ORIGINAL ARTICLE

Depression and Anxiety among COVID-19 Indian Intensive Care Unit Survivors: A Prospective Observational Study

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Abstract

Background: Long-lasting physical, cognitive, and mental health sequelae including depression and anxiety are common in intensive care unit (ICU) survivors.

Aim: This study was aimed to assess the immediate and medium-term mental health sequelae – depression and anxiety among coronavirus disease-2019 (COVID-19) ICU survivors.

Methods: The COVID-19 ICU Survivors of a tertiary level ICU were recruited into this study from 1 July 2020 to 31 October 2020. Willing participants were circulated with an electronic questionnaire. It consisted of demographics and questionnaires related to COVID-19 disease, comorbidities, and a patient health questionnaire (PHQ-9) scale for depression, and generalized anxiety disorder (GAD-7) scale for anxiety. Responses were collected at the time of discharge. Follow-up was done at 2 weeks and 6 months.

Results: Among the 133 COVID-19 ICU survivors contacted, 91 survivors submitted the baseline data at the time of discharge. Fourteen and another 11 survivors were lost to follow-up at 2 weeks and at 6 months. The median age was 52.75 and 68.1% ($n = 62/91$) were male. The median PHQ-9 and GAD-7 scores showed a statistically significant decrease at 2 weeks and a non-significant decrease at 6 months compared to baseline scores. The GAD-7 score was the same or worse between baselines to 2 weeks, but it reduced between baseline to 6 months for all variables and their subgroups.

Conclusion: This study revealed a high prevalence of anxiety and depression in the immediate post-discharge period. These findings suggest the need for better mental rehabilitation strategies to deal with the well-being of critically ill survivors in future pandemics.

Keywords: Anxiety, Coronavirus disease-2019, Depression, Intensive care unit survivors, Mental health, Well-being.

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Introduction

Coronavirus disease-2019 is a severe acute respiratory infection caused by severe acute respiratory syndrome-coronavirus-2 (SARS-CoV-2). It started as an outbreak in Wuhan, Hubei Province of China, and spread rapidly globally becoming a pandemic of 2020.[1] It is a highly contagious disease with a varying spectrum of clinical presentations most common being respiratory symptoms.[2] However, indirect symptomatology of mental, and psychological problems such as stress, anxiety, insomnia, and depression are also prevalent among COVID-19-infected patients and health care workers.[3] These indirect symptomatologies are further aggravated by the fear of high contagiousness, rapid spread, active and passive quarantine of COVID-19 patients from family, changes in circadian rhythm due to isolation, lack of availability of dedicated health care services, improper self-care, inadequate stay and food during isolation, infrequent and inadequate interactions, and communications with family and friends (the need of modern/digital era). In addition, less time and no space for recreational activities further exacerbate emotional and psychological problems.[4,5]

We speculated that the limited but evolving evidence-based treatment options in COVID-19 critical care combined with high mortality among ICU admitted patients and lack of well-established clinical services have disastrous outcomes. Further, various above-mentioned risk factors, compromised ICU clinical care delivery services, and a dearth of robust mental health care services (psychological or psychiatric counseling) among COVID-19 survivors

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had a negative impact on immediate and long-term clinical outcomes. There was and there still is a social stigma attached to the disease affecting the emotional and psychological problems among COVID-19 patients.

It is worth noting that the experience from the previous severe acute respiratory syndrome (SARS) outbreak has shown high levels of depression; anxiety and stress-related issues with long-term psychological implications among SARS-infected survivors and health care providers.[6–8] At present, various mental health services described in the COVID-19 literature are single-point time surveys during the peak of COVID-19.[3,5] However, there is no documentation of immediate-, medium- and long-term implications for COVID-19 survivors. Hence, this study was planned to assess the immediate and medium-term depression and anxiety among COVID-19 survivors who required ICU admission for their illness.

Methods

Study Design

This was a prospective observational study carried out at the super-specialty referral center (Level-III COVID-19 care center) after approval from the Institutional Ethics Committee (IEC; IEC code: 2020-207-IP-EXP-23) and was registered at the Clinical Trials Registry of India (REF/CTRI/2020/07/026612). Initially, the study was protocolized for a multi-centric study design, and invitations were sent to four other participating centers (tertiary level-III COVID-19 care centers). These four other participating centers expressed interest in the study participation initially, however, eventually withdrew from the study, and no reasons were submitted for withdrawal. Hence, the study was carried out as a single-center study from 1 July 2020 to 31 May 2021.

Inclusion and Exclusion Criteria

All adult patients admitted to the ICU of the COVID-19 care facility, with confirmed positive reverse transcriptase polymerase chain reaction for SARS-CoV-2 done on nasopharyngeal and oral swab samples, and requiring respiratory support (recovered from the ventilator or non-invasive ventilator or requirement of at least more than 12 L/minute oxygen) at any point during the stay of ICU and surviving hospital discharge to home isolation were considered for inclusion into the study. Survivors who did not consent to the study, survivors with communication problems, no formal education, and age less than 18 years were excluded from the study.

