

| |
|---|
| Access this article online |
| Quick Response Code: |
|  |
| Website: www.jehp.net |
| DOI: 10.4103/jehp.jehp_119_21 |

Psychiatric comorbidities among COVID-19 survivors in North India: A cross-sectional study

Shabir Ahmad Dar, Mohammad Maqbool Dar, Shanoo Sheikh¹, Inaamul Haq², Aaliya Mohi Ud Din Azad³, Mehvish Mushtaq³, Naveed Nazir Shah³, Zaid Ahmad Wani

Abstract:

BACKGROUND: The coronavirus disease-19 (COVID-19) emerged from China and rapidly spread to many other countries all over the world. This study aimed to assess the prevalence of anxiety, depression, posttraumatic stress disorder, and obsessive-compulsive (OC) symptoms among COVID-19 survivors after their discharge from the COVID-19 treatment center.

MATERIALS AND METHODS: This was a cross-sectional, hospital-based study performed among 119 COVID-19 survivors. The Hospital Anxiety and Depression Scale (HADS) was used to measure anxiety and depression. Posttraumatic Stress Disorder (PTSD)-Checklist (PCL) and Brief OC Scale were used to measure PTSD and OC symptoms. Data were analyzed by descriptive and inferential statistics using the SPSS (IBM Corp. Released 2015 version 23.0).

RESULTS: The mean anxiety, depression, and PTSD scores were, 7.12 ± 0.68 , 8.08 ± 0.22 , and 19.78 ± 0.88 , respectively. Based on cutoff scores, the prevalence of anxiety, depression, and PTSD among COVID-19 survivors was $n = 53$, 44.54%; $n = 73$, 61.34%; and $n = 30$, 25.21%, respectively. Older COVID-19 survivors (≥ 50 years) were more likely to show symptoms of depression and anxiety ($P < 0.001$) compared to younger ones. Furthermore, COVID-19 survivors who were ≥ 50 years of age experienced a greater level of PTSD compared to younger ones; similar trends were seen in those experiencing OC symptoms. In the present study, $n = 98$ (82.4%) were obsessed with fears of contamination and an equal number had compulsive handwashing.

CONCLUSION: Anxiety, depression, PTSD, and OC symptoms are common among the COVID-19 survivors and that underscores the need to diagnose and manage mental health morbidities among these survivors long after their recovery from COVID-19.

Keywords:

Anxiety, COVID-19, depression, obsessive-compulsive disorder, posttraumatic stress disorder, prevalence, survivors

Introduction

The outbreak of the coronavirus disease-19 (COVID-19) in Wuhan, China, and its rapid spread worldwide has transformed the psychology and interpersonal relationships of millions across the globe. The initial emotional response of fear and uncertainty in a pandemic is followed by negative emotions such as stress, anxiety, and depression

which can lead to social discontent and mental health issues.^[1]

Patients with severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS) have been shown to experience psychological distress after cure as well as during their illness, while 35% of the SARS survivors in Hong Kong reported significant anxiety and/or depressive symptoms at 4 weeks or more after discharge.^[2] Park *et al.* in South Korea

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Dar SA, Dar MM, Sheikh S, Haq I, Azad AM, Mushtaq M, *et al.* Psychiatric comorbidities among COVID-19 survivors in North India: A cross-sectional study. J Edu Health Promot 2021;10:309.

Department of Psychiatry,
Government Medical
College, Srinagar, Jammu
and Kashmir, India,
¹Department of Clinical
Psychology, College of
Health and Rehabilitation,
Princess Nourah
Abdulrahman University,
Riyadh,
Saudi Arabia, ²Department
of Social and Preventive
Medicine, Government
Medical College, Srinagar,
Jammu and Kashmir,
India, ³Department of
Respiratory Medicine,
Government Medical
College, Srinagar,
Jammu and Kashmir, India

Address for correspondence:

Dr. Shabir Ahmad Dar,
Department of Psychiatry,
Government Medical
College, Srinagar,
Jammu and Kashmir,
India.
E-mail: shabir1055@
gmail.com

Received: 26-01-2021
Accepted: 10-02-2021
Published: 31-08-2021

reported that 27% of the MERS survivors had depression in comparison to 43% of the MERS survivors who had posttraumatic stress disorder (PTSD) 12 months after the advent of the outbreak.^[3]

Similar to an epidemic of SARS and MERS, COVID-19 patients were likely to develop depressive and anxiety symptoms, as well as other psychiatric disorders during their quarantine and hospitalization.^[4]

The psychological morbidity in a pandemic not only affects the patients directly but also the general population. Knowledge of the risk factors for COVID-19 mortality can affect a person's perception of the likelihood of death from COVID-19 leading to traumatizing experience and subsequent psychiatric symptoms in patients with COVID-19. PTSD is a stress-related psychological illness that occurs immediately after a trauma, such as a severe accident or exposure to violence.^[5,6]

In previous disease outbreaks, the prevalence of PTSD after developing a serious infectious disease ranged from 4% to 41% in the general population.^[7] Following the outbreak of COVID-19, rates of PTSD in COVID-19 survivors ranged between 5% in China and 31.8% in the United States.^[8,9] Only a few studies have addressed this important issue, although a high prevalence of PTSD is expected among patients infected with SARS-CoV-2.^[8,10,11]

