in the Chinese population appear to be even more elevated. High trust in governmental actions to face COVID-19 and a highly subjective level of information regarding COVID-19 are associated with low mental health burden. Therefore, maintaining trust in governmental actions to face COVID-19 as well as providing transparency and understandable information regarding COVID-19 is important for governmental authorities during the pandemic. Lastly, establishing appropriate and low-threshold interventions to support mentally burdened people is crucial.

Declaration of competing interest

The authors declare that they have no competing interests.

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Jurnal ke-3 (Depression, Anxiety, and Stress Symptoms and Its Associated Factors Among Residents of Gondar Town During the Early Stage of COVID-19 Pandemic)

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Depression, Anxiety, and Stress Symptoms and Its Associated Factors Among Residents of Gondar Town During the Early Stage of COVID-19 Pandemic

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Purpose: An acute respiratory disease caused by the novel coronavirus disease (COVID) was identified in late 2019. COVID-19 triggered a wide range of psychological problems, such as anxiety, depression, and stress. However, studies on mental health status in developing countries including Ethiopia related to COVID-19 are very limited. Therefore, this study was aimed at determining the magnitude of depression, anxiety, and stress, and their associated factors among Gondar town population during the early stage of the COVID-19 pandemic.

Patients and Methods: A community-based cross-sectional study was conducted among 660 residents of Gondar town in April 2020. A multi-stage sampling technique was employed to select study participants. A 21 item depression, anxiety, and stress scale (DASS-21) was used. Variables with a *p*-value <0.05 in the final model were declared as statistically significant. Hosmer and Lemeshow goodness of fit test was used to check the model fitness.

Results: In this study, the prevalence of depression was 32.0% (95% CI: 28.4–35.5), anxiety 25.8% (95% CI: 22.4–29.1), and stress 14.7% (95% CI: 12.0–17.4), respectively. The odds of developing depression was higher among female respondents (AOR=2.30, 95% CI: 1.01, 3.83) and ever smokers (AOR=2.8, 95 CI: 1.23, 6.28) as compared to their counterparts. Besides, history of medical illness and ever smoking increase the odds of anxiety by 2.3 (AOR=2.3; 95% CI: 1.42–3.76), and 2.8 (AOR=2.8; 95% CI: 1.23–3.83), respectively. Furthermore, being unemployed and family size of <5 increase the odds of stress by 2.1 (AOR=2.1; 95% CI: 1.17–3.83) and 1.8 (AOR=1.8; 95% CI: 1.09–2.81), respectively.

Conclusion: In this study, the overall depression, anxiety, and stress were significantly high. There are number of factors associated with depression, anxiety, and stress. Designing and implementing tailored strategies for COVID-19 prevention and control could be supremely important to reduce mental health problems in the community.

Keywords: depression, anxiety, stress, COVID-19, Gondar

Background

The Coronavirus Disease 2019 (COVID-19) has emerged in Wuhan city, Hubei province of China, spread nationwide alarmingly on top of half a dozen in other countries between December 2019 and early 2020.[1] On March 11, 2020, the World Health Organization (WHO) declared COVID-19 as a global pandemic disease and call for countries to work jointly and coordinate international responses towards the disease.[2]

According to Johns Hopkins University report, as of July 31, there are 17,600,740 cases and 679,600 deaths with 10,342,311 recoveries of COVID-19 globally.[3] In the time of the outbreak, individuals are commonly stressed and worried[4] and resulted in an economic crisis.[5] Since COVID-19 is an emerging suddenly and highly infectious, it causes serious threats to peoples' physical health and lives. Besides, data from different countries highlighted that the COVID-19 outbreak and associated quarantine measures negatively affect mental health and triggered a wide variety of psychological problems and increase symptoms of psychological distress such as anxiety, depression, suicidal attempts and post-traumatic stress among the general population.[6–8] The stressful conditions of COVID-19 pandemic also lead to psychological distress and clinical worsening of affective symptoms in individuals with mental disorders.[9] According to the recent meta-analysis, the prevalence of depression, anxiety and stress during COVID-19 pandemic was 33.7%, 31.9%, and 29.6%, respectively.[10]

A study done in China among the general population during the COVID-19 pandemic reported that 35.1% of the study participants had Generalized Anxiety Disorder (GAD-7), and 20.1% had depressive symptoms.[11] Another report in Spain during the early phase of the COVID-19 pandemic identified that 36% of the study participants had moderate to severe psychological problems; of which 25% had a mild to severe anxiety, 41% had depression and 41% had stress symptoms.[12]

During the COVID-19 pandemic, younger age and being female were associated with the higher prevalence of psychological distress symptoms like depression and anxiety.[13] Socioeconomic status, early childhood trauma, conducting leisure activities, sex, age, job status, and the perception of being in good health were factors associated with mental health outcomes.[12,14] Studies in Italy showed that the higher number of lockdown days, living alone during the lockdown, smoking habits, and long duration of illness during the acute phase of COVID-19 pandemic were associated with a higher prevalence of psychological distress and post-traumatic stress symptoms.[14–16] Biological factors like low serum vitamin-D were also found to be associated with higher psychological distress in patients with mood disorders during the COVID-19 outbreak.[9]

Even though countries across the globe design different strategies including full/partial lockdown, social distancing measures, closure of schools, cancelation of public gatherings, and use of a mask to control the spread of the pandemic and to minimize the catastrophic effect of COVID-19, the spread of the pandemic and its disastrous effect is become worsen. However, studies on mental health status in developing countries like Ethiopia are very limited. Hence, understanding and investigating public psychological problems during this tumultuous time has practical significance. Therefore, this study aimed to determine the magnitude of depression, anxiety, and stress, and their associated factors among Gondar town residents' during the early stage of the COVID-19 pandemic. Policymakers, health care planners, medical practitioners, and other concerned bodies might use the information from this study to develop a diagnosis, treatment, and preventive strategies of COVID 19 induced depression, anxiety, and stress.

Methods

Study Design, Area, and Period

A community-based cross-sectional study was conducted in April 2020. This study was conducted in Gondar town, located 728 km far from Addis Ababa, and the capital city of Ethiopia. According to the 2018 population projection, the estimated population size is 430,178. It is subdivided into 12 sub-cites. The town has 24 kebeles, the smallest administrative units in the country. According to the town's health office report of 2018, the town has 1 referral hospital, 8 government health centers, and 14 health posts (the lowest health care unit in Ethiopian health care system). On the other hand, there is 1 primary hospital, 41 different level clinics, one international laboratory, and 23 pharmacy units and drug stores owned by private sectors.

Population and Sample

All adults (≥18 years) who were volunteers to participate after informed consent was given have participated. The sample size was calculated using a single population proportion formula based on a previous study from China[17] using the following assumptions: 95% confidence level, and α = level of significance (5%), and margin of error (d) =0.05, design effect of 2, and non-response 10%. The sample was calculated using Epi-info version 7 and the maximum sample size used in this study was 693. From 20 kebeles of Gondar town, 6 kebeles were selected randomly using the lottery method. A multi-stage sampling technique was employed (Table 1).

Table 1 Sample Size Calculation Using Epi-Info Version 7

Variable	Prevalence	Sample Size (Including Non-Response and Design Effect)
Depression	16.5	466
Anxiety	28.8	693
Stress	8.1	228

Variable of the Study

In this study, the outcome variables were the presence or absence of symptoms of depression, anxiety, and stress. Independent variables include socio-demographic characteristics: age, sex, educational status, religion, marital status, occupation, family size, and the number of people with close contact, clinical factors: history of medical and known mental illness, and behavioral factors: ever alcohol drinking, current alcohol drinking, ever cigarette smoking, current cigarette smoking, ever chat chewing, and current chat chewing.

A modified version of the self-reported Depression Anxiety, and Stress Scale (DASS) that contains 21 items was used to measure depression, anxiety, and stress. Each domain comprises 7 items assessing symptoms of depression, anxiety, and stress. These items include, for example, for depression: "I found it difficult to work up the initiative to do things"; for anxiety: "I experienced trembling"; and for stress: "I tended to over-react to situations". Participants were asked to indicate the presence of symptoms in each domain over the past week and responses ranged from 0 to 3 with 0 indicating "did not apply to me at all"; 1 indicating "applied to me to some degree, or some of the time"; 2 indicating "applied to me to a considerable degree or a good part of the time", and 3 indicating "applied to me very much or most of the time". The tool has 21 items, 3 subscales of 7 items for each outcome variables: depression, anxiety and stress. Therefore, each outcome variables has 7 questions. Because the DASS 21 is a short form version of the DASS 42 items, the final score of each outcome variable: Depression, Anxiety and Stress were multiplied by two (x2), and then categorized according to the DASS manual as normal, mild, moderate, severe, and extremely severe. The individual item scores range from a minimum of 0 to a maximum of 42. A higher score indicates a greater level of depression, anxiety, and stress. Accordingly, depression score of 0–9 was considered as normal, 10–13 as mild, 14–20 as moderate, 21–27 as severe, and 28 and above as extremely severe depression. For anxiety, participants with anxiety score of 0–7 was considered as normal, 8–9 as mild, 10–14 as moderate, 15–19 as severe, and 20 and above as extremely severe. For the case of stress, stress score of 0–14 were considered as normal, 15–18 as mild, 19–25 as moderate, 26–33 as severe, and 34 and above as extremely severe.[18]

Chronic medical illness was defined as those respondents who had at least one chronic illness that is diagnosed before from any private and public health institution and currently on follow up. Past mental illness was defined as a respondent who was previously diagnosed with mental illness and treated in the past or currently on treatment. Current use was defined as use of alcohol, chat, and/or cigarette in the last three months. Ever use was defined as use of alcohol, chat, and/or cigarette even once in one's lifetime.[19]

Data Collection Instrument and Quality Control

English version standardized questionnaires DASS-21 was prepared initially and translated to local language (Amharic) then back to English to ensure its consistency. The interviewer-administered method was applied to collect the data. A total of 11 Bachelor of Science (BSC) psychiatry and professional nurses were recruited to collect the data. Five individuals were assigned as a supervisor in controlling the overall data collection process. The training was given for data collectors and supervisors. The pre-test was done on 5% of the sample size out of the study area.

Data Processing and Analysis

The data was entered into Epi-info version 7 and exported to Stata 14 for analysis. Descriptive statistics like frequencies, percentages, and mean were determined and presented in the form of tables and texts. Chi-square assumption was checked. Bi-variable binary logistic regression was carried out first for each variable and those with p-value <0.2 were taken into the multivariable analysis to control the effect of confounders. Then the multivariable logistic regression model was fitted to identify associated factors for depression, anxiety, and stress. Variables with a p- value < 0.05

were reported as significant and declared as associated factors. Crude odds ratio (COR) and adjusted odds ratios (AOR) with a 95% confidence level were reported to show the strength of the association between the outcome and the independent variables. Hosmer and Lemeshow goodness of fit was used to check the model fitness.

Results

Socio-Demographic Characteristics of Study Participants

In this study, 660 (95.2%) study participants were included. The median age of participants was 32 years with interquartile range (IQR) of 26 to 40 years. Female respondents account for 58.9% of the study participants. Regarding the marital status of the respondents nearly half (52.4%) were married and 552 (83.6%) were Orthodox Christian followers. Three hundred sixty-two (54.9%) of the participants had a family size of less than five (Table 2).

Table 2 Socio-Demographic Characteristics of Gondar Town Adult Population, Northwest Ethiopia, 2020 (N=660)

Variables	Category	Frequency (%)
Sex	Male Female	271 (41.1%) 389 (58.9%)
Age (in years)	<26 26–60 ≥61	149 (22.6%) 477 (72.3%) 34 (5.1%)
Marital status	Married Single Divorced Widowed	346 (52.4%) 245 (37.1%) 36 (5.5%) 33 (5.0%)
Religion	Orthodox Muslim Other*	552 (83.6%) 82 (12.4%) 26 (3.9%)
Occupation	Unemployed Government employed Private employed	324 (49.1%) 203 (30.8%) 133 (20.2%)
Educational status	Unable to read and write Able to read and write Primary education Secondary education and above	70 (10.6%) 101 (15.3%) 178 (27.0%) 311 (49.1%)
Family size	<5 ≥5	362 (54.9%) 297 (45.1%)

Note: *Catholic and protestant.

One hundred six (16.1%) respondents had a history of medical illness. Of these, hypertension and diabetes mellitus accounts for 31.19% and 26.6%, respectively. Two hundred twenty-eight (34.6%) respondents had a history of close contact with 2–5 individuals. Two hundred sixteen (32.7%) individuals reported that other people showed a lot of concern to what they were doing while 76 (11.5%) respondents stated that other people did not show any concern and interest to what they were doing. Getting practical help from friends was perceived as easy by 230 (34.9%) and very difficult by 43 (6.5%) respondents (Table 3).