Outcome Measures

Depression and Anxiety Scales

- Patient health questionnaire-9 depression scale (range, 0–27)[9]
  - 0–4: Normal/minimal
  - 5–9: Mild
  - 10–14: Moderate
  - 15–19: Moderately severe
  - 20–27: Severe
- Generalized anxiety disorder-7 anxiety scale (range, 0–21)[10]
  - 0–4: Normal/minimal
  - 5–9: Mild
  - 10–14: Moderate
  - 15–21: Severe

The cutoff scores for detecting symptoms of major depression, and anxiety were 10 and 7, respectively. These validated scales are copyright free and are available for download from the Internet with instructions on measurement.[9,10]

Recruitment and Data Collections

Survivors were recruited into the study from 1 July 2020 to 31 October 2020 and the last follow-up was completed on 31 May 2021 after 6 months from the last patient recruitment. Patients planned for discharge to home isolation were discussed with clinical in-charges of particular ICUs and were contacted telephonically one day prior to planned discharge for inclusion into the study. Study details were discussed with all the eligible COVID-19 patients and relevant study information was shared electronically using regionally popular messaging applications by the chief investigator. Additionally, further deliberation of the study was done by the doctor on duty in the ICU care facility who had donned personal protective equipment (since we were dealing with a highly contagious virus, strict isolations and social distancing were mandatory to curb the disease spread, and it was not possible for the chief investigator to discuss the study details with COVID-19 patients physically). All willing participants were recruited and consent was taken using Google Forms.

All willing participants were circulated with the electronic questionnaire using messaging applications. This questionnaire consisted of demographics of participants, generalized questionnaires related to COVID-19 disease, comorbidities including past psychiatric illnesses, and PHQ-9 and GAD-7 scales. The responses were collected in an online format using Google Forms on the day of discharge. Then patients were followed up at 2 weeks, and depression and anxiety were evaluated. Optionally, data were also collected for PHQ-9 and GAD-7 scores at 6-months duration for assessing depression and anxiety to compare to baseline and 2-weeks scores. All data were self-reported by participants, and last the follow-up was completed in May 2021. This study closely adhered to the STROBE statement and a completed strengthening the reporting of observational study in epidimiology (STROBE) checklist is uploaded as a supplement (Supplementary Material).

Sample Size Calculation

Assuming at least 50% of ICU survivors in the COVID-19 pandemic were suffering from moderate-to-severe mental and psychological problems and at 20% relative error of the assumed prevalence and minimum two-sided 95% confidence interval, a minimum sample size was required 97. The sample size was estimated using the software Power analysis and sample size version 16 (PASS-16, NCSS, LLC, USA). Finally, a targeted sample size of 100 was chosen for the study.

Statistical Analysis

Data were collected using Google Forms and transferred into Microsoft Excel 2010. Continuous variables were presented in mean ± standard deviation (SD)/median [interquartile range or (IQR)]. To test the change in pre and post-observation between continuous measurements, signed-rank test was used. Categorical variables were presented in frequency (%) and compared by Chi-squared test/Fisher's exact test. A $p < 0.05$ was taken as statistically significant. Statistical package for social sciences (SPSS), version 23 (IBM, Chicago, USA) used for data analysis.

Results

In this study, a total of 133 patients were contacted, of which only 96 expressed their interest in participating in the study (Flowchart 1).

Flowchart 1: Flowchart of study participants

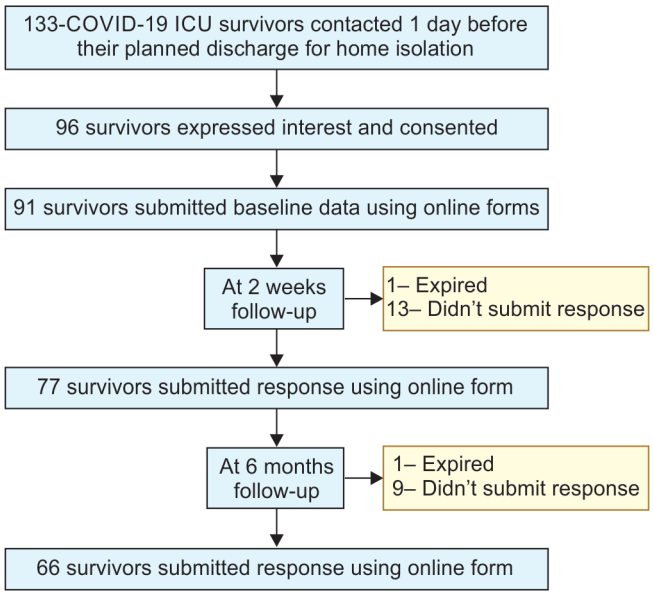

Table 1: Distribution of frequencies of PHQ-9 and GAD-7 at baseline, 2-weeks, and 6-months