For COVID-19 patients, several stressors were reported related to the psychiatric implications, such as prognosis of COVID-19,^[12] isolation with limited social support,^[13] limited information about the epidemic,^[13] financial burden,^[12] and stigma.^[13] Furthermore, the stress of the work overload on health-care staff,^[14] widespread fear, and public concern^[15] further exacerbate patient's anxiety and depressive symptoms. An important risk factor for mental illness during a pandemic is an individual's constant worry about self and family members.^[16] Stressful life events may precipitate or predispose individuals to the development of obsessive-compulsive (OC) disorder (OCD) symptoms. The intense focus on the danger of contamination from a virus during COVID-19, with the ensuing major disruption of personal health, social routines, health systems, and the economy, may increase the risks associated with the genesis of OCD symptoms in the population.^[17]

While COVID-19 shares some of the characteristics of previous epidemics however it, as a new type of emerging infectious disease (EID), shows different characteristics when compared with past EIDs, like high infectivity, prevalence, public health impact,^[18] and dearth of knowledge of psychological distress in its survivors after cure prompted us to take this study.

Materials and Methods

Study design and setting

This was a cross-sectional hospital-based study conducted among COVID-19 survivors under the aegis of the Institute of Mental Health and Neurosciences, Kashmir, in collaboration with the Department of Respiratory Medicine, Government Medical College, Srinagar, who visited the COVID-19 survivor clinic. This was a time-bound study and data collection was done over a period of 2 months (September and October 2020) by trained data collectors either by face-to-face interview or through self-administration of the questionnaire (for those who were literate). The study was approved by the institute's Ethics Committee under ethical approval number IEC/IMHANS/231-6, and the highest level of anonymity and confidentiality was maintained. A convenience sampling technique was employed to recruit the COVID-19 survivors into the study. A COVID-19 survivor was defined in our study as an adult (18 years and older) with a confirmed positive result on reverse transcription-polymerase chain reaction testing for the COVID-19 virus on oropharyngeal and nasopharyngeal fluid who was treated successfully and discharged with a COVID-19 discharge certificate.

We excluded survivors who had a history of previous psychiatric illnesses or severe physical or mental sequelae such as hearing problems that limit their participation in the study. We also excluded patients with chronic medical conditions such as chronic obstructive pulmonary disease, bronchial asthma, and pulmonary tuberculosis. Informed written consent was taken from each survivor, and each was given the freedom to opt-out of the study at any point in time.

Data Collection and Technique

A semi-structured questionnaire was used to record sociodemographic details such as age, gender, marital status, occupation, residence, and education. COVID-19-related variables explored include their past medical history of psychiatric illness before being diagnosed with COVID-19 (yes/no) and knowledge of a relative or friend who died with COVID-19 (yes/no).

Anxiety and depression in this study were examined using the Hospital Anxiety and Depression Scale (HADS). The HADS consists of 14 items which are used to measure symptoms of anxiety and depression in the hospital, primary health-care facility, and among the general population.^[19]

Each item on the scale was rated on a four-point Likert scale ranging from 0 to 3 to describe how often the COVID-19 survivors experienced the 14 items in the

last week after their discharge from the hospital. The HADS consists of seven items for the anxiety subscale and seven for the depression subscale.^[20] The total score for each participant ranged from 0 to 21. Higher scores implied higher anxiety and depression levels. For both anxiety and depression, we used the recommended cutoff score of 8 and above according to a clinically tested classification of psychiatric morbidity.^[19,21,22] The choice to use the HADS was informed by the fact that it has been used to measure anxiety and depression among survivors of a similar postinfectious disease outbreak such as SARS.^[23] The HADS has previously been used in Sierra Leone among ex-Ebola Treatment Centre staff.^[24]

In the present study, COVID-19 survivors were asked to tick a particular response that they think was closest to how they have been feeling in the past week. A score of ≥ 8 indicates a possible case of anxiety and depression.^[19,21,22] The HADS ascertained high internal consistency with Cronbach’s alpha coefficient of 0.87 and test-retest intraclass correlation coefficient of 0.97 and high concurrent validity.

To screen the prevalence of PTSD, the PTSD Checklist-5 (PCL-5) was used.^[25] The PCL-5 is a 20-item self-report tool involving a five-point Likert-type scale, with scores ranging from “not at all” (0) to “extremely” (4), resulting in a symptom severity score of between 0 and 80; the PCL-5 assesses the presence and severity of PTSD symptoms. For the present study, if a score of 33 was obtained, then a diagnosis of PTSD was made.^[26]

The 20-min (average duration) assessment also assessed OC symptoms with two items on the Brief Obsessive-Compulsive Scale (BOCS).^[27] The two modified questions from the BOCS were:

“I am worried about dirt, germs, and viruses. Ex. Fear of getting germs from touching door handles or shaking hands or sitting in certain chairs or seats or fear of getting COVID-19.”

“I wash my hands very often or in a special way to be sure I am not dirty or contaminated.”

Ex. Washing one’s hands many times a day or for long periods after touching, or thinking one has touched, a contaminated object.

The responses to the above questions were modified to “only during COVID-19 pandemic” or “never.”