Table 3 Clinical Characteristics and Physical Contact History of Gondar Town Adult Population, Northwest Ethiopia, 2020 (N=660)

Variables	Category	Frequency (%)
History of medical illness	Yes No	106 (16.1%) 554 (83.9%)
Type of medical illness	Hypertension Diabetes Mellitus HIV Heart disease (CHF) Bronchial asthma Cancer Epilepsy Other	34 (31.2%) 29 (26.6%) 11 (10.1%) 11 (10.1%) 16 (14.8%) 2 (1.9) 7 (6.5%) 15 (14.0%)
Family history of mental illness	Yes No	2 (0.3%) 658 (99.7%)
Number of people with close contact	0 1–2 3–5 >5	47 (7.1%) 213 (32.3%) 228 (34.6%) 172 (26.1%)
How much concern people give to you in any situation	No concern and interest Little concern and interest Uncertain Some A lot	76 (11.5%) 83 (12.6%) 81 (12.3%) 204 (30.9%) 216 (32.7%)
How easy is it to get practical help from friends or dorm-mates	Very easy Easy Possible Difficult Very difficult	181 (27.4%) 230 (34.9%) 111 (16.8%) 95 (14.4%) 43 (6.5%)

Table 4 Prevalence and Level of Depression, Anxiety, and Stress Among Gondar Town Population, Northwest Ethiopia, Ethiopia (N=660)

Status	Depression	Anxiety	Stress
Yes	211	170	97
No	449	490	563
Level			
Normal	449	490	563
Mild	59	46	46
Moderate	92	77	40
Severe	28	24	7
Extremely severe	32	23	4

Substance Use Characteristics of Respondents in Gondar Town

Lifetime history of cigarette smoking, alcohol drinking, and khat chewing was reported by 46 (7.0%), 267 (40.4%), and 78 (11.8%) participants, respectively. Regarding substance use history in the last 3 months, 31 (4.7%), 196 (29.7%), and 45 (6.8%) respondents had a history of cigarette smoking, alcohol drinking, and khat chewing, respectively.

Prevalence of Depression, Anxiety, and Stress Among Gondar Town Population

The prevalence of depression, anxiety and stress was 32.0% (95% CI: 28.4–35.5), 25.8% (95% CI: 22.4–29.1), and 14.7% (95% CI: 12.0–17.4), respectively. The mean depression, anxiety, and stress score was 7.53±8.83 (ranging 0–42), 4.6 ±6.35 (ranging 0–36), and 7.26± 7.33 (ranging 0–40), respectively. Regarding the level of depression, anxiety, and stress, moderate depression 92 (13.9%), moderate anxiety 46 (7.0%), and mild stress 46 (7.0%) was the most common patterns (Table 4).

Factors Associated with Depression Among Gondar Town Adult Population

In the bivariate analysis, age, marital status, family size, number of people in close contact, ever cigarette smoking, current cigarette smoking, ever alcohol drinking, ever chat chewing, and current chewing was significant for depression. But, only sex and ever cigarette smoking were significantly associated with depression. The odds of having depression among female adults were 70% higher (AOR=1.7; 95% CI: 1.14–2.51) than males. Respondents with the lifetime history of cigarette smoking had 2.8 times (AOR=2.8, 95% CI: 1.23–6.28) odds of developing depression than non-ever smokers (Table 5).

Factors Associated with Anxiety Among Gondar Town Adult Population

In the bivariate analysis age, marital status, religion, occupation, educational status, number of person close contacts, history of medical illness, ever cigarette smoking, current cigarette smoking, ever chewing chat, and current chewing chat. However, in the multivariable analysis number of people in close contact, history of medical illness, and being ever smoker were significantly affected anxiety. Study participants with a history of close contact with 1–2 people had 2.3 (AOR=2.3, 95% CI: 1.01–5.19) higher odds of anxiety than those with a history of no close contact. The odds of anxiety among participants with a history of medical illness were 2.3 times (AOR=2.3, 95% CI: 1.42–3.76) that of those without a history of medical illness. The odds of anxiety among respondents with a history of lifetime cigarette smoking were 2.8 times (AOR=2.8, 95% CI: 1.23–6.43) that of respondents without a history of cigarette smoking (Table 6).

Factors Associated with Stress Among Gondar Town Adult Population

In the bivariate analysis age, marital status, religion, occupation, family size, history of medical illness, ever cigarette smoking, current cigarette smoking, ever chat chewing, and current chat chewing. The odds of stress among individuals with the occupation of unemployed were 2.1 times (AOR=2.1, 95% CI: 1.17–3.83) higher than governmental employees. Respondents with a family size of less than five were 1.8 times (AOR=1.8, 95% CI: 1.09–2.81) that of those with a family size of five or more. Study participants with a history of medical illness had 2.2 times (AOR=2.2, 95% CI: 1.24–3.89) higher odds of stress than those without a history of medical illness (Table 7).

Discussion

In this study, nearly one-third (32.0%), about a quarter (25.8%), and one in every seventh study participants had depression, anxiety, and stress, respectively. Being female and ever smoking negatively affect depression. On the other hand, a history of medical illness, the number of people in close contacts between 1 and 2, and ever smoking are contributing factors for anxiety. Moreover, unemployment, having < 5 family sizes, and having a history of medical illness were the main contributing factors for stress.

Table 5 Factors Affecting Depression During COVID-19 Pandemic Among Gondar Town Population, Northwest Ethiopia, 2020 (N=660)

Variable	Depression		COR 95% CI	AOR 95% CI
	Yes	No		
Sex				
Male	79	192	1	1
Female	132	257	1.2 (0.89–0.74)	81.7 (1.14–2.51)
Age in years				
<26	47	102	1	1
26–60	149	328	0.9 (0.7–1.46)	0.9 (0.59–1.48)
≥61	15	19	1.7 (0.80–3.6)	1.9 (0.79–4.65)
Marital status				
Married	96	250	1	1
Single	84	161	1.4 (0.95–1.93)	1.5 (0.98–2.22)
Widowed and divorced	31	38	2.1 (1.25–3.60)	1.7 (0.95–3.00)
Family size				
<5	127	235	1.4 (0.98–1.91)	1.2 (0.87–1.78)
≥5	84	213	1	1
Number of people in dose contact				
0	17	30	1	1
1–2	87	126	1.2 (0.63–2.34)	1.5 (0.77–3.10)
3–5	70	158	0.8 (0.40–1.51)	1.0 (0.49–1.98)
>5	37	135	0.5 (0.24–0.97)	0.6 (0.30–1.33)
Ever smoke				
Yes	29	17	4.0 (2.17–7.55)	2.8 (1.23–6.28)
No	182	432	1	1
Current cigarette smoking				
Yes	19	12	3.6 (1.71–7.57)	1.5 (0.57–3.89)
No	192	437	1	1
Ever drink alcohol				
Yes	109	158	2.0 (1.41–2.74)	1.2 (0.70–2.06)
No	102	291	1	1
Current drink alcohol				
Yes	84	112	2.0 (1.40–2.82)	1.6 (0.90–2.76)
No	127	337		1
Ever chew khat				
Yes	35	43	1.9 (1.16–3.03)	1.2 (0.58–2.34)
No	176	406	1	1
Current chew khat				
Yes	20	25	1.8 (0.96–3.27)	1.4 (0.57–3.20)
No	191	424	1	1

In the current study, about one in every three study participants had depression. This finding is higher than the study from India which showed that 25% of study participants were depressed.[20] The possible reason could be in the former study more than half (54%) of study participants were under the age of 25 years. Pieces of evidence suggest that age causes body changes that increased the occurrence of depression[21] and an increase in age is highly correlated with low physical exercise that triggered the development of depression.[22,23] The second

Table 6 Factors of Anxiety During COVID-19 Pandemic Among Gondar Town Community, Northwest Ethiopia, 2020 (N=660)

Variable	Anxiety		COR 95% CI	AOR 95% CI
	Yes	No		
Age in years				
<26	32	117	1	1
26–60	122	355	1.3 (0.81–1.95)	1.2 (0.72–1.99)
≥61	16	18	3.3 (1.49–7.08)	1.8 (0.72–4.65)
Marital status				
Married	88	258	1	1
Single	57	188	0.9 (0.61–1.30)	1 (0.66–1.61)
Widowed and divorced	25	44	1.7 (0.96–2.9)	1.5 (0.81–2.68)
Religion				
Orthodox	137	415	1	1
Muslim	27	55	1.5 (0.90–2.5)	1.5 (0.82–2.59)
Others*	6	20	0.9 (0.36–2.31)	0.9 (0.34–2.4)
Occupation				
Unemployed	95	229	1.3 (0.90–2.0)	1.4 (0.83–2.21)
Government employed	48	155	1	1
Private employed	27	106	0.8 (0.48–1.4)	0.7 (0.39–1.36)
Educational status				
Unable to read and write	22	48	1.5 (0.83–2.6)	1.1 (0.56–2.17)
Able to read and write	23	78	0.9 (0.55–1.6)	0.8 (0.42–1.44)
Primary education	51	127	1.3 (0.85–1.9)	1.2 (0.76–0.98)
Secondary and above	74	237	1	1
Number of people close contact				
0	10	37	1	1
1–2	65	148	1.6 (0.76–3.5)	2.3 (1.01–5.19)
3–5	52	176	1.1 (0.51–2.4)	1.5 (0.65–3.42)
>5	43	129	1.2 (0.57–2.7)	1.6 (0.71–3.82)
History of medical illness				
Yes	45	61	2.5 (1.64–3.9)	2.3 (1.42–3.76)
No	125	429	1	1
Ever smoke				
Yes	24	22	3.5 (1.90–6.4)	2.8 (1.23–6.43)
No	146	468	1	1
Current cigarette smoking				
Yes	15	16	2.9 (1.39–5.9)	1.4 (0.54–3.63)
No	155	474	1	1
Ever chew khat				
Yes	29	49	1.9 (1.1–3.0)	1.1 (0.51–2.23)
No	141	441	1	
Current chewing khat				
Yes	17	28	1.8 (0.98–3.44)	1.2 (0.53–0.95)
No	153	462	1	

Note: *Catholic and protestant.

Table 7 Factors Affecting Stress During COVID-19 Pandemic Among Gondar Town Population, Northwest Ethiopia, 2020 (N=660)

Variable	Stress		COR 95% CI	AOR 95% CI
	Yes	No		
Age in years				
<26	17	132	1	1
26–60	70	407	1.3 (0.76–2.35)	1.2 (0.64–2.30)
≥61	10	24	3.2 (1.32–7.91)	1.6 (0.55–0.73)
Marital status				
Married	49	297	1	1
Single	31	214	0.9 (0.54–1.42)	0.9 (0.56–1.69)
Widowed and divorced	17	52	2 (1.06–3.70)	1.6 (0.80–3.09)
Religion				
Orthodox	76	476	1	1
Muslim	15	67	1.4 (0.76–2.58)	1.1 (0.54–2.22)
Others*	6	20	1.9 (0.73–4.82)	2.1 (0.80–5.75)
Occupation				
Unemployed	6	268	1.8 (1.06–0.09)	2.1 (1.17–3.83)
Government employed	21	182	1	1
Private/self-employee	20	113	1.5 (0.80–2.95)	1.7 (0.83–3.40)
Family size				
<5	60	302	1.4 (0.90–2.17)	1.8 (1.09–2.81)
≥5	37	260	1	1
History of medical illness				
Yes	27	79	2.4 (1.42–3.9)	2.2 (1.24–3.89)
No	70	484	1	1
Ever smoke				
Yes	15	31	3.1 (1.62–6.07)	1.6 (0.65–4.11)
No	82	532	1	
Current cigarette smoking				
Yes	11	20	3.5 (1.61–7.50)	2.3 (0.82–6.47)
No	86	543	1	1
Ever chew khat				
Yes	21	57	2.5 (1.41–4.27)	2.0 (0.90–4.65)
No	76	506	1	
Current chewing khat				
Yes	11	34	2.0 (0.97–4.07)	1.0 (0.38–2.72)
No	86	529	1	

Note: *Catholic and protestant.

reason could be in the former study more than 86% of study participants attained at least graduate-level study. This finding is fostered by a randomized controlled trial that showed behavioral and education therapy has a significant role in improving the health status of the participants and minimize the burden of depression.[24] However, in the current study, only small proportion of respondents attained education. Besides, the current finding is higher than the study from Spain (18.7%). The possible explanation could be in the previous study depression was measured within 1 week preceding the survey and used Impact of Events Scale-Revised (IES-R) tool which is a 22-item self-administered questionnaire.[25] However, in the recent study depression was measured using the DASS-21 tool within weeks preceding the survey. According to works of literature using DASS-21 is

a more appropriate and measuring depression with a sensitivity and specificity of 86% and 64%, respectively.[26] In contrast, the IES-R tool is mainly recommended in people experiencing trauma and less frequently advisable in assessing depression without a crisis.[27]

In this study, one in every fourth respondent had anxiety. This finding is consistent with a study from China (24%)[28] and Mexico 22.6%.[29] In contrast, this finding is lower than a study done from the United States which showed that 45.4% of participants had anxiety. The difference is attributed to a measurement difference. In the former study, Generalized Anxiety Disorder-7 (GAD-7) was used and in the current study, DASS-21 was used. Evidence spotted out GAD-7 is an appropriate and valid tool for measuring anxiety among students, but its use in health care and research is limited.[30] On the other hand, the current study is higher than the study done in Jordan, only 8% of the general population had anxiety symptoms.[31] The possible variation could be the use of different tools in which the former study used GAD-7 and the current study used DASS-21 for measuring anxiety.