Statistical analysis

We used percentages to summarize categorical variables. To analyze the relationship between two categorical

variables, we used the Chi-square test and reported two-sided exact *P* values. *P* < 0.05 was considered statistically significant. Data were analyzed using the SPSS (IBM Corp. Released 2015. IBM SPSS Statistics for Windows, version 23.0 Armonk, NY, USA: IBM Corp.).

Results

Survivors clinical characteristics

Out of the 127 survivors who were asked to participate in the study, four refused to consent, two each were having comorbid chronic obstructive pulmonary disease, and bronchial asthma and were excluded, as a result of which 119 survivors were taken for the final analysis. The mean age of COVID-19 survivors was 54.2 ± 4.22 years. A total of 96 (80.7%) survivors were in the age group of ≥ 50 years. More than half ($n = 78, 65.5\%$) were male, more than three-fourths ($n = 104, 87.40\%$) of the survivors were married, and almost three-fourths ($n = 86, 72.3$) were from an urban background. A total of 49 (41.2%) survivors had knowledge of relative/friend dying due to COVID-19.

Levels of anxiety symptoms and depressive symptoms, posttraumatic stress disorder, and obsessive-compulsive symptoms

The data related to different levels of anxiety and depressive symptoms in COVID-19 survivors are presented in Table 1. The mean value of anxiety score was 7.12 ± 0.68 , and depression score was 8.08 ± 0.22 . For anxiety symptoms, 32 (26.89%) patients were borderline cases, and 21 (17.65%) patients were evaluated as abnormal. For depressive symptoms, 27 (22.68%) patients

Table 1: Levels of anxiety and depressive symptoms, posttraumatic stress disorder, and obsessive-compulsive disorder

| Scales | n | Rate (%) |
|--|----|----------|
| Anxiety score | | |
| 0-7 | 66 | 55.46 |
| 8-10 | 32 | 26.89 |
| >10 | 21 | 17.65 |
| Depression score | | |
| 0-7 | 46 | 38.65 |
| 8-10 | 27 | 22.68 |
| >10 | 46 | 38.65 |
| PTSD score | | |
| <33 | 89 | 74.79 |
| ≥ 33 | 30 | 25.21 |
| I wash my hands very often or in a special way to be sure I am not dirty or contaminated | | |
| Never | 21 | 17.6 |
| During COVID-19 pandemic | 98 | 82.4 |
| I am worried about dirt, germs, and viruses | | |
| Never | 21 | 17.6 |
| During COVID-19 pandemic | 98 | 82.4 |

PTSD=Posttraumatic stress disorder, COVID-19=Coronavirus disease-19

were borderline cases, and 46 (38.65%) patients were classified as abnormal. PTSD was seen in 30 (25.21%) survivors.

For anxiety symptoms, results showed that patients who aged ≥ 50 years had significantly higher rate of anxiety symptoms than those aged 30–49 years ($\chi^2 = 30.46, P = 0.001$), as shown in Table 2. Significant differences were observed in gender ($\chi^2 = 15.46, P = 0.001$), marital status ($\chi^2 = 26.21, P = 0.001$), education ($\chi^2 = 24.45, P = 0.001$), and knowledge of a relative/friend dying due to COVID-19 ($\chi^2 = 26.20, P = 0.001$), as shown in Table 3.

Table 4 shows that survivors who were aged ≥ 50 years had significantly higher rate of depressive symptoms than those aged 30–49 years ($\chi^2 = 53.11, P = 0.001$). Significant differences were observed in gender ($\chi^2 = 11.18, P = 0.003$), marital status ($\chi^2 = 52.56, P = 0.001$), and education ($\chi^2 = 17.47, P = 0.020$).

The mean PCL-5 score was 19.78 ± 0.88 . Table 4 shows that survivors who were aged ≥ 50 years had significantly higher posttraumatic symptoms than those aged 30–49 years ($\chi^2 = 7.67, P = 0.017$). Significant

differences were observed in gender ($\chi^2 = 5.62, P = 0.025$) and education ($\chi^2 = 13.57, P = 0.007$).

New-onset OC symptoms were seen in 98 (82.4%) survivors. OC symptoms were more significantly seen in those survivors who were aged ≥ 50 years had significantly higher posttraumatic symptoms than those aged 30–49 years ($\chi^2 = 6.22, P = 0.033$). Significant differences were observed in occupation ($\chi^2 = 11.83, P = 0.012$) and knowledge of a relative/friend dying due to COVID-19 ($\chi^2 = 4.52, P = 0.049$), as shown in Table 5. For hospital stay, anxiety and depressive symptoms were significantly seen in those having longer stay in the hospital, as shown in Table 6.

Discussion

Viral respiratory infections are associated with both short- and long-term psychopathological disturbances in the survivors.^[28] The degree of psychopathological reaction in an individual during COVID-19 may be related to several COVID-19-related factors. Panic of being diagnosed with COVID-19, unpredictable outcome and prognosis, shame and disgrace associated with the

Table 2: Anxiety-symptom-associated factors in coronavirus disease-19 survivors

| Characteristics | Anxiety | | | P |
|--|--------------|-------------------|----------------|-------|
| | Normal (0-7) | Borderline (8-10) | Caseness (11+) | |
| Age (years) | | | | |
| <30 | 2 | 11 | 0 | 0.001 |
| 30-49 | 3 | 5 | 2 | |
| ≥ 50 | 61 | 16 | 19 | |
| Gender | | | | |
| Male | 36 | 30 | 12 | 0.001 |
| Female | 30 | 2 | 9 | |
| Marital status | | | | |
| Single | 2 | 11 | 0 | 0.001 |
| Married | 62 | 21 | 21 | |
| Widow/widower | 2 | 0 | 0 | |
| Occupation | | | | |
| Farmer | 0 | 2 | 0 | 0.096 |
| Businessman | 13 | 12 | 4 | |
| Government employee | 25 | 7 | 8 | |
| Unemployed | 28 | 11 | 9 | |
| Residence | | | | |
| Urban | 49 | 25 | 12 | 0.230 |
| Rural | 17 | 7 | 9 | |
| Education | | | | |
| Illiterate | 2 | 6 | 4 | 0.001 |
| Studied up to 8 th | 25 | 6 | 9 | |
| Studied up to higher secondary level | 25 | 8 | 0 | |
| Graduate | 12 | 12 | 8 | |
| Postgraduate | 2 | 0 | 0 | |
| Knowledge of a relative/friend dying due to COVID-19 | | | | |
| Yes | 22 | 8 | 19 | 0.001 |
| No | 44 | 24 | 2 | |

COVID-19=Coronavirus disease-19

Table 3: Depression-associated factors in coronavirus disease-19 survivors

| Characteristics | Depression | | | P |
|--|--------------|-------------------|----------------|-------|
| | Normal (0-7) | Borderline (8-10) | Caseness (11+) | |
| Age (years) | | | | |
| <30 | 0 | 13 | 0 | 0.001 |
| 30-49 | 3 | 0 | 7 | |
| ≥50 | 43 | 14 | 39 | |
| Gender | | | | |
| Male | 22 | 19 | 37 | 0.003 |
| Female | 24 | 8 | 9 | |
| Marital status | | | | |
| Single | 0 | 13 | 0 | 0.001 |
| Married | 44 | 14 | 46 | |
| Widow/widower | 2 | 0 | 0 | |
| Occupation | | | | |
| Farmer | 0 | 0 | 2 | 0.063 |
| Businessman | 11 | 6 | 12 | |
| Government employee | 19 | 4 | 17 | |
| Unemployed | 16 | 17 | 15 | |
| Residence | | | | |
| Urban | 37 | 19 | 30 | 0.285 |
| Rural | 9 | 8 | 16 | |
| Education | | | | |
| Illiterate | 2 | 0 | 10 | 0.020 |
| Studied up to 8 th | 15 | 8 | 17 | |
| Studied up to higher secondary level | 15 | 10 | 8 | |
| Graduate | 12 | 9 | 11 | |
| Postgraduate | 2 | 0 | 0 | |
| Knowledge of a relative/friend dying due to COVID-19 | | | | |
| Yes | 16 | 11 | 22 | 0.451 |
| No | 30 | 16 | 24 | |

COVID-19=Coronavirus disease-19

disease, traumatic experiences of severe illness, and being quarantined or living alone during the pandemic are significant psychological stressors that may act as detrimental in defining the psychopathological outcome.^[13,29]

Our study indicates that close to half (44.54%) of the survivors exhibited a possible diagnosis of anxiety which is slightly higher than those reported by Kong *et al.*^[30] and Li *et al.*^[31] in China. The SARS-CoV-2 infection has been implicated in neuropsychiatric manifestations during and after SARS and MERS outbreaks.^[4]

In pandemics, there is a general increase in psychiatric comorbidity as has been seen in the SARS epidemic in the form of PTSD, depression, panic disorder, and OCD even at 1–50 months of follow-up.^[2,32,33] Our findings mirror the results from previous coronavirus outbreak studies, where the psychiatric morbidities ranged from 10% to 35% even in the postillness stage.^[34] Mazza *et al.* also reported high rates of PTSD, depression, anxiety, insomnia, and OC symptomatology in a sample of COVID-19 survivors, thus corroborating with our study results.^[35]

With regard to depression, our study indicates that more than half (61.33%) of the COVID-19 survivors interviewed show possible cases of depression. Zhang *et al.*^[36] conducted a similar study in China and found depression to be prevalent in only 29.2% of the sample, thus contradicting our findings. Xin Cai *et al.* in their study found a prevalence of 31%, 22.2%, and 38.1% for excessive stress, anxiety, and depression, respectively, in early convalescence of COVID-19 survivors. Prior published literature all over the globe has shown an incidence of mental disorders after major disasters to range from 10% to 20%.^[23,37,38]

The possible causes for higher psychiatric morbidity seem to be the severity of the disease, high infectivity as compared to prior pandemics,^[39] nonavailability of definitive antiviral therapy,^[39] and the risk of reinfection of the positive SARS-CoV-2 RNA in convalescence.^[40,41] Second, with the popularization of the Internet and smartphones, people are overwhelmed with all kinds of information, resulting in more misunderstandings about the disease, excessive worries, and unnecessary fears. A recent study found that heavy media use increases the incidence of PTSD and depression in social unrest.^[42]