Nearly 15% of the study participants had stress in the current study. This finding is lower than a study from Spain which showed that 41% of study participants had stress.[25] This could be Spain was the second most affected country during the early phase of the pandemic at the end of February 2020 by case and death. However, the disease does not spread across the globe and it introduced to Ethiopia since March 4. On the other hand, this finding is higher than a study from the general population in India which showed that 11% of the population had stress.[20]

Being female increased the odds of depression compared to male counterparts. This finding is in agreement with a study done among the general population in Mexico[29] and China.[17] This might be because females are more likely to develop depression due to the intersect effect of genetic, biological, hormonal, social, and psychological factors.[32] The second reason could be the presence of androgen receptors in males that may give protection,[33] and testosterone hormone does not cycle as estrogen in women that has also a protection in males. Besides, in the male brain testosterone is converted into estrogen that mediates protective actions through estrogen receptors.[34]

Moreover, smokers were at higher odds of developing depression and anxiety than non-smokers. This finding is supported by a study from Australia.[35] This is because smokers are at higher risk of developing respiratory problems like lung cancer and Chronic Obstructive Pulmonary Disease (COPD) that worsen the effect of COVID-19. Consequently, they will develop depression and anxiety. Besides, it is due to the fact that smoking reduces the dopamine hormone released in the brain that triggers happiness or pleasure.[36,37] Hence, they become easily depressed and it gives a clue to offer proper support for these vulnerable populations to minimize its burden.

Having more number of close contacts was associated with higher odds of anxiety than having no contact. This finding is concurrent with a study from Mexico.[29] This could be because of possible misinformation or information overload when there was a large number of close contacts.[38] Likewise, more close contact increases the likelihood of exposing the deadly virus. Therefore, it is highly recommended to apply precaution measures like social distancing, frequent hand washing, using masks, and sanitizer.

In this study, unemployed study participants were at higher odds of developing stress. This could be because unemployment causes financial crises due to the national lockdown and family members may be unable to cover all the expenses. A piece of evidences suggest that family economic status negatively affects mental health status.[39] Besides, the finding from Spain noted that because of unemployment, economic crises was the most common cause of suffering that causes stress.[25]

In this study, participants with chronic diseases had higher odds of anxiety and stress than the counterparts. This finding is in line with a study conducted in Israel,[40] Spain,[26] and Greek.[27] This is because patients with chronic diseases have an increased risk of complications and mortality from COVID-19.[41] As a result, patients with chronic diseases are getting anxious and stressed. Hence, it is good to provide psychological support, particularly to vulnerable groups to halt the psychological effect and to keep the adherence to their treatment for the chronic diseases as well.

This finding can be generalized to the Gondar town population. However, it has the following limitations. The first one is the finding was conducted in Gondar town only and may not be generalized to the whole of Ethiopia and other low- and middle-income countries. Secondly, it lacks the temporal relationships between the exposure and outcome variables because of the cross-sectional nature of the data. Finally, the self-reported nature of the questionnaires administered and the lack of information about substance use, other than alcohol, khat and smoke were the other limitations of this study.

The findings of this study have paramount importance to the public and clinical setups. In this study, magnitude and factors affecting depression, anxiety, and stress were well spotted. Hence, persons with the problem will identify early which is helpful to get early treatment. Besides, the finding of the study highlighted the need to improve mental health care planning, treatment, and design preventive measures.

Conclusion

In this study, the overall depression, anxiety, and stress were significantly high. There are number of predictors associated with depression, anxiety, and stress. Designing and implementing tailored strategies with COVID-19 prevention and control could be supremely important to reduce these problems in the community.

Abbreviations

AOR, adjusted odds ratio; BSc, Bachelor of Science; CI, confidence interval; COVID-19, coronavirus disease 19; COR, crude odds ratio; DASS-21, Depression Anxiety Stress scale; IES-R, Impact of Events Scale-Revised; GAD-7, Generalized Anxiety Disorder; IQR, interquartile range; WHO, World Health Organization.

Data Sharing Statement

Data will be available upon request from the corresponding author.

Ethical Approval and Consent to Participate

Ethical approval was obtained from the institutional review board of the University of Gondar. Similarly, we got permission from the regional health authorities to conduct this study in the community. Verbal informed consent was approved by the Institutional Review Board of the University of Gondar, and that this study was conducted in accordance with the Declaration of Helsinki. Verbal informed consent was taken after describing the purpose of the research briefly; those individuals who refused to participate were excluded. Sanitizer and surgical face masks were used to prevent from COVID-19 infection. The confidentiality of the study participants was protected.

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Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.

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Disclosure

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Anxiety, depression, traumatic stress and COVID-19-related anxiety in the UK general population during the COVID-19 pandemic

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Background

The COVID-19 pandemic has created an unprecedented global crisis, necessitating drastic changes to living conditions, social life, personal freedom and economic activity. No study has yet examined the presence of psychiatric symptoms in the UK population under similar conditions.

Aims

We investigated the prevalence of COVID-19-related anxiety, generalised anxiety, depression and trauma symptoms in the UK population during an early phase of the pandemic, and estimated associations with variables likely to influence these symptoms.

Method

Between 23 and 28 March 2020, a quota sample of 2025 UK adults aged 18 years and older, stratified by age, gender and household income, was recruited by online survey company Qualtrics. Participants completed standardised measures of depression, generalised anxiety and trauma symptoms relating to the pandemic. Bivariate and multivariate associations were calculated for demographic and health-related variables.

Results

Higher levels of anxiety, depression and trauma symptoms were reported compared with previous population studies, but not dramatically so. Anxiety or depression and trauma symptoms were predicted by young age, presence of children in the home, and high estimates of personal risk. Anxiety and depression were also predicted by low income, loss of income and pre-existing health conditions in self and others. Specific anxiety about COVID-19 was greater in older participants.

Conclusions

This study showed a modest increase in the prevalence of mental health problems in the early stages of the pandemic, and these problems were predicted by several specific COVID-related variables. Further similar surveys, particularly of those with children at home, are required as the pandemic progresses.

Keywords

COVID-19 pandemic; anxiety; depression; traumatic stress; UK general population survey.

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) was first detected in Wuhan, China, on 31 December 2019. The disease it causes has been named COVID-19. The first UK coronavirus case was confirmed on 31 January 2020, and on 11 March 2020 the World Health Organization declared the global spread of COVID-19 to be a pandemic. Since then there have been rapidly increasing cases and deaths associated with the virus globally and in the UK. On the evening of 23 March 2020, the UK Prime Minister announced extensive restrictions on freedom of movement, the closure of non-essential businesses and the requirement to stay at home except for limited purposes. The mental health consequences for the population of an existential threat on the scale of the current pandemic, and of the associated restrictions on movement and social gatherings, are not well understood. There has been research on the psychological effects of other infectious respiratory diseases (IRDs) such as SARS, the H1N1 flu pandemic and MERS. However, with a few exceptions, which are mostly from the far east and have focused largely on anxiety and its influence on risk perception and health behaviours rather than mental health more broadly,[1,2] these studies have predominantly considered healthcare workers[3,4] and patients.[5] This absence of knowledge is troubling because there is plausible evidence from modelling that emotional and behavioural responses to a pandemic may affect its course,[6] and because the burden of population mental ill-health may have implications for resources during the pandemic and national recovery afterwards. In 2003, the Canadian National Advisory Committee on SARS and Public Health,[7] proposed that a 'systemic perspective', which focused not only on medical staff and patients but also on the general population, should be prioritised by all those engaged in IRD psychosocial research. A similar approach was advocated in a recent UK expert panel convened by the Academy of Medical Sciences and the mental health research charity MQ.[8]

Here, we report initial findings from the first wave of a longitudinal, multi-wave survey of the social and psychological effects of COVID-19 on the UK population, conducted by researchers in seven UK and Irish universities (the COVID-19 Psychological Research Consortium).[9] Of note, in a mirror study with similar methodology, we recently reported the social and psychological effects of COVID-19 on the population of the Republic of Ireland.[10] The primary aim of this study was to assess the levels of anxiety, depression and traumatic stress, based on validated self-report measures, in a large, representative community sample during an early stage of the pandemic, between 23 and 28 March 2020. Based on the scant previous studies[11] and given the dramatic restrictions imposed because of COVID-19, we expected higher levels of common psychological and stress symptoms compared with previous population estimates. Our secondary aim was to identify groups that are psychologically vulnerable during the pandemic, by assessing the relationship between levels of anxiety, depression

and traumatic stress and (a) age; (b) household income; (c) economic threat due to COVID-19; (d) health-related risk factors (being male, self or close friend or relative having a pre-existing serious health condition); (e) COVID-19 infection status; (f) anxiety specifically related to COVID-19; (g) perceived risk of COVID-19 infection; (h) living in an urban area; (i) living as a lone adult and (j) living with children in the home.

Method

Recruitment and participants

Data collection started on 23 March 2020, 52 days after the first confirmed COVID-19 case in the UK and on the same day that the UK Prime Minister announced at 8.30 pm the 'lockdown' that required all people in the UK to stay at home except for very limited purposes, and was completed on 28 March 2020. The fieldwork was conducted by the survey company Qualtrics. The UK adult population aged 18 years and older was the target population, and quota sampling methods were used to ensure that the sample was representative of this population in terms of age and gender, based on 2016 population estimates from Eurostat, and household income based on the 2017 Office for National Statistics household income bands. Qualtrics provides an online platform to securely house data and leverages partners to connect with potential participants who could have been alerted to the study in one of two ways: (a) they opted to enter studies they were eligible for themselves by signing up to a panel platform; or (b) they received automatic notification through a partner router which alerted them to studies for which they were eligible (via email, SMS or in-app notifications). Importantly, to avoid self-selection bias, survey invitations to eligible participants only provided general information and did not include specific details about the contents of the survey. Participants were required to be an adult (aged 18 years or older), able to read and write in English, and a resident of the UK. No other exclusion criteria were applied. Panel members were not obliged to take part in the study.

For purposes of quota sampling for age, gender and household income, Qualtrics proceeded as follows during the 6 days of fieldwork: (a) respondents in 'hard to reach' quota groups (e.g. young adults in the highest income bands) were prioritised and targeted first; (b) next, the focus shifted to allow the quotas to 'fill up' naturally, without specific targeting; and (c) finally, a switch back to targeting respondents to fill incomplete quotas ensued. Participants followed a link to a secure website and completed all surveys online. The invite link was active for a participant until a quota they would have qualified for was reached but after the quota was filled; previously eligible respondents were prevented from taking part in this study. Participants were informed about the purpose of the study, that their data would be treated in confidence, that geolocation would be used to determine the area in which they lived, and of the right to terminate the study at any time without giving a reason. All participants provided informed consent prior to completing the survey and were directed to contact the National Health Service 111 COVID-19 helpline at the end of the survey if they experienced any distress or had additional concerns about COVID-19. Ethical approval for the study was granted by the ethical review board of Sheffield University (the reference number for ethical approval is 033759).

Qualtrics employed checks to identify and remove potential duplicate respondents or any participants who completed the survey in less than the minimum completion time (half the median time of the 'soft-launch' with 50 participants) to ensure responses were trustworthy. The pre-recruitment quotas were achieved with a high level of accuracy; the quotas were obtained to within 1% for gender, 0.1–0.6% for age bands and 0.25–1% for household income bands. The 2014 Adult Psychiatric Morbidity Survey in England estimated the rate of post-traumatic stress disorder (PTSD) to be 4.4%;[12] this was lower than the rates for anxiety and depression. To detect a disorder with a prevalence of 4%, with precision of 1% and a 95% confidence level, a sample size of 1476 was required. However, estimating the prevalence of disorders with a low prevalence (<5%) may result in a small number of 'cases' being identified. For instance, a sample size of 1476 and prevalence of 4% will identify approximately 60 cases and, if follow-up analyses are based only on these cases, tests may be underpowered. To detect a correlation of 0.30, with alpha = 0.05 and power of 0.80, 84 cases are required (or an overall sample size of 2100). As a compromise between ensuring adequate sampling to reliably estimate prevalence and adequate power for subgroup analysis, a target sample size of 2000 participants was set.

Given the dual processes used by Qualtrics and partners to recruit respondents to quotas, it was not possible to determine the number of survey invitations that were distributed to panel members, or indeed the number of panellists who were alerted to the survey and who did or did not complete the survey (i.e. the response rate). Qualtrics did provide some metrics for the study, as follows: 159 respondents did not provide full informed consent and were screened out; 35 respondents who completed the survey from outside the UK or were aged under 18 years were also screened out; and, to ensure responses were trustworthy, 77 participants who completed the survey in less than the minimum completion time were removed, as were 64 potential duplicate respondents. This resulted in a sample of 2025 participants who completed the survey over 6 days of fieldwork.