Table 4: Posttraumatic stress disorder-associated factors in coronavirus disease-19 survivors

| Characteristics | Normal | PTSD | P |
|--|--------|------|-------|
| Age (years) | | | |
| <30 | 13 | 0 | 0.017 |
| 30-49 | 5 | 5 | |
| ≥50 | 71 | 25 | |
| Gender | | | |
| Male | 53 | 36 | 0.025 |
| Female | 25 | 5 | |
| Marital status | | | |
| Single | 13 | 0 | 0.089 |
| Married | 74 | 30 | |
| Widow/widower | 2 | 0 | |
| Occupation | | | |
| Farmer | 2 | 0 | 0.320 |
| Businessman | 19 | 10 | |
| Government employee | 33 | 7 | |
| Unemployed | 35 | 13 | |
| Residence | | | |
| Urban | 63 | 23 | 0.641 |
| Rural | 26 | 7 | |
| Education | | | |
| Illiterate | 4 | 8 | 0.007 |
| Studied up to 8 th | 30 | 10 | |
| Studied up to higher secondary level | 28 | 5 | |
| Graduate | 27 | 7 | |
| Postgraduate | 2 | 0 | |
| Knowledge of a relative/friend dying due to COVID-19 | | | |
| Yes | 37 | 12 | 1.0 |
| No | 52 | 18 | |

PTSD=Posttraumatic stress disorder, COVID-19=Coronavirus disease-19

Third, the isolation from family members and friends brings out helplessness and loneliness. Idleness during the isolation period is likely to lead to an increase in negative mood states, as well as worry about one’s physical health.^[12] Fourth, as indicated by the burden hypothesis,^[43] the COVID-19 epidemic affects the employment and incomes of most families, which adds to psychological distress.

Our study reports that a quarter (25.2%) of the COVID-19 survivors interviewed showed possible cases of PTSD. A similar prevalence of posttraumatic stress reactions 4–6 weeks postdischarge was reported in a study by Chang and Park in Korea.^[44] Compared to other infectious disease outbreaks, our study reported lower levels of PTSD than that reported on SARS survivors in Hong Kong.^[23] In previous disease outbreaks, the prevalence of PTSD after developing a serious infectious disease ranged from 4% to 41% in the general population^[7] and thus is in the range of our study results. Some factors, such as interpersonal conflict, lower socioeconomic status, female sex, frequent use of social media, and lower resilience and social support, have been

reported to increase the risk of PTSD.^[45] Similar results were reported previously while 25.5% of the survivors continued to meet criteria for PTSD even after 30 months of contracting SARS.^[46]

In the present study, 82.4% were obsessed with fears of contamination and an equal percentage (82.4%) had compulsive handwashing. The etiology of OCD is associated with the interplay of multiple risk factors, such as genes, environment, and life stressors.^[47] Our results almost corroborate with the study done by Abba-Aji *et al.* in Canada who studied a total of 6041 and found that 60.3% of the respondents had obsessions and 53.8% had compulsions to wash hands repeatedly or in a special way, both of which started during the COVID-19 pandemic.^[48]

In this study, OCD contamination symptoms were associated with age ≥50 years and those who were employed in government setup. These findings are in contrast with other studies reporting a significant association of OCD with younger age.^[49] The mean age of respondents in our study is 54.2 ± 4.22 years which is higher than the generally reported mean age of the onset of 17.9 years for OCD.^[50] This is important because the onset of OCD before 20 years of age is associated with a poor prognosis, whereas an onset over 20 tends to have a shorter course and better outcomes.^[51]

We also found that the anxiety-symptom-associated factors were age and gender, which is consistent with Wang *et al.*^[52] Individuals aged between 46 and 60 years often have the main responsibility and act as the backbone of their family – thus higher levels of anxiety in this age group. Moreover, females have probably a higher risk of anxiety than males. Acting as a leading caregiver in the family and being more sensitive to separation,^[52] women are more prone to have anxiety symptoms.

We found that age and hospital stays are factors affecting the rate of depressive symptoms in COVID-19 patients. As same as anxiety symptoms, patients aged 46–60 years also had a higher rate of depressive symptoms. The results of this study also showed that depressive symptoms were associated with anxiety symptoms, and the stressors that influenced anxiety symptoms increased the possibility of depressive symptoms, including financial burden and family responsibilities. The present study demonstrated that time since admission or length of hospitalization could be associated with depressive symptoms, which was consistent with Brooks *et al.*^[13] and Papaioannou *et al.*^[53]

The results of this early-stage pandemic study support the proposal that surveying the OCD symptom dimensions is important for future pandemic planning, where strict public health measures (e.g., requiring

Table 5: Obsessive-compulsive-symptom-associated factors in coronavirus disease-19 survivors

| Characteristics | OC symptoms/I am worried about dirt, germs, and viruses/I wash my hands very often or in a special way to be sure I am not dirty or contaminated | | P |
|--|--|--------------------------|-------|
| | Never | During COVID-19 pandemic | |
| Age (years) | | | |
| <30 | 0 | 13 | 0.033 |
| 30-49 | 4 | 6 | |
| ≥50 | 17 | 79 | |
| Gender | | | |
| Male | 12 | 66 | 0.449 |
| Female | 9 | 32 | |
| Marital status | | | |
| Single | 0 | 13 | 0.147 |
| Married | 21 | 83 | |
| Widow/widower | 0 | 2 | |
| Occupation | | | |
| Farmer | 2 | 0 | 0.012 |
| Businessman | 2 | 27 | |
| Government employee | 8 | 32 | |
| Unemployed | 9 | 39 | |
| Residence | | | |
| Urban | 14 | 72 | 0.593 |
| Rural | 7 | 26 | |
| Education | | | |
| Illiterate | 2 | 10 | 0.818 |
| Studied up to 8 th | 6 | 34 | |
| Studied up to higher secondary level | 8 | 25 | |
| Graduate | 5 | 27 | |
| Postgraduate | 0 | 2 | |
| Knowledge of a relative/friend dying due to COVID-19 | | | |
| Yes | 13 | 36 | 0.049 |
| No | 8 | 62 | |