Subsequent checks ensured that the participants were also representative of the population in terms of voting history, number of people in household and other important demographic characteristics.[9]

Participants were recruited from the four countries of the UK, proportional to their relative population sizes: England (86.9%), Wales (3.1%), Scotland (7.8%), Northern Ireland (2.3%). The mean age of the sample was 45.44 years (median = 45.00, s.d. = 15.90, range 18–83), and 51.7% ($n = 1047$) were female, 48.0% were male ($n = 972$) and 0.3% ($n = 6$) checked the transgender/prefer not to say/other option. Most reported that they were born in the UK (90.6%, $n = 1834$) and grew up (spent most of their life up to 16 years of age) in the UK (92.4%, $n = 1872$). Participants reported their ethnicity as follows: White British/Irish ($n = 1732$, 85.5%), White non-British/Irish ($n = 116$, 5.7%), Indian ($n = 41$, 2.0%), Pakistani ($n = 27$, 1.3%), Chinese ($n = 19$, 0.9%), other Asian/African–Caribbean/African/Arab/Bangladeshi/Other ($n = 90$, 4.30%). Regarding participants' highest level of educational achievement, 19.0% ($n = 385$) had completed O-Level/GCSE or similar, 18.1% ($n = 366$) had completed A-Level or similar, 28.2% ($n = 572$) had completed an undergraduate degree and 15.6% ($n = 316$) had completed a postgraduate degree, with 19.1% ($n = 386$) reporting no qualifications, diploma, other qualifications or technical qualification. Nearly half of the respondents were in full-time employment (48.8%, $n = 988$), 15.0% ($n = 303$) were in part-time employment, 16.5% ($n = 334$) were retired, 4.7% ($n = 95$) were students, 5.1% ($n = 103$) were currently unemployed and seeking work, 3.4% ($n = 69$) were not working owing to disability, and 6.6% ($n = 133$) were unemployed and not seeking work.

Measures

Demographic

Self-reported gender and age were recorded, and age was also categorised into a six-level variable for the regression analysis.

Living area

Participants were asked 'Do you consider yourself to live in:' and were required to choose one of the options provided: 'City', 'Suburb', 'Town' or 'Rural'.

Lone adult: Participants were asked 'How many adults (18 years or above) live in your household (including yourself)?' and were provided with options ranging from '1' to '10 or more'. The data were recoded into a binary variable to represent living alone.

Children

Participants were asked 'How many children (below the age of 18) live in your household?' and were provided with options ranging from '1' to '10 or more'. The scores were categorised into four groups (0, 1, 2, 3 or more children).

Income

Participants were asked 'Please choose from the following options to indicate your approximate gross (before tax is taken away) household income in 2019 (last year). Include income from partners and other family members living with you and all kinds of earnings including salaries and benefits' and to choose one of five categories: '£0–£300 per week (equals about £0–£1290 per month or £0–15 490 per year)', '£301–£490 per week (equals about £1291–£2110 per month or £15 491–£25 340 per year)', '£491–£740 per week (equals about £2111–£3230 per month or £25 341–£38 740 per year)', '£741–£1111 per week (equals about £3231–£4830 per month or £38 741–£57 930 per year)' and '£1112 or more per week (equals about £4831 or more per month or £57 931 or more per year)'.

Loss of income

Participants were asked 'Some people have lost income because of the coronavirus COVID-19 pandemic, for example because they have not been able to work as much or because business contracts have been cancelled or delayed. Please indicate whether your household has been affected in this way', and the response options were 'My household has lost income because of the coronavirus COVID-19 pandemic', 'My household has not lost income because of the coronavirus COVID-19 pandemic, and 'I do not know whether my household has lost income because of the coronavirus COVID-19 pandemic'. The first option was considered as 'Yes' (1) and the other options were collapsed to represent 'No'.

Health problems

Participants were asked 'Do you have diabetes, lung disease, or heart disease?', and the response options were 'Yes' (1) and 'No' (0). They were also asked 'Do any of your immediate family have diabetes, lung disease, or heart disease?', and the response options were 'Yes' (1) and 'No' (0).

COVID-19 status, self and other

Participants were asked 'Have you been infected by the coronavirus COVID-19?', and six responses were provided. These were collapsed into a binary variable representing 'Perceived infection status'. Positive perceived infection status was based on the selection of either, 'I have the symptoms of the COVID-19 virus and think I may have been infected' or 'I have been infected by the COVID-19 virus and this has been confirmed by a test'. Negative perceived infection status was based on the selection of either, 'No. I have been tested for COVID-19 and the test was negative', 'No, I do not have any symptoms of COVID-19', 'I have a few symptoms of cold or flu but I do not think I am infected with the COVID-19 virus' or 'I may have previously been infected by COVID-19 but this was not confirmed by a test and I have since recovered'. Positive status (self) was coded '1' and negative status was coded as '0'.

Participants were also asked 'Has someone close to you (a family member or friend) been infected by the coronavirus COVID-19?', and four responses were provided. These were collapsed into a binary variable representing 'Perceived infection status – someone close'. Positive perceived infection status was based on the selection of either, 'Someone close to me has symptoms, and I suspect that person has been infected' or 'Someone who is close to me has had a COVID-19 virus infection confirmed by a doctor'. Negative perceived infection status was based on the selection of either, 'No' or 'Someone close to me has symptoms, but I am not sure if that person is infected'. Positive status (other) was coded '1' and negative status was coded as '0'.

Perceived risk of COVID-19 infection

Participants were asked 'What do you think is your personal percentage risk of being infected with the COVID-19 virus over the following time periods?', and three sliders were presented, one for each time period: (1) 'In the next month', (2) 'In the next three months', (3) 'In the next six months'? The slider had '0' and '100' at the left- and right-hand extremes, respectively, with 10 point increments, and the labels 'No Risk', 'Moderate Risk' and 'Great Risk' were shown on the left-hand, middle and right-hand parts of the scale, respectively. These produced continuous scores for each time period, ranging from 0 to 100, with higher scores reflecting higher levels of perceived risk of being infected by COVID-19. The scores were recoded into 'low' (0–33), 'moderate' (34–67) and 'high' (68–100).

Depression

Nine symptoms of depression were measured using the Patient Health Questionnaire-9 (PHQ-9).[13] Participants indicated how often they had been bothered by each symptom over the past 2 weeks using a four-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Possible scores ranged from 0 to 27, with higher scores indicative of higher levels of depression. To identify participants likely to meet the criteria for depressive disorder, a cut-off score of 10 was used. This cut-off produces adequate sensitivity (0.85) and specificity (0.89), corresponds to 'moderate' levels of depression[14] and is used to identify a level of depression that may require psychological intervention.[15] The psychometric properties of the PHQ-9 scores have been widely supported, and the reliability of the scale among the current sample was excellent ($\alpha = 0.92$).

Generalised anxiety

Symptoms of generalised anxiety were measured using the Generalized Anxiety Disorder 7-item Scale (GAD-7).[16] Participants indicated how often they had been bothered by each symptom over the past 2 weeks on a four-point Likert scale (0 = Not at all, to 3 = Nearly every day). Possible scores ranged from 0 to 21, with higher scores indicative of higher levels of anxiety. A cut-off score of 10 was used; this has been shown to result in sensitivity of 89 % and a specificity of 82 %.[16] The GAD-7 has been shown to produce reliable and valid scores in community studies,[17] and the reliability in the current sample was high ($\alpha = 0.94$).

Traumatic stress

The International Trauma Questionnaire (ITQ)[18] is a self-report measure of ICD-11 PTSD based on a total of six symptoms across the three symptom clusters of re-experiencing, avoidance and sense of threat: each symptom cluster comprises two symptoms. Participants were asked to complete the ITQ '… in relation to

your experience of the COVID-19 pandemic. Please read each item carefully, then select one of the answers to indicate how much you have been bothered by that problem in the past month'. The PTSD symptoms are accompanied by three items measuring functional impairment caused by these symptoms. All items are answered on a five-point Likert scale, ranging from 0 (not at all) to 4 (extremely), with possible scores ranging from 0 to 24. A score of ≥2 (moderately) is considered 'endorsement' of that symptom. A PTSD diagnosis requires traumatic exposure and at least one symptom to be endorsed from each PTSD symptom cluster (re-experiencing, avoidance and sense of threat), and endorsement of at least one indicator of functional impairment. The psychometric properties of the ITQ scores have been demonstrated in multiple general populations[19,20] and in clinical and high-risk samples.[21,22] The reliability of the PTSD items was high (α = 0.93).

COVID-19-related anxiety

The survey included a question 'How anxious are you about the coronavirus COVID-19 pandemic?', and the participants were provided with a 'slider' (electronic visual analogue scale) to indicate their degree of anxiety with '0' and '100' at the left- and right-hand extremes, respectively, and 10 point increments. This produced continuous scores ranging from 0 to 100, with higher scores reflecting higher levels of COVID-19-related anxiety. The scores were recoded into quintiles, and the upper quintile was considered to be indicative of 'COVID-19 anxiety'.

Similar recruitment strategies and measures have been used by international collaborators in other countries, including Ireland,[10] Italy, Spain, Saudi Arabia and the United Arab Emirates.

Analysis plan

The analyses were conducted in three linked phases. First, the prevalences of generalised anxiety, depression and traumatic stress were estimated using the established cut-off scores. Second, the bivariate associations between the predictor variables and the mental health variables were calculated using logistic regression, and the associations were reported as odds ratios (ORs) with 95 % confidence intervals. Third, all predictor variables were entered simultaneously into multivariate binary logistic regression models to estimate the unique effect of each predictor variable, and the associations were reported as ORs.

Results

Based on the cut-off scores for the GAD-7 and the PHQ-9, the prevalence of depression was 22.1 % (95 % CI 20.3–23.9 %) and that of anxiety was 21.6 % (95 % CI 19.8–23.4 %). There was no significant difference between prevalence of depression for males and females (χ^2 (1) = 2.34, P = 0.12), but significantly more females (25.1 %) screened positive for anxiety than males (17.9 %: χ^2 (1) = 15.48, P < 0.001). A variable was computed to represent participants who screened positive for the most common mental health disorders (anxiety/depression), either anxiety or depression; the prevalence for this was 27.7 % (95 % CI 25.8–29.7 %), and the prevalence was higher for females (31.7 %) than for males (23.4 %: (χ^2 (1) = 17.57, P < 0.001). Using the diagnostic algorithm for the ITQ, the prevalence of traumatic stress was 16.79 % (95 % CI 15.2–18.4 %). There was a significant gender difference, with a higher prevalence of traumatic stress for males (18.9 %) compared with females (14.9 %: χ^2 (1) = 5.85, P < 0.01). The COVID-19 anxiety prevalence was 21.3 % (95 % CI 19.5–23.1 %), and there was a significant gender difference, with a higher prevalence of COVID-19 anxiety for females (24.6 %) compared with males (17.7 %: χ^2 (1) = 5.85, P < 0.01).

Three binary logistic regression models were used to predict caseness on COVID-19-related anxiety, anxiety/depression and traumatic stress. The predictor variables were age, gender, living location, lone adult status, number of children, income, loss of income, pre-existing health condition (self and other), COVID-19 infection status (self and other) and personal risk of infection over the following month.

Table 1 shows the findings for COVID-19-related anxiety, stratified by the predictor variables, with bivariate associations (unadjusted) presented as ORs, and ORs from the multivariate (adjusted) model with all predictors entered. The multivariate model was significant (χ^2 (24) = 139.97, P < 0.001). When the unadjusted ORs were calculated, only female gender, the presence of children in the household and estimates of personal risks of infection were predictive of COVID-related anxiety. However, when the adjusted effects were calculated, the effect for the presence of children became stronger; there was an effect for history of infection, which should be interpreted with caution in the light of the small numbers involved; and there was a very strong effect for age, with older participants reporting more anxiety about the virus.

The multivariate regression models for both anxiety/depression (χ^2 (24) = 292.03, P < 0.001), and traumatic stress (χ^2 (24) = 328.58, P < 0.001) were statistically significant; the unadjusted and adjusted ORs are shown in Tables 2 and 3. For anxiety/depression, there was a strong effect for age, contrary to the effect observed for COVID-related anxiety, with very high levels of psychological symptoms in the youngest participants and low levels in those over 65 years of age. A bivariate effect for urban location did not survive in the multivariate model, and the effect of having children in the house was much muted in the multivariate model. Participants who had lost income in the pandemic and those in the lower-income categories showed markedly higher risk for anxiety/depression. Higher levels of anxiety/depression were also reported by those who had pre-existing health conditions, knew someone who had a pre-existing health condition, had become infected themselves, and/or gave a high estimate of their personal risk of infection.

Finally, in the case of traumatic stress, there was again a higher prevalence in younger participants, but the gender effect was reversed compared with anxiety/depression, with more symptoms being reported by males. The influence of the presence of children was marked for both the bivariate associations and the multivariate model, but there was little effect for income or loss of income when other variables were controlled for. The lack of an association for being infected by COVID-19 in the multivariate model should be interpreted with caution, given the small numbers involved and the wide confidence intervals. Trauma symptoms were also associated with the perception of a high risk of infection.

Discussion

This study was one of the first to measure psychological disorders in a representative sample of the UK population during a pandemic. The study had the additional virtues of recruiting participants early in the crisis and using standardised measures, allowing follow-up at later stages. We found higher levels of anxiety, depression and traumatic stress than those previously reported by general population-based studies. Although previous studies have investigated the psychological effects of past pandemics, particularly the SARS and H1N1 pandemics in the far east, they mostly considered the effects on pandemic survivors and health professionals, and the only population-based studies did not use standardised instruments. For example, a study in Taiwan following the 2003 SARS pandemic used a five-item symptom-rating scale, and found that poorer mental health was related to personal experience of SARS

Table 1 Bivariate and multivariate binary logistic regression results predicting COVID-related anxiety

		COVID-19 anxiety		
	N	*N* (%)	Unadjusted OR	Adjusted OR
Age				
18–24	246	42 (17.1 %)	–	–
25–34	380	66 (17.4 %)	1.02 (0.667–1.56)	0.93 (0.59–1.46)
35–44	353	75 (21.2 %)	1.31 (0.86–1.99)	1.40 (0.88–2.21)
45–54	410	96 (23.4 %)	1.48 (0.99–2.22)	1.99 (1.28–3.07)**
55–64	349	84 (24.1 %)	1.54 (1.02–2.33)*	2.58 (1.63–4.08)***
65+	287	68 (23.7 %)	1.51 (0.98–2.32)	2.42 (1.50–3.91)***
Gender				
Female	1047	258 (24.6 %)	–	–
Male	972	172 (17.7 %)	0.65 (0.53–0.82)***	0.586 (0.463–0.743)***
Living location				
Rural	335	74 (22.1 %)	–	–
Town	620	130 (21.0 %)	0.94 (0.68–1.29)	0.92 (0.65–1.29)
Suburb	572	106 (18.5 %)	0.80 (0.57–1.12)	0.77 (0.54–1.09)
City	498	121 (24.3 %)	1.13 (0.81–1.57)	1.20 (0.84–1.71)
Lone adult				
No	1571	337 (21.5 %)	–	–
Yes	454	94 (20.7 %)	0.96 (0.740–1.24)	0.971 (0.716–1.317)
Children				
0	1429	283 (19.7 %)	–	–
1	292	56 (19.1 %)	0.96 (0.70–1.32)	1.09 (0.77–1.55)
2	237	73 (30.7 %)	1.80 (1.33–2.44)***	2.11 (1.49–2.98)***
3+	61	19 (31.1 %)	1.84 (1.05–3.21)*	2.35 (1.29–4.28)**
Income				
£57 930+	410	77 (18.8 %)	–	–
−£57 930 pa	410	86 (21.0 %)	1.15 (0.81–1.62)	1.15 (0.80–1.65)
−£38 740 pa	385	88 (22.9 %)	1.28 (0.91–1.81)	1.40 (0.97–2.03)
−£25 340 pa	410	86 (21.0 %)	1.15 (0.82–1.62)	1.37 (0.94–2.02)
£0–15 490 pa	410	94 (22.9 %)	1.29 (0.92–1.80)	1.30 (0.881–1.92)
Lost income				
Not lost	1377	282 (20.5 %)	–	–
Lost	648	149 (23.0 %)	1.16 (0.93–1.45)	1.18 (0.93–1.51)
Pre-existing health condition, self				
No	1714	348 (20.3 %)	–	–
Yes	311	83 (26.7 %)	1.43 (1.08–1.89)*	1.24 (0.91–1.69)
Pre-existing health condition, someone close				
No	1510	305 (20.2 %)	–	–
Yes	515	126 (24.5 %)	1.28 (1.01–1.62)*	1.07 (0.82–1.39)
COVID-19, self				
No	1977	425 (21.5 %)	–	
Yes	48	6 (12.5 %)	0.52 (0.22–1.23)	0.39 (0.16–.99)*
COVID-19, someone close				
No	1913	407 (21.3 %)	–	–
Yes	112	24 (21.4 %)	1.01 (0.63–1.61)	0.89 (0.54–1.45)
Personal risk 1 month				
Low	633	81 (12.8 %)	–	
Moderate	867	182 (21.0 %)	1.81 (1.36–2.41)***	1.75 (1.31–2.34)***
High	525	168 (32.0 %)	3.21 (2.38–4.31)***	3.14 (2.31–4.28)***

*P <0.05, **P <0.01, ***P <0.001.

or knowing people who had been affected.[11] In a Chinese study that employed a short questionnaire during the same pandemic, respondents reported increased fear, anxiety and panic.[2] However, a longitudinal study of citizens of Hong Kong during the 2009 H1N1 pandemic found low levels of anxiety throughout, but anxiety levels were associated with compliance with social distancing advice.[1]

Our primary aim was to assess the levels of anxiety, depression and traumatic stress in the population during the early stages of the COVID-19 pandemic. The prevalence of anxiety (21.63 %) and depression (22.12 %) found in this study appear to be higher than those previously reported, but not markedly so. The English 2014 Adult Psychiatric Morbidity Survey (APMS)[23] reported that 15.7 % of the sample experienced symptoms of common mental health disorders, based on a cut-off score of 12 on the Clinical Interview Schedule-Revised, with a higher prevalence for women (19.1 %) than for men (12.2 %). The prevalence of anxiety or depression in the Understanding Society study in 2014 was 19.7 % (22.5 % for females, 16.8 % for males),[24] based on the General Health Questionnaire (GHQ). The closest comparable study is probably the National Institute for Health Research Applied Research Collaboration North West Coast Household Health Survey, which administered the PHQ9 and GAD7 (face-to-face) to 4000 people in the north-west of England, mainly living in deprived areas; in this study, 17 % were depressed and 13 % were anxious.[25] A recently published study used data from the Understanding Society COVID-19 web survey, and reported the population prevalence of clinically significant levels of mental distress to be 27.3 %.[26] The study used the GHQ to identify clinically significant distress, and data collection was approximately 1 month after our data collection period, but despite these differences the GHQ prevalence was similar to that based on meeting the criteria for either anxiety or depression

Table 2 Bivariate and multivariate binary logistic regression results predicting anxiety/depression

		Anxiety/depression		
	N	*N* (%)	Unadjusted OR	Adjusted OR
Age				
18–24	246	121 (49.2 %)	–	–
25–34	380	152 (40.0 %)	0.69 (0.50–0.95)*	0.67 (0.47–0.95)*
35–44	353	97 (27.5 %)	0.39 (0.278–0.551)***	0.408 (0.28–0.60)***
45–54	410	96 (23.4 %)	0.32 (0.22–0.44) ***	0.36 (0.25–0.52)***
55–64	349	68 (19.5 %)	0.25 (0.17–0.36) ***	0.31 (0.21–0.47)***
65+	287	28 (9.8 %)	0.11 (0.07–0.18) ***	0.141 (0.09–0.23)***
Gender				
Female	1047	227 (23.4 %)	–	–
Male	972	332 (31.70 %)	0.65 (0.54-0.80)***	0.89 (0.71–1.12)
Living location				
Rural	335	77 (23.0 %)	–	–
Town	620	167 (26.9 %)	1.23 (0.91–1.68)	1.02 (0.73–1.43)
Suburb	572	138 (24.1 %)	1.06 (0.77–1.46)	0.98 (0.70–1.39)
City	498	180 (36.1 %)	1.90 (1.39–2.59)***	1.21 (0.86–1.7)
Lone adult				
No	1571	424 (27.0 %)	–	–
Yes	454	138 (30.4 %)	1.18 (0.94–1.48)	1.32 (0.99–1.75)
Children				
0	1429	355 (24.8 %)	–	–
1	292	95 (32.4 %)	1.46 (1.11–1.91)**	1.19 (0.88–1.61)
2	237	90 (37.8 %)	1.84 (1.38–2.46)***	1.41 (1.01–1.96)*
3+	61	22 (36.1 %)	1.71 (1.00–2.93)*	1.41 (0.79–2.53)
Income				
£57 930+	410	70 (17.1 %)	–	–
–£57 930 pa	410	91 (22.2 %)	1.39 (0.98–1.96)	1.28 (0.89–1.85)
–£38 740 pa	385	117 (30.4 %)	2.12 (1.51–2.97)***	1.69 (1.17–2.44)**
–£25 340 pa	410	135 (32.9 %)	2.38 (1.71–3.31)***	1.67 (1.15–2.42)**
£0–15 490 pa	410	149 (36.3 %)	2.77 (2.00–3.84)***	2.44 (1.67–3.56)***
Lost income				
Not lost	1377	323 (23.5 %)	–	–
Lost	648	239 (36.9 %)	1.91 (1.56–2.33)***	1.25 (1.25–1.95)***
Pre-existing health condition, self				
No	1714	452 (26.4 %)	–	–
Yes	311	110 (35.4 %)	1.53 (1.18–1.97)**	1.45 (1.07–1.96)*
Pre-existing health condition, someone close				
No	1510	386 (25.6 %)	–	–
Yes	515	176 (34.2 %)	1.51 (1.22–1.88)***	1.33 (1.03–1.74)*
COVID-19, self				
No	1977	535 (27.1 %)	–	
Yes	48	27 (56.3 %)	3.46 (1.94–6.18)***	2.17 (1.14–4.11)**
COVID-19, someone close				
No	1913	515 (26.9 %)	–	–
Yes	112	47 (42.0 %)	1.96 (1.33–2.89)**	1.50 (0.97–2.32)
Personal risk, 1 month				
Low	633	139 (22.0 %)	–	–
Moderate	867	208 (24.0 %)	1.12 (0.88–1.43)	1.13 (0.87–1.47)
High	525	215 (41.0 %)	2.46 (1.91–3.18)***	2.20 (1.66–2.91)***

*P <0.05, ** P<0.01, ***P <0.001.

in this study, which was 27.7 %. This may be indicative of a stable psychological response during the first month of lockdown, although longitudinal studies will be required to determine the longitudinal change during lockdown.

The prevalence of PTSD in this current study was 16.79 %, similar to the combined prevalence of PTSD and complex PTSD in a UK trauma-exposed sample (prevalence of 5.3 % for PTSD and 12.9 % for complex PTSD[27]) and much higher than that reported by the APMS (4.4 %, with no gender differences found[11]). However, these comparisons should be treated with caution, as the status of COVID-19 as a traumatic stressor is not clear. Unexpectedly, the prevalence for males was higher than that for females; most epidemiological studies report a higher prevalence of PTSD for females.[28] The reasons for this are not immediately clear, but the health and economic threats that COVID-19 poses may be undermining traditional male gender roles, or the higher prevalence of mortality for males during the British COVID-19 pandemic may play a part.

The unadjusted estimates for the model predicting anxiety/depression revealed that younger age, being female, living in a city, pre-existing health conditions, COVID-19 status and perceived risk of COVID-19 infection all significantly increased the likelihood of screening positive for anxiety or depression.

Contrary to expectations, the oldest age group and being male were associated with a lower likelihood of anxiety or depression, despite these factors being associated with higher COVID-19-related mortality.[29] In the 2014 Adult Psychiatric Morbidity Survey, a much lower prevalence of common psychological disorders was observed in those over 65 compared with those of working age, although the effect was nonlinear and the high prevalence observed for those under 35 in this study were not evident there. Strikingly, the opposite relationship with age was observed

Table 3 Bivariate and multivariate binary logistic regression results predicting traumatic stress

		Traumatic stress		
	N	*N* (%)	Unadjusted OR	Adjusted OR
Age				
18–24	246	59 (24.0%)	–	–
25–34	380	109 (28.7%)	1.27 (0.88–1.84)	0.99 (0.65–1.49)
35–44	353	88 (24.9%)	1.05 (0.72–1.54)	0.74 (0.48–1.15)
45–54	410	53 (12.9%)	0.47 (0.31–0.71)***	0.39 (0.25–0.62)***
55–64	349	24 (6.9%)	0.23 (0.14–0.39)***	0.31 (0.18–0.54)***
65+	287	7 (2.4%)	0.08 (0.03–0.18)***	0.09 (0.04–0.22)***
Gender				
Female	1047	156 (14.9%)	–	–
Male	972	184 (18.9%)	1.33 (1.06–1.68)*	1.85 (1.41–2.44) ***
Living location				
Rural	335	36 (10.7%)	–	–
Town	620	76 (12.3%)	1.16 (0.76–1.77)	0.94 (0.60–1.50)
Suburb	572	88 (15.4%)	1.51 (0.99–2.28)	1.24 (0.79–1.94)
City	498	140 (28.1%)	3.25 (2.18–4.83)***	1.91 (1.23–2.94)**
Lone adult				
No	1571	268 (17.1%)	–	–
Yes	454	72 (15.9%)	0.92 (0.69–1.22)	1.412 (0.99–2.00)
Children				
0	1429	163 (11.4%)	–	–
1	292	75 (25.6%)	2.68 (1.96–3.65)***	1.83 (1.30–2.58)**
2	237	83 (34.9%)	4.17 (3.05–5.70)***	2.56 (1.78–3.68)***
3+	61	19 (31.1%)	3.52 (2.00–6.21)***	2.39 (1.29–4.44)**
Income				
£57 930+	410	49 (12.0%)	–	–
–£57 930 pa	410	59 (14.4%)	1.24–(0.82–1.86)	1.27 (0.82–1.98)
–£38 740 pa	385	81 (21.0%)	1.96 (1.33–2.88)**	1.55 (0.99–2.40)
–£25 340 pa	410	98 (23.9%)	2.31 (1.59–3.36)***	1.85 (1.19–2.87)**
£0–15 490 pa	410	53 (12.9%)	1.09 (0.72–1.65)	1.28 (0.78–2.07)
Lost income				
Not lost	1377	196 (14.2%)	–	–
Lost	648	144 (22.2%)	1.722 (1.36–2.18)***	1.27 (0.97–1.66)
Pre-existing health condition, self				
No	1714	279 (16.3%)	–	–
Yes	311	61 (19.6%)	1.25 (0.92–1.71)	1.21 (0.829–1.77)
Pre-existing health condition, someone close				
No	1510	247 (16.4%)	–	–
Yes	515	93 (18.1%)	1.13 (0.87–1.46)	1.13 (0.82–1.56)
COVID-19, self				
No	1977	324 (16.4%)	–	–
Yes	48	16 (33.3%)	2.55 (1.38–4.70)**	1.03 (0.50–2.12)
COVID-19, someone close				
No	1913	305 (15.9%)	–	–
Yes	112	35 (31.3%)	2.39 (1.57–3.64)***	1.70 (1.04–2.77)*
Personal risk, 1 month				
Low	633	54 (8.5%)	–	–
Moderate	867	132 (15.2%)	1.92 (1.37–2.69)***	1.88 (1.32–2.68)**
High	525	154 (29.3%)	4.45 (3.18–6.23)***	3.55 (2.47–5.09)***

*P <0.05, **P<0.01, ***P <0.001.

for anxiety specifically about the COVID-19 pandemic, which was related to mortality risk in a logical way. The adjusted estimates were generally attenuated, but the same pattern of associations was found. The unadjusted estimates for the model predicting traumatic stress differed in that being male was a significant risk factor, and there was a large effect for living in an urban area.