OC=Obsessive-compulsive, COVID-19=Coronavirus disease-19

Table 6: Association of anxiety, depression, and posttraumatic stress disorder with days of hospital stay

| Parameters | Days of hospital stay | | | P |
|-------------------|-----------------------|------|-----|-------|
| | ≤7 | 8-14 | >14 | |
| Anxiety | | | | |
| Normal (0-7) | 33 | 33 | 0 | 0.001 |
| Borderline (8-10) | 14 | 18 | 0 | |
| Caseness (11+) | 0 | 10 | 11 | |
| Depression | | | | |
| Normal (0-7) | 17 | 29 | 0 | 0.001 |
| Borderline (8-10) | 14 | 13 | 0 | |
| Caseness (11+) | 16 | 19 | 11 | |
| PTSD | | | | |
| Normal | 39 | 43 | 7 | 0.226 |
| PSTD | 8 | 18 | 4 | |

PTSD=Posttraumatic stress disorder

regular handwashing, use of facemask, and social distancing) are implemented or enforced.

Our study should be viewed with few limitations. Cross-sectional design and small sample size may

limit the generalizability of the study. Several variables that could be potential risk factors for psychiatric comorbidity, such as personal characteristics and social support, were not investigated in the present study. Lack of control group and convenient sampling may give biased results.

Conclusion

Our study suggests that anxiety, depression, PTSD, and OC symptoms are common among COVID-19 survivors. Our data support the proposal that public health advice during pandemics should incorporate mental health wellness campaigns aiming to reduce the psychological impact of pandemics. Cognitive behavior therapy and interpersonal therapy need to be explored as part of overall mental health-care package interventions.

Acknowledgment

The authors would like to thank participants who participated generously.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