This study had both strengths and limitations. On the strengths side, the sample was highly representative of the UK population, was recruited early in the progress of the pandemic, and used standardised measures, allowing comparisons with findings from later stages of the COVID-19 crisis. However, despite the sampling frame and large sample size, and although the participants in this study were representative of the UK population in terms of demographic, economic and social factors, as well as voting history, it was not a true random probability sample (which would have been very difficult to obtain under the current circumstances), and it is possible that individuals' decisions about whether to participate were affected by psychological factors, creating the possibility of sampling bias. Second, all mental health assessments were based on self-report and not clinician-administered interviews; this may have resulted in overestimation of prevalence. Third, the validity of the assessment of traumatic stress may be questioned, as it is not clear whether the COVID-19 pandemic meets the ICD-11 criteria ('an extremely threatening or horrific event or series of events') or DSM-5 criteria (direct exposure, witnessing the trauma, learning that a relative or close friend was exposed to a trauma, indirect exposure to aversive details of the trauma, usually in the course of professional duties) for a traumatic event for the entire population. This question is already being debated,[30] with arguments being made that the global nature of the threat, its wide ranging effects (i.e. health, economic and social), and the widespread reports of behaviours and cognitions

analogous to PTSD symptoms (heightened perceptions of threat, voluntary (and enforced) avoidance, and re-experiencing being facilitated by mainstream and social media) mean that the pandemic should be considered a traumatic stressor. Finally, the mechanisms by which the threat of the pandemic and/or the quarantine influenced mental health could not be established. Previous research has identified disruptions in circadian rhythms,[31] disruptions in social contact[32] and quarantine related stressors as important contributing factors.[33]

Conclusions

Modelling studies have suggested that the influence of pandemics on psychological disorders in the general population may affect the progress of a pandemic and, therefore, indirectly affect mortality.[6] Furthermore, the development of psychological disorders in the population may create a burden that impedes national social and economic recovery once the pandemic ends. The fact that the prevalence of psychological problems observed in the present study was not dramatically higher than those reported in previous studies suggests that the population, at an early stage of the pandemic, has successfully adapted to the unprecedented changes that have been forced on their lifestyles. However, we have identified certain key groups who may be more vulnerable to the social and economic challenges of the pandemic, particularly those whose income has been affected, who have children living in the home and who have pre-existing health conditions that make them vulnerable to the more devastating effects of the COVID-19 virus. Further research is needed to track whether these groups show higher levels of psychological problems at later stages in the pandemic and whether specific interventions and policies should be developed to address their needs.

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Data availability

The datasets generated during and/or analysed during the current study will be archived with the UK Data Service (https://ukdataservice.ac.uk/) within 6 months of the study ending.

Author contributions

MS.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; data analysis; project administration. OM.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. JM.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. JG.M.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. T.K.H.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; data analysis; project administration. LL.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. LM.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. A.P.M.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; ethical approval; project administration. R.M.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. T.V.A.S.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. K.M.B.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. P.H.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; data analysis; project administration. T.K.: Contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration. R.P.B.: Conception of study; contribution to the design of the study; drafting or revising manuscript; final approval of the version to be published; project administration.

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None.

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Levels and predictors of anxiety, depression and health anxiety during COVID-19 pandemic in Turkish society: The importance of gender

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Abstract

Background: The COVID-19 pandemic is having negative effects on societies' mental health. Both the pandemic and the measures taken to combat it can affect individuals' mental health.

Aims: The purpose of this study was to evaluate the levels of depression, anxiety and health anxiety in Turkish society during the COVID-19 pandemic, and to examine the factors affecting these.

Method: The study was performed using anonline questionnaire. Participants wereasked to complete a sociodemographic data form, the Hospital Anxiety and Depression Scale (HADS) and the Health Anxiety Inventory (HAI). The effects on depression, anxiety and health anxiety levels of factors such as age, sex, marital status, living with an individual aged above 60, the presence of a new Coronavirus+ patient among friends or relatives, previous and current psychiatric illness and presence of accompanying chronic disease were then investigated.

Results: In terms of HADS cut-off points, 23.6% (n = 81) of the population scored above the depression cut-off point, and 45.1% (n = 155) scored above the cut-off point for anxiety. In regression analysis, female gender, living in urban areas and previous psychiatric illness history were found as risk factors for anxiety; living in urban areas was found as risk factor for depression; and female gender, accompanying chronic disease and previous psychiatric history were found as risk factors for health anxiety.

Conclusion: The results of this cross-sectional study suggest that the groups most psychologically affected by the COVID-19 pandemic are women, individuals with previous psychiatric illness, individuals living in urban areas and those with an accompanying chronic disease. Priority might therefore be attached to these in future psychiatric planning.

Keywords

Health anxiety, depression, anxiety, COVID-19

Background

A novel Coronavirus type (2019-nCoV) was identified as an etiological agent in cases of pneumonia of indefinite cause seen in the Chinese city of Wuhan on 31 December 2019 (Zhu et al., 2020). The virus subsequently spread rapidly across the world and led to the pandemic known as COVID-19. Although the virus was first seen in China, countries in the European and American continents are the most affected. The first case in Turkey was reported on 11 March 2020. Various precautions began being adopted as the number of cases increased, and a wide range of measures are still in place. As of 20 April 2020, the total number of reported cases in Turkey was 90,980, with 2,140 deaths (Republic of Turkey Ministry of Health, 2020).

Traumatic events can reduce people's feeling of security, remind them of the fact of death and have adverse effects on their mental health. Questions related to the pandemic with no definite answers, such as when it will come to an end and methods of treatment; constant exposure to a flow of information about the pandemic and its effects; decreased social relations due to the pandemic; and recommendations/prohibitions such as remaining at home as much as possible all can adversely affect individuals' mental health. Symptoms such as anxiety, depression, fear, stress and sleep problems are being seen more frequently during the COVID-19 pandemic (Torales et al., 2020). An incidence of depression, anxiety and post-traumatic stress disorder symptoms between 10% and 18% was reported during and after the Severe Acute Respiratory Syndrome

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(SARS) epidemic (Wu et al., 2005). One study of 253 individuals from one of the regions most affected by the COVID-19 pandemic in China reported a 7% incidence of post-traumatic stress symptoms 1 month after the outbreak of the pandemic (Liu et al., 2020). Another study from China observed that 53% of people experienced feelings of terror (Zhang & Ma, 2020). One extensive study determined that 0.9% of university students exhibited severe symptoms of anxiety, 2.7% moderate symptoms and 21.3% mild symptoms. Family income stability and living together with parents were found to exhibit a protective effect against anxiety symptoms (Cao et al., 2020). Variables such as occupation, education and gender have been found to affect symptoms of anxiety and depression developing during the pandemic (Y. Wang et al., 2020).

Health anxiety is a multifaceted phenomenon, consisting of distressing emotions, physiological arousal and associated bodily sensations, thoughts and images of danger and avoidance and other defensive behaviors. The phenomenon is experienced on an occasional basis by many people in daily life. Health anxiety is a crucial issue, and both increases and decreases can result in problems (GjG, 2004). Considering heath anxiety as a broad spectrum, individuals' health anxiety can be classified as high or low (Taylor, 2019). Some individuals with high health anxiety during the pandemic may cause crowding in the health system by presenting to physicians and hospitals on a frequent basis. Others with high anxiety may be reluctant to seek medical assistance out of concerns that hospitals are sources of transmission. In contrast, individuals with low health anxiety may be reluctant to comply with warnings regarding bringing the pandemic under control, and may behave in a highly relaxed manner (Asmundson & Taylor, 2020). One study investigating the number of visits to 18 emergency departments in the United States following the H1N1 pandemic showed that the emergency department visits in the week before the pandemic reached the country was as high as the number in the week when the pandemic was most intense. The number of presentations was also 7% higher than in normal times (McDonnell et al., 2012). The ability to bring pandemics under control depends on compliance with warnings. One psychological factor capable of affecting adherence to warnings is health anxiety.

The current COVID-19 pandemic and the measures adopted against it are as follows: The psychological effects on the Turkish public may vary depending on variables such as gender, place of residence, age, accompanying chronic disease, previous or current psychiatric illness and presence of a COVID+ relative. Since anxiety and depressive disorders are more prevalent in women (Alexander et al., 2007), women are also estimated to be more affected during pandemics (Kim et al., 2014). Crowded areas involve a greater risk for droplet-transmitted 2019-nCoV. Individuals living in urban areas may therefore also be expected to be more affected. As is known from previous epidemics, individuals with a history of current or previous psychiatric illness are significantly affected (Page et al., 2011). 2019-nCoV is known to exhibit a particularly severe course in the above 60s and individuals with accompanying chronic disease (Zhou et al., 2020). This group and individuals living with someone above 60 may therefore be expected to be more severely affected.

To the best of our knowledge, no previous studies have investigated health anxiety during the COVID-19 pandemic. This research investigated the levels of depression, anxiety and health anxiety in Turkish society during the COVID-19 pandemic. This study also investigated the effect on these variables of potentially affecting factors such as age, gender, place of residence, accompanying chronic disease, a COVID+ friend or relative, living with someone aged above 60 and a current or previous history of psychiatric disease.

Method

The research population in this descriptive population consisted of individuals aged above 18 living in various provinces of Turkey. Minitab 19.0 software was used to determine the sample size. The sample size was calculated based on an expected prevalence of 6.3% (Y. Wang et al., 2020), Type I error of 5% and study power of 95% based on a similar previous study. The calculation showed that at least 159 individuals would need to be enrolled. However, to be able to perform subgroup comparisons within the main study group, we planned to enroll 318 participants. Data were collected through an online questionnaire between 14 and 16 April 2020, using SurveyMonkey software (SurveyMonkey, San Mateo, CA, USA). Individuals agreeing to participate were asked to complete the questionnaire through social media (WhatsApp, Twitter and Facebook). The 54-item questionnaire consisted of a sociodemographic data form, the Hospital Anxiety and Depression Scale (HADS) and the Health Anxiety Inventory (HAI).

HADS is a self-report scale developed by Zigmond and Snaith (1983) which is used to determine anxiety and depression levels. It consists of 14 questions, each of which is scored 0–3. Anxiety and depression are evaluated with seven questions each. The lowest possible scores for depression and anxiety are 0, and the highest possible scores are 21. Higher scores indicate increased severity of anxiety or depression. The reliability and validity of the Turkish language version were examined by Aydemir et al. Cut-off scores for Turkish society have been determined as 7 for anxiety and 10 for depression (Aydemir et al., 1997).

HAI is a self-report scale developed by Salkovskis et al. (2002) and contains 18 questions. The first 14 questions consist of four options from which individuals select the one that best describes their mental state. The last four questions are intended to measure mental state in the event

of severe disease. All questions are scored 0–3, with higher scores indicating greater health anxiety. The total score ranges from 0 to 54. The validity and reliability were studied by Aydemir et al. (2013).

Statistical analyses were performed on SPSS 15.0 software. Results were expressed as mean ± standard deviation or number (%). The Kolmogorov–Smirnov test was used to assess normal distribution of quantitative data. The use of nonparametric tests at data analysis was found to be appropriate. The Mann–Whitney *U*-test was applied in two-way group comparisons, and the chi-square test for quantitative data. Participants were grouped as individuals with anxiety and depression based on HADS cut-off scores, and binary logistic regression was used to identify factors associated with anxiety and depression. Multiple linear regression analysis was used to identify the factors associated with health anxiety. Due to the absence of sufficient individuals aged above 60 ($n = 9$), a cut-off point of 50 was determined. Values of p less than .05 were regarded as significant for all tests. Approval for the study was granted by the Ondokuz Mayıs University Clinical Research Ethical Committee (no. 2020/147).

Results

A total of 343 individuals completed the questionnaire online, 278 of whom lived in an urban area and 71 (20.9%) of whom lived with another person aged above 60. Participants shared their homes with a mean 3.51 people (±1.27). Overall, 250 (72.8%) participants were working before the pandemic, of whom 89 stopped or suspended working after it; 35 participants (10.2%) had friends or relatives with COVID-19; 54 (15.7%) participants had a chronic disease; and 62 (42.5%) of the 162 individuals who smoked before the pandemic reported quitting or cutting down after it. The number of participants who had gone outside in the previous week was 282 (82.2%), the most common reasons cited being to buy food ($n = 224$) and for work ($n = 118$). And 15 (4.3%) participants did not follow news stories or developments about COVID-19. Participants' mean HADS anxiety and depression scores were 6.8 ± 4.2 and 6.7 ± 4.2, respectively. HAI total score was 15.1 ± 7.0 (Table 1).

Depression scores were significantly higher among women, individuals living in an urban area, individuals with COVID+ patients among friends or relatives, individuals with current or previous psychiatric illness history and individuals with chronic disease. Anxiety scores were significantly higher among women, individuals with a COVID+ patient among friends and relatives and individuals with a current psychiatric disease. Total HAI score was significantly higher among women, individuals with current or previous psychiatric illness and individuals with chronic disease (Table 2). In terms of HADS cut-off points, 23.6% ($n = 81$) of the population scored above the depression cut-off point, and 45.1% ($n = 155$) scored above the cut-off point for anxiety.

According to the results of multiple binary logistic regression analysis evaluating the risk factors for depression and anxiety, living in urban areas (OR = 0.534, 95% CI = (0.297, 0.960)) was found to be a risk factor for depression, while female gender (OR = 2.478, 95% CI = (1.439, 4.267)), living in urban areas (OR = 0.362, 95% CI = (0.159, 0.823)) and previous psychiatric illness (OR = 0.363, 95% CI = (0.196, 0.675)) were identified as risk factors for anxiety (Table 3). According to the results of multiple linear regression analysis evaluating risk factors for health anxiety, female gender ($\beta = .105, p = .047$), accompanying chronic disease ($\beta = .160, p = .003$) and previous psychiatric illness ($\beta = .176, p = .001$) were found to predict health anxiety (Table 4).

Discussion

This study investigated the levels of depression, anxiety and health anxiety in Turkish society during the COVID-19 pandemic and found that women, and individuals living in urban areas, with a COVID+ patient among friends or relatives, previously or currently in receipt of psychiatric treatment and with at least one accompanying chronic disease, were more severely affected.

Various measures are being taken during the pandemic to reduce the spread of the virus such as social distancing, lockdowns and self-isolation. At the same time, the number of patients contracting the disease and death rates continue to grow rapidly. Based on the number of reported cases, Turkey had the seventh highest number of reported cases as of 20 April 2020 (World Health Organization, 2020). All these factors can have adverse effects on the mental health of the society. The relatively high depression and anxiety levels and rates (23.6% and 45.1%, respectively) are therefore expected findings in terms of pandemic psychological effects. One extensive study from China reported that approximately 35% of people were psychologically affected by the pandemic (Qiu et al., 2020). The high incidence of depression and anxiety in individuals with previous histories of psychiatric illness may be a finding associated with recurrence of psychiatric diseases before and after the pandemic, as shown in previous such studies (Lee et al., 2007). People are being asked not to leave their homes during the pandemic. In addition, individuals with psychiatric symptoms experience difficulties in obtaining medical assistance for reasons such as some hospitals being converted into pandemic hospitals, psychiatric clinics being unable to provide active health services or number of patients examined being reduced for safety reasons, and hospital environments constituting a risk in terms of viral load.

Individuals experience varying levels of psychological distress during pandemics. A low level of health anxiety in

Table 1. Sociodemographic and clinical features of the participants.

Variables					
Age (years), $M \pm SD$	37.16 ± 10.31				
Gender, *n* (%)	Male	174 (50.7)			
	Female	169 (49.2)			
Marital status, *n* (%)	Married	218 (63.5)			
	Single[a]	125 (36.4)			
Place of residence, *n* (%)	Urban	278 (81.0)			
	Rural	65 (18.9)			
Education time, $M \pm SD$	14.85 ± 3.95				
Working before pandemic, *n* (%)	Yes	250 (72.8)	Working after pandemic	Yes	161 (64.4)
				No	89 (35.6)
	No	93 (27.1)			
No. of people living together, $M \pm SD$	3.51 ± 1.27				
Living with an individual aged above 60, *n* (%)	Yes	72 (20.9)			
	No	271 (79.0)			
Friends or relatives with COVID, *n* (%)	Yes	35 (10.2)			
	No	308 (89.8)			
Accompanying chronic disease, *n* (%)	Yes	54 (15.7)			
	No	289 (84.3)			
Smoking, *n* (%)	No	181 (52.7)			
	Yes, with the same frequency	79 (23.0)			
	Yes, reduced	69 (20.1)			
	Yes, increased	14 (4.0)			
Previous or current psychiatric illness, *n* (%)	Yes	75 (21.8)			
	No	268 (78.2)			
History of going out in the past week, *n* (%)	Yes	282 (82.2)			
	No	61 (17.7)			
Reason for going out in the previous week, *n*	Work	118			
	Food supply	224			
	Health	68			
	Financial transactions	60			
	Others	46			
Following new stories about COVID-19, *n* (%)	Yes	324 (95.7)			
	No	15 (4.3)			
HADS, $M \pm SD$	Anxiety subscale	6.8 ± 4.2			
	Depression subscale	6.7 ± 4.2			
HAI, $M \pm SD$	Total	15.1 ± 7.0			

HADS: Hospital Anxiety and Depression Scale; HAI: Health Anxiety Inventory.
[a]Divorced and widowed people are grouped together with singles because there are few.

pandemics may result in situations that adversely affect people's lives from numerous perspectives, due to failure to comply with protective measures. It is therefore important for everyone to exhibit the same awareness and responsibility at times when collective awareness needs to be high, such as pandemics. This study shows that women, individuals with past or present psychiatric illnesses and individuals with chronic disease have greater sensitivity to and awareness of sensations in their own bodies. Health anxiety may be higher in women and individuals with a history of psychiatric disease (Bobevski et al., 2016). The increase in health anxiety in individuals with chronic disease linked to an increased risk may also reflect the psychological distress that people feel during the COVID-19 pandemic. As far as is known, the level of health anxiety was studied for the first time in the COVID-19 pandemic. It was found that female gender, accompanying chronic disease, and previous psychiatric illness history predict sensitivity to physical sensations.

In this study, depression, anxiety and health anxiety levels were higher in women, showing that the psychiatric impact during the COVID-19 pandemic may be greater on women. Several previous studies have shown that anxiety disorders and depressive disorders are more frequent in women (Alexander et al., 2007). Female gender has been identified as the most potent predictor of post-traumatic stress disorder symptoms after pandemics (Liu et al., 2020). In a study from China, although women were better

Table 2. Comparison of the participants divided into groups in terms of HADS and HAI.

Variables		HADS		HAI M ± SD
		Depression M ± SD	Anxiety M ± SD	
Gender	Male	6.2 ± 3.8	5.9 ± 3.6	14.2 ± 6.2
	Female	7.2 ± 4.4	7.7 ± 4.5	15.9 ± 7.6
	p-value	.047*	.000*	.030
Age groups	18–49	6.8 ± 4.1	6.8 ± 4.1	15.1 ± 6.8
	⩾50	6.14 ± 4.9	6.3 ± 4.7	14.7 ± 8.0
	p-value	.171	.310	.458
Marital status	Married	6.4 ± 4.0	6.6 ± 4.0	14.5 ± 6.4
	Single[a]	7.2 ± 4.4	7.0 ± 4.4	16.1 ± 7.8
	p-value	.091	.664	.144
Place of residence	Urban	6.9 ± 4.2	6.9 ± 4.3	15.2 ± 7.1
	Rural	5.8 ± 4.1	6.2 ± 3.3	14.4 ± 6.3
	p-value	.029*	.373	.550
Working after pandemic	Yes	7.0 ± 4.2	6.9 ± 4.3	14.8 ± 6.7
	No	6.3 ± 3.8	6.2 ± 3.7	14.1 ± 6.3
	p-value	.340	.308	.542
Living with an individual aged above 60	Yes	7.7 ± 4.3	6.7 ± 4.1	14.6 ± 7.7
	No	6.6 ± 4.1	6.8 ± 4.2	15.2 ± 6.8
	p-value	.433	.952	.403
Friends or relatives with COVID	Yes	9.0 ± 4.6	8.4 ± 4.4	16.8 ± 7.7
	No	6.4 ± 4.0	6.6 ± 4.1	14.9 ± 6.9
	p-value	.001*	.014*	.144
Previous psychiatric illness	Yes	8.3 ± 4.8	7.8 ± 4.7	18.3 ± 7.2
	No	6.5 ± 4.1	6.7 ± 4.1	14.8 ± 6.9
	p-value	.036*	.206	.011*
Current psychiatric illness	Yes	7.9 ± 4.6	8.5 ± 4.8	18.0 ± 8.2
	No	6.4 ± 4.0	6.3 ± 3.9	14.3 ± 6.4
	p-value	.020*	.000*	.000*
History of going out in the previous week	Yes	6.8 ± 4.2	6.9 ± 4.2	15.0 ± 7.0
	No	6.1 ± 4.0	6.2 ± 4.0	15.5 ± 6.8
	p-value	.247	.369	.342
Accompanying chronic disease	Yes	7.8 ± 4.5	7.7 ± 4.3	17.9 ± 7.6
	No	6.5 ± 4.1	6.6 ± 4.1	14.6 ± 6.7
	p-value	.050*	.061	.001*

HADS: Hospital Anxiety and Depression Scale, HAI: Health Anxiety Inventory.
[a]Divorced and widowed people are grouped together with singles because there are few.
*$p < .05$.

informed about the disease than men during the COVID-19 pandemic and complied more with advice, such as wearing masks and avoiding public spaces, they also reported not knowing whether the pandemic could be brought under control or the probability of such control being established (Zhong et al., 2020). Anxiety disorder has been seen at three-fold higher levels in women than in men during the COVID-19 pandemic (Y. Wang et al., 2020). High health anxiety may result in the individual misinterpreting his or her own sensations, and may leave the individual vulnerable to negative affective states such as anxiety and depression. In light of our present knowledge, the higher levels of anxiety, depression and health anxiety in women in this study is not an unexpected finding.

2019-nCoV is a viral agent mainly transmitted through droplets or direct contact. Such viruses can be transmitted more, and more easily, in urban and central areas with denser human populations (Taylor, 2019). Psychological impact may therefore be greater in individuals in urban areas (Chen et al., 2020). Individuals living in urban areas may also have a greater probability of access to communication and information. The majority of COVID-19 cases in Turkey are known to be in urban areas. The higher levels of depression among people living in urban areas, where the probabilities of encountering the virus are also higher, is therefore also an expected finding.

Advanced age and comorbid chronic diseases have been identified as the most important risk factors for mortality

Table 3. Results of logistic regression analysis on factors significantly associated with depression and anxiety.

	According to HADS anxiety vs non anxiety		According to HADS depression vs non-depression	
	OR (95% CI)	*p*-value	OR (95% CI)	*p*-value
Gender (female vs male)	2.478 (1.439, 4.267)	.001*	1.298 (0.833, 2.022)	.249
Place of residence (urban vs rural)	0.362 (0.159, 0.823)	.015*	0.534 (0.297, 0.960)	.036*
Friends or relatives with COVID (yes vs no)	0.650 (0.297, 1.423)	.281	0.485 (0.232, 1.012)	.054
Accompanying chronic disease (yes vs no)	0.601 (0.302, 1.197)	.148	0.587 (0.317, 1.087)	.090
Current psychiatric illness (yes vs no)	0.981 (0.388, 2.484)	.968	1.002 (0.429, 2.340)	.996
Previous psychiatric illness (yes vs no)	0.363 (0.196, 0.675)	.001*	0.573 (0.323, 1.019)	.058

HADS: Hospital Anxiety and Depression Scale; OR: odds ratio; CI: confidence interval.
*$p < .05$.

Table 4. Results of multiple linear regression analysis[a] of clinical variables for predicting HAI subscales.

	HAI			
	B	β	95% CI for *B*	*p*-value
Gender (female vs male)	1.475	.105	(0.022, 2.928)	.047*
Place of residence (urban vs rural)	0.560	.031	(−1.291, 2.411)	.552
Friends or relatives with COVID (yes vs no)	1.476	.064	(−0.906, 3.858)	.224
Accompanying chronic disease (yes vs no)	3.133	.160	(1.098, 5.168)	.003*
Current psychiatric illness (yes vs no)	1.375	.054	(−1.403, 4.154)	.331
Previous psychiatric illness (yes vs no)	3.088	.176	(1.195, 4.982)	.001*

HAI: Health Anxiety Inventory; CI: confidence interval.
[a]Forced entry model was applied.
*$p < .05$.

due to 2019-nCoV (Zhou et al., 2020). In addition, the elderly and individuals with chronic disease have an increased risk of contracting the disease (B. Wang et al., 2020). Parallel to all these findings, increased levels of health anxiety, depression and anxiety were also observed in individuals with chronic disease. However, we found no statistically significant difference in terms of depression, anxiety and health anxiety levels between individuals living with another person aged above 60 and the control group. Although this is a difficult finding to account for, participants' relatively high educational level (14.85 ± 3.95) may have a protective effect against negative emotions (Y. Wang et al., 2020). Individuals with high educational levels have higher levels of information about and better attitudes toward COVID-19 (Zhong et al., 2020). At the same time, there was no significant difference in variables between the 18–49 and above-50 age groups. The 60-and-above age group is generally reported to be the group in which the course of disease is most severe; 80% of mortality is in this age group (CDC COVID-19 Response Team, 2020). To show the difference, the age cut-off value in this study (50 years) may have remained low. Another reason may be the protective role against life events of crystallized intelligence with increasing experience, as suggested by Cattell (1963).