- Shigemura J, Ursano RJ, Morganstein JC, Kurosawa M, Benedek DM. Public responses to the novel 2019 coronavirus (2019-nCoV) in Japan: Mental health consequences and target populations. *Psychiatry and clinical neurosciences*. 2020 Apr; 74 (4):281.
- Park HY, Jung J, Park HY, Lee SH, Kim ES, Kim HB, Song KH. Psychological Consequences of Survivors of COVID-19 Pneumonia 1 Month after Discharge. *Journal of Korean medical science*. 2020 Dec 7;35 (47).
- Park HY, Park WB, Lee SH, Kim JL, Lee JJ, Lee H, Shin HS. Posttraumatic stress disorder and depression of survivors 12 months after the outbreak of Middle East respiratory syndrome in South Korea. *BMC public health*. 2020 Dec; 20:1-9.
- Rogers JP, Chesney E, Oliver D, Pollak TA, McGuire P, Fusar-Poli P, Zandi MS, Lewis G, David AS. Psychiatric and neuropsychiatric presentations associated with severe coronavirus infections: A systematic review and meta-analysis with comparison to the COVID-19 pandemic. *The Lancet Psychiatry*. 2020 Jul 1;7 (7):611-27.
- Miao XR, Chen QB, Wei K, Tao KM, Lu ZJ. Posttraumatic stress disorder: From diagnosis to prevention. *Military Medical Research*. 2018 Dec; 5 (1):1-7.
- Kucharski AJ, Russell TW, Diamond C, Liu Y, Edmunds J, Funk S, et al. Early dynamics of transmission and control of COVID-19: A mathematical modelling study. *Lancet Infect Dis* 2020;20:553-8.
- Torales J, O'Higgins M, Castaldelli-Maia JM, Ventriglio A. The outbreak of COVID-19 coronavirus and its impact on global mental health. *Int J Soc Psychiatry* 2020;66:317-20.
- Liu CH, Zhang E, Wong GT, Hyun S. Factors associated with depression, anxiety, and PTSD symptomatology during the COVID-19 pandemic: Clinical implications for US young adult mental health. *Psychiatry research*. 2020 Aug 1;290:113172. <https://doi.org/10.1016/j.psychres.2020.113172>
- Sun L, Sun Z, Wu L, Zhu Z, Zhang F, Shang Z, Jia Y, Gu J, Zhou Y, Wang Y, Liu N. Prevalence and risk factors of acute posttraumatic stress symptoms during the COVID-19 outbreak in Wuhan, China. *MedRxiv*. 2020 Jan 1. <https://doi.org/10.1101/2020.03.06.20032425>
- Fekih-Romdhane F, Ghrissi F, Abbassi B, Cherif W, Cheour M. Prevalence and predictors of PTSD during the COVID-19 pandemic: Findings from a Tunisian community sample. *Psychiatry Research*. 2020 Aug; 290:113131. <https://doi.org/10.1016/j.psychres.2020.113131>
- Forte G, Favieri F, Tambelli R, Casagrande M. COVID-19 pandemic in the Italian population: Validation of a post-traumatic stress disorder questionnaire and prevalence of PTSD symptomatology. *International journal of environmental research and public health*. 2020 Jan; 17 (11):4151.
- Xiang YT, Yang Y, Li W, Zhang L, Zhang Q, Cheung T, et al. Timely mental health care for the 2019 novel coronavirus outbreak is urgently needed. *Lancet Psychiatry* 2020;7:228-9.
- Brooks SK, Webster RK, Smith LE, Woodland L, Wessely S, Greenberg N, et al. The psychological impact of quarantine and how to reduce it: Rapid review of the evidence. *The lancet*. 2020 Mar 14;395 (10227):912-20.
- Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *bmj*. 2020 Mar 26;368. <https://doi.org/10.1136/bmj.m1211>
- Asmundson GJ, Taylor S. Coronaphobia: Fear and the 2019-nCoV outbreak. *Journal of anxiety disorders*. 2020 Mar; 70:102196. [10.1016/j.janxdis.2020.102196](https://doi.org/10.1016/j.janxdis.2020.102196)
- Li S, Wang Y, Xue J, Zhao N, Zhu T. The impact of COVID-19 epidemic declaration on psychological consequences: A study on active Weibo users. *International journal of environmental research and public health*. 2020 Jan; 17 (6):2032. <https://doi.org/10.3390/ijerph17062032>.
- Rosso G, Albert U, Asinari GF, Bogetto F, Maina G. Stressful life events and obsessive-compulsive disorder: Clinical features and symptom dimensions. *Psychiatry research*. 2012 May 30;197 (3):259-64. <https://doi.org/10.1016/j.psychres.2011.10.005>
- World Health Organization (WHO). Novel Coronavirus (2019-nCoV) Situation Reports; 2020. Available from: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports>. [Last accessed on 2020 Jun 09].
- Djukanovic I, Carlsson J, Årestedt K. Is the Hospital Anxiety and Depression Scale (HADS) a valid measure in a general population 65-80 years old? A psychometric evaluation study. *Health Qual Life Outcomes* 2017;15:193.
- Rishi P, Rishi E, Maitray A, Agarwal A, Nair S, Gopalakrishnan S. Hospital anxiety and depression scale assessment of 100 patients before and after using low vision care: A prospective study in a tertiary eye-care setting. *Indian J Ophthalmol* 2017;65:1203.
- Bah AJ, James PB, Bah N, Sesay AB, Sevalie S, Kanu JS. Prevalence of anxiety, depression and post-traumatic stress disorder among Ebola survivors in northern Sierra Leone: A cross-sectional study. *BMC Public Health* 2020;20:1391.
- Turon H, Carey M, Boyes A, Hobden B, Dilworth S, Sanson-Fisher R. Agreement between a single-item measure of anxiety and depression and the Hospital Anxiety and Depression Scale: A cross-sectional study. *PLoS One* 2019;14:e0210111.
- Luceño-Moreno L, Talavera-Velasco B, García-Albuérne Y, Martín-García J. Symptoms of posttraumatic stress, anxiety, depression, levels of resilience and burnout in Spanish health personnel during the COVID-19 pandemic. *Int J Environ Res Public Health* 2020;17:5514.
- Waterman S, Hunter EC, Cole CL, Evans LJ, Greenberg N, Rubin GJ, et al. Training peers to treat Ebola centre workers with anxiety and depression in Sierra Leone. *Int J Soc Psychiatry* 2018;64:156-65.
- Blevins CA, Weathers FW, Davis MT, Witte T, Domino JL. The posttraumatic stress disorder checklist for DSM-5 (PCL-5): Development and Initial Psychometric Evaluation. *J Trauma Stress* 2015;28:489-98.
- Ibrahim H, Ertl V, Catani C, Ismail AA, Neuner F. The validity of posttraumatic stress disorder checklist for DSM-5 (PCL-5) as screening instrument with Kurdish and Arab displaced populations living in the Kurdistan region of Iraq. *BMC Psychiatry* 2018;18:259.
- Bejerot S, Edman G, Anckarsäter H, Berglund G, Gillberg C, Hofvander B, et al. The Brief Obsessive-Compulsive Scale (BOCS): A self-report scale for OCD and obsessive-compulsive related disorders. *Nord J Psychiatry* 2014;68:549-59.
- Bohmwald K, Gálvez NM, Ríos M, Kalergis AM. Neurologic alterations due to respiratory virus infections. *Front Cell Neurosci* 2018;12:386.
- de Medeiros Carvalho PM, Moreira MM, de Oliveira MN, Landim JM, Neto ML. The psychiatric impact of the novel coronavirus outbreak. *Psychiatry research*. 2020 Apr; 286:112902. <https://doi.org/10.1016/j.psychres.2020.112902>
- Kong X, Zheng K, Tang M, Kong F, Zhou J, Diao L, Wu S, Jiao P, Su T, Dong Y. Prevalence and factors associated with depression and anxiety of hospitalized patients with COVID-19. *MedRxiv*.