Not following new stories about COVID-19 (n = 15, 4.3%) may be regarded as avoidance behavior. Many Turkish television channels are presenting news broadcasts and programs about the pandemic. At the same time, there is more content about the pandemic on the social media. Other factors in the social-psychological field of pandemic psychology are rumors and observational learning (Taylor, 2019). These also frequently occur during the COVID-19 pandemic. Avoidance is a defense mechanism that can be used as a means of coping with anxiety. The prevalence of avoidance behavior during the swine flu epidemic in the United Kingdom in 2009 was reported as 4.9% (Rubin et al., 2009). Avoidance has been identified as one of the behavioral coping methods employed during outbreaks (Chew et al., 2020). The rate of avoidance in this study is therefore unsurprising.

One particular advantage of this study is that it measured the public psychological state during the pandemic. Depression, anxiety and health anxiety levels were evaluated in a cross-sectional manner in the pandemic. One of the principal limitations of this study is that due to the cross-sectional nature of the research, it is difficult to draw any conclusions regarding its long-term effect. It is difficult to apply sampling methods at this time because of the pandemic. In addition, there is also the possibility

of selection bias since the study was performed with an online questionnaire. Individuals without Internet and unable or unwilling to use smartphones or email could not be included in the study.

Conclusion

In conclusion, our findings suggest that the pandemic may have a greater effect on women, individuals with a past or present psychiatric disease, individuals living in urban areas and individuals with a comorbid chronic disease. Priority might therefore perhaps be attached to psychological support measures for members of these groups.

Conflict of interest

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Lampiran 2 Lembar Konsultasi Online

LEMBAR KONSULTASI ONLINE

KARYA TULIS ILMIAH

***STUDI LITERATUR* PENINGKATAN DEPRESI COVID-19 PADA MASYARAKAT**

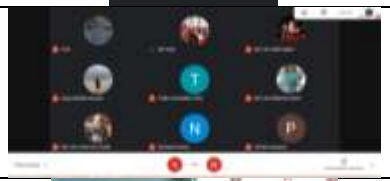
Nama : Miftachul Umami

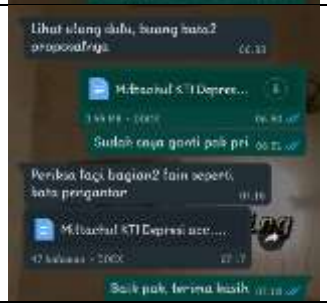
NIM : P27820418068

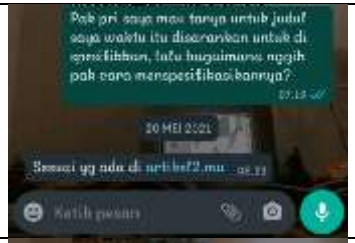
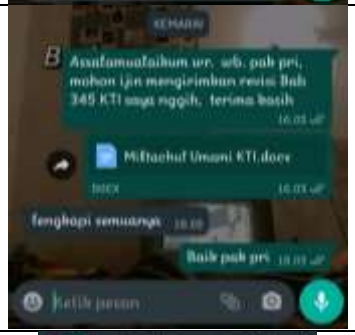
Kelas : 3B

Dosen Pembimbing : Suprianto,S.Kep,Ns,M.Psi

Bimbingan Ke	Tanggal Bimbingan	Materi Bimbingan	Revisi / Masukan Pembimbing	Upload Foto	Tanda Tangan	
					Mahasiswa	Pembimbing
1	11 Februari 2021	Menentukan topik yang akan diambil				

2	18 Februari 2021	Mengumpulkan jurnal yang telah di baca	Mencari jurnal terkait dengan tema yang diambil sebanyak mungkin			
3	27 Februari 2021	BAB 1	Harus sesuai dengan MKSK			
4	22 Maret 2021	BAB 1 dan BAB 2	Menambahkan kalimat pada latar belakang + menjelaskan secara umum maksud dari BAB 2			
5	25Maret 2021	BAB 2	Menambahkan tabel PICOS			
6	26 Maret 2021	BAB 1 dan BAB 2	Menambahkan latar belakang			

7	11 Mei 2021	BAB 3 dan 4	Bimbingan BAB 3 dan 4			
8	11 Mei 2021	BAB 3 dan 4	Revisi Hasil dan Pembahasan			
9	12 Mei 2021	BAB 3 dan 4	Revisi			

10.	13 Mei 2021	BAB 3, 4 dan 5	Mengerjakan BAB 5			
11.	15 Mei 2021	BAB 3, 4 dan 5	Melanjutkan BAB dan 5			
12.	18 Mei 2021	BAB 3, 4 dan 5	ACC BAB 3, 4 dan 5			

13.	19 Mei	BAB 3,4, dan 5	Bimbingan Akhir Sebelum Seminar Hasil			

Lampiran 3 PICOS

No	Judul	*Population*	*Intervention*	*Comparation*	*Outcome*	*Study Design*	*Publication Year,* (Nama Pengarang), Alamat Web
1.	Depression, anxiety, stress levels of physicians and associated factor in Covid-19 pandemics	Dokter	-	-	286 (64,7%) had symptoms of depression	Descriptive-survey	(Rimeysa Yeni Elbay, 2020), https://pubmed.ncbi.nlm.nih.gov/32497969/
2.	Increase generalized anxiety, depression and disstress during the COVID-19 pandemic : a cross sectional study in germany	German Society	-	-	Significantly improved symptoms were very common in all dimensions: depression (14.3%)	Deskriptif – *Cross Sectional*	2020, (Alexander Bauerle) https://pubmed.ncbi.nlm.nih.gov/32657323/
3.	Depression, Anxiety, and Stress Symptoms and	Residents of Gondar town	-	-	The prevalence of depression	Descriptive-Cross Sectional	2020, (Temesgen Yihunie Akalu), https://pubmed.ncbi.nlm.nih.gov/33758560/

	Its Associated Factors Among Residents of Gondar Town During the Early Stage of COVID-19 Pandemic				was 32.0% (95% CI: 28.4–35.5),		
4.	Anxiety, Depression, traumatic stress and COVID-19-related anxiety in the UK general population during the COVID-19 pandemic	British Society	-	-	Prevalensi depresi adalah 22,1% (95% CI 20,3–23,9%)	Deskriptive-Survey	2020, (Mark Shevlin), https://pubmed.ncbi.nlm.nih.gov/33070797/
5.	Levels and predictors of anxiety, depression and health anxiety during COVID-19		-	-	23,6% (n=81) of the population scored above the depression cut-off point	Descriptive - Survey	2020, (Selcuk Ozdin), https://pubmed.ncbi.nlm.nih.gov/32380879/

	pandemic in Turkish Society: The importance of gender						
6.	Tingkat Depresi Mahasiswa Keperawatan di Tengah Wabah COVID-19	Mahasiswa Keperawatan	-	-	Mahasiswa mengalami gangguan mood ringan (25,7%), depresi berat berat (12,2%), depresi rendah (8,1%), Depresi sedang (0,7%), dan ekstrem (0,7%)	Deskriptif Kuantitatif – *Cross Sectional*	2020, Santoso, Agus, https://ejournal2.undip.ac.id/index.php/hnhs
7.	Tingkat Kecemasan stress, dan depresi mahasiswa terhadap pengerjaan	Mahasiswa			Mahasiswa mengalami depresi (37,70%) normal (22,60%) ringan,	Deskriptif kuantitatif-survey	2020, (Yossi Vrichasti), https://s.id/AFgBY

	skripsi dalam situasi pandemic COVID-19		(18,90%), sedang (15,10%), parah (5,70% sangat parah)		
8.	Adversity quotient dengan kecenderungan depresi pada driver ojek online di tengah pandemic COVID-19	Driver Ojek Online	Hasil sebanyak 5% depresi sangat tinggi, 18,3% depresi tinggi, 46,7%, sedang, 30% rendah, 0% sangat rendah	Kuantitatif-Korelasional	2020, (Fathony, Ahmad Syahrul) , https://s.id/AFfqr
9.	Determination of the level of stress, depression and fatigue of frontline nurses during	Nurses	Data obtained from 705 nurses who worked in hospitals during COVID-19	Descriptive-Cross Sectional	2020, (Merve Murat), https://pubmed.ncbi.nlm.nih.gov/33222350/

	the COVID-19 pandemic		obtained results from nurses who worked between 1 and 10 years. They have high levels of stress and fatigue as well as moderate depression.		
10.	Prevalence of depression during the COVID-19 outbreak: A meta-analysis of community-based studies	Community	The prevalence rates collected ranged from 7.45% - 48.30%.	Descriptive - Cross Sectional	2020, (Juan Bueno-Notivol), https://s.id/AFf6Q
11.	Depression, anxiety and stress among Indians at the time of Covid-19 Lockdown	Indian people	388 Indians experienced depression, 108 men, 280 women	Descriptive-Correlational	2020, (Usama Rehman), https://doi.org/10.1007/s10597-020-00664-x

12.	Prevalence of stress, anxiety, depression among general population during the COVID-19 Pandemic: systematic review and meta-analysis	Public	The prevalence of depression with a sample of 44,531 people was 33.7%	Deskriptive-Cross Sectionl	2020, (Nader Salari), https://pubmed.ncbi.nlm.nih.gov/32631403/

Lampiran 4 Daftar Hadir Peserta Seminar

DAFTAR HADIR PESERTA SEMINAR

Mahasiswa Tingkat lll Prodi D3 Keperawatan Sidoarjo

Tahun Akademik : 2020/2021

NOMOR		NAMA MAHASISWA	Hari/Tanggal/Kegiatan	Tanda Tangan
URUT	INDUK			
1.	P.27820418068	Miftachul Umami	Senin, 05 April 2021 (Seminar Proposal)	
2.	P.27820418068	Miftachul Umami	Senin, 24 Mei 2021 (Seminar Hasil)	

Sidoarjo ,2021

Mengetahui ,

Pembimbing Utama KTI

Suprianto,S.Kep,Ns,M.Psi

NIP:197306161998031002

Lampiran 5 Lembar Catatan Perbaikan

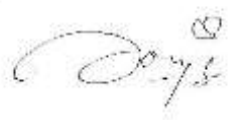
Politeknik Kesehatan Kemenkes Surabaya
Program Studi D3Keperawatan Sidoarjo
Jl. Pahlawan No. 173A
Sidoarjo

Catatan Perbaikan Seminar
Proposal KTI
Prodi D3 Keperawatan Sidoarjo

NAMA : Miftachul Umami

NIM : P27820418068

JUDUL KTI : *Literature Review* Peningkatan Depresi COVID-19 Pada Masyarakat

No.	Revisi	Tanda Tangan Penguji
1.	Dony Sulistyono, S.Kep,Ns,M.Kep Saran : - Spasi menggunakan 0,1 - Berfore – afternya diatur - Rata kanan dan kiri - Daftar Pustaka sudah benar, hanya kurang spasi 0,1 - Judul terlalu luas, difokuskan berdasarkan jurnal yang dipakai - Disarankan menggunakan jurnal yang populasinya sama - Jurnal kedua tidak disarankan	
2.	Krisnawati.A.Per.Pend,M.M.Kes Saran : - Tambahkan solusi - Jika populasinya berbeda, disarankan gunakan 2 perawat, 2 pasien, atau 3 perawat 3 pasien - Jika menggunakan populasi yang sama juga boleh - Disarankan menggunakan alat ukur yang sama	

Lampiran 6 Lembar Catatan Perbaikan

Politeknik Kesehatan Kemenkes Surabaya
Program Studi D3 Keperawatan Sidoarjo
Jl. Pahlawan No. 173A
Sidoarjo

Catatan Perbaikan Seminar Hasil KTI
Prodi D3 Keperawatan Sidoarjo

NAMA : Miftachul Umami

NIM : P27820418068

JUDUL KTI : *Literature Review* Peningkatan Depresi COVID-19 Pada Masyarakat

No.	Revisi	Tanda Tangan Penguji
1.	Dony Sulistyono, S.Kep,Ns,M.Kep Saran : - Spasi menggunakan 0,1 - Tulisan oleh pada abstrak dihapus, paragraf dihilangkan, berdasarkan IMRAD dan dibuat 1 kalimat - Daftar lampiran dibuat rumus - BAB 2 Tinjauan Pustaka - BAB 4 Hasil dibuat lengkap	
2.	Krisnawati.A.Per.Pend,M.M.Kes Saran : - Abstrak dibuat sesuai IMRAD - Kesimpulan diperbaiki - Halaman diperbaiki - Cetak tebal hanya pada BAB, Sub judul tidak perlu tebal	
3.	Suprianto,S.Kep,Ns,M.Psi Saran : - Judul KTI tanpa pasca - Dalam pembahasan disertakan alasan depresi dari Covid-19