- 2020 Jan 1. <https://doi.org/10.1101/2020.03.240.20043075>
31. Li X, Tian J, Xu Q. The Associated Factors of Anxiety and Depressive Symptoms in COVID-19 Patients Hospitalized in Wuhan, China. *Psychiatric Quarterly*. 2020 Nov 23;1-9. <https://doi.org/10.1007/s11126-020-09865-9>
 32. Wu Y, Xu X, Chen Z, Duan J, Hashimoto K, Yang L, *et al.* Nervous system involvement after infection with COVID-19 and other coronaviruses. *Brain Behav Immun* 2020;87:18-22.
 33. Zheng Y, Xiao L, Xie Y, Wang H, Wang G. Prevalence and Characteristics of Obsessive-Compulsive Disorder Among Urban Residents in Wuhan During the Stage of Regular Control of Coronavirus Disease-19 Epidemic. *Frontiers in psychiatry*. 2020 Dec 16;11:1435.
 34. Zamanian M, Ahmadi D, Sindarreh S, Aleebrahim F, Vardanjani HM, Faghihi SH, *et al.* Fear and rumor associated with COVID-19 among Iranian adults, 2020. *J Educ Health Promot* 2020;9:355.
 35. Mazza MG, De Lorenzo R, Conte C, Poletti S, Vai B, Bollettini I, *et al.* Anxiety and depression in COVID-19 survivors: Role of inflammatory and clinical predictors. *Brain Behav Immun* 2020;89:594-600.
 36. Zhang J, Lu H, Zeng H, Zhang S, Du Q, Jiang T, *et al.* The differential psychological distress of populations affected by the COVID-19 pandemic. *Brain Behav Immun* 2020;87:49-50.
 37. Pietrzak RH, Tracy M, Galea S, Kilpatrick DG, Ruggiero KJ, Hamblen JL, *et al.* Resilience in the face of disaster: Prevalence and longitudinal course of mental disorders following hurricane Ike. *PLoS One* 2012;7:e38964.
 38. Makwana N. Disaster and its impact on mental health: A narrative review. *J Family Med Prim Care* 2019;8:3090-5.
 39. Cascella M, Rajnik M, Cuomo A, Dulebohn SC, Di Napoli R. Features, evaluation and treatment coronavirus (COVID-19). *Statpearls [internet]*. 2020 Mar 8.
 40. Qu YM, Kang EM, Cong HY. Positive result of Sars-Cov-2 in sputum from a cured patient with COVID-19. *Travel medicine and infectious disease*. 2020 Mar 1. 10.1016/j.tmaid. 2020.101619
 41. Chen D, Xu W, Lei Z, Huang Z, Liu J, Gao Z, *et al.* Recurrence of positive SARS-CoV-2 RNA in COVID-19: A case report. *Int J Infect Dis* 2020;93:297-9.
 42. Ni MY, Yao XI, Leung KS, Yau C, Leung CM, Lun P, *et al.* Depression and post-traumatic stress during major social unrest in Hong Kong: A 10-year prospective cohort study. *Lancet* 2020;395:273-84.
 43. Achdut N, Refaeli T. Unemployment and psychological distress among young people during the COVID-19 pandemic: Psychological resources and risk factors. *Int J Environ Res Public Health* 2020;17:7163.
 44. Chang MC, Park D. Incidence of post-traumatic stress disorder after coronavirus disease. *Healthcare (Basel)* 2020;8:373.
 45. Mowbray H. In Beijing, coronavirus 2019-nCoV has created a siege mentality. *BMJ* 2020;368:m516.
 46. Xiao S, Luo D, Xiao Y. Survivors of COVID-19 are at high risk of posttraumatic stress disorder. *Glob Health Res Policy* 2020;5:29.
 47. Fontenelle LF, Cocchi L, Harrison BJ, Miguel EC, Torres AR. Role of stressful and traumatic life events in obsessive-compulsive disorder. *Neuropsychiatry* 2011;1:61.
 48. Abba-Aji A, Li D, Hrabok M, Shalaby R, Gusnowski A, Vuong W, *et al.* COVID-19 pandemic and mental health: prevalence and correlates of new-onset obsessive-compulsive symptoms in a Canadian province. *Int J Environ Res Public Health* 2020;17:6986.
 49. Subramaniam M, Abdin E, Vaingankar JA, Chong SA. Obsessive-compulsive disorder: Prevalence, correlates, help-seeking and quality of life in a multiracial Asian population. *Soc Psychiatry Psychiatr Epidemiol* 2012;47:2035-43.
 50. Brakoulias V, Starcevic V, Belloch A, Brown C, Ferrao YA, Fontenelle LF, *et al.* Comorbidity, age of onset and suicidality in obsessive-compulsive disorder (OCD): An international collaboration. *Compr Psychiatry* 2017;76:79-86.
 51. Anholt GE, Aderka IM, Van Balkom AJ, Smit JH, Schruers K, Van Der Wee NJ, *et al.* Age of onset in obsessive-compulsive disorder: Admixture analysis with a large sample. *Psychol Med* 2013;44:185-94.
 52. Wang Y, Di Y, Ye J, Wei W. Study on the public psychological states and its related factors during the outbreak of coronavirus disease 2019 (COVID-19) in some regions of China. *Psychology, health & medicine*. 2021 Jan 2;26 (1):13-22. <https://doi.org/10.1080/135485060.2020.1746817>
 53. Papaioannou AI, Bartziokas K, Tsikrika S, Karakontaki F, Kastanakis E, Banya W, *et al.* The impact of depressive symptoms on recovery and outcome of hospitalized COPD exacerbations. *Eur Respir J* 2013;41:815-23.