Variables	*Severity*	*Baseline N (%)*	*2 weeks N (%)*	*6 weeks N(%)*
PHQ-9, depression	Minimal	10 (11)	21 (27.3)	30 (44.8)
	Mild	46 (50.5)	33 (42.9)	24 (35.8)
	Moderate	23 (25.3)	17 (22.1)	10 (14.9)
	Moderately severe	9 (9.9)	4 (5.2)	1 (1.5)
	Severe	3 (3.3)	2 (2.6)	2 (3.0)
GAD-7, anxiety	Minimal	40 (44)	18 (23.1)	35 (52.2)
	Mild	42 (46.1)	49 (62.8)	22 (32.8)
	Moderate	4 (4.4)	6 (7.7)	7 (10.4)
	Severe	5 (5.5)	5 (6.4)	3 (4.5)

GAD-7, Generalized anxiety disorder-7; PHQ-9, Patient health questionnaire-9

A total of 91 study patients submitted the baseline data including demographics and including questionnaires. Among the 91 patients recruited at baseline, 14 patients were lost to follow-up at 2 weeks and another 11 patients were lost to follow-up at 6 months. Mean and median age of the patients was 52.75 and 55 years with a maximum of 68.1% ($n = 62/91$) were males.

The distribution of various scores of PHQ-9 and GAD-7 at baseline, 2-weeks, and 6-months have been represented in Table 1. At the time of discharge from ICU, depression was mild in 50.5%, moderate in 25.3%, moderately severe in 9.9%, and severe 3.3%; however, depression was minimal in 11% of patients; and anxiety was mild in 46.1%, moderate in 4%, severe in 5.5%; however, anxiety was minimal in 44% of patients. The PHQ-9 scale showed a decrease in the distribution scores uniformly from baseline to 6-months period in mild, moderate, and moderately severe categories. The GAD-7 scale shows an increase in the distribution of the mild category at 2 weeks followed by a decrease at 6 months.

The overall PHQ-9 score showed a significantly ($p < 0.001$) decreasing trend from baseline to 6 months and the difference was found statistically significant from baseline to 2 weeks (median: 9 vs 7, $p < 0.05$) and baseline to 6 months (median: 9 vs 5, $p < 0.05$) as well as from 2 weeks to 6 months (median: 7 vs 5, $p < 0.05$), respectively. However, overall, the GAD-7 score did not follow similar trends as displayed by the PHQ-9 score. The GAD-7 showed a significant increase in score from baseline to 2 weeks (5 vs 6, $p < 0.05$) but significantly decreased from 2 weeks to 6 months (6 vs 4, $p < 0.05$) whereas the score was insignificantly decreased from baseline to 6 months (5 vs 4, $p > 0.05$) (Table 2, Fig. 1).

Observed scores of PHQ-9 and GAD-7 were converted into percentage observed scores (after dividing by their maximum score and multiplying by 100). For assessment of change in PHQ-9 and GAD-7 scores over the follow-up with respect to baseline (where decreasing or negative scores from baseline showed improvement in anxiety and depression), observed differences (%) were calculated. The calculated differences were 2 weeks–baseline, 6 months–baseline, and 6 months–2 weeks (Table 3). Results showed that median PHQ-9 scores were decreasing between baseline to 2 weeks and baseline to 6-months whereas GAD-7 was decreasing only between baseline to 6-months. Improvement in PHQ-9 and GAD-7 scores were compared between socioeconomic, demographic, and comorbid conditions. The result showed that the PHQ-9 score was reduced

Table 2: Baseline and follow-up score in study participants ($N = 91$)

Variable	*Mean*	*SD*	*Median*	*Q1*	*Q3*	*p-value*	*Multiple comparisons ($p < 0.05$)*
Age	52.75	14.50	55	39	62	–	–
Patient health questionnaire-9 – depression scale							
Baseline ($n = 91$)	9.19	4.43	9	6	12	<0.001	B/L-2W
2 weeks ($n = 77$)	7.9	4.51	7	4	10		B/L-6M
6 months ($n = 66$)	5.85	4.73	5	3	9		2W-6M
Generalized anxiety disorder-7 anxiety scale							
Baseline ($n = 91$)	5.77	4.08	5	3	8	<0.001	B/L-2W
2 weeks ($n = 77$)	6.77	3.67	6	5	8		2W-6M
6 months ($n = 66$)	5.04	4.87	4	0	7		–

Friedman test used followed by multiple comparisons using Bonferroni corrections; $p < 0.05$ significant; BL, Baseline; 2W, 2 weeks; 6M, 6 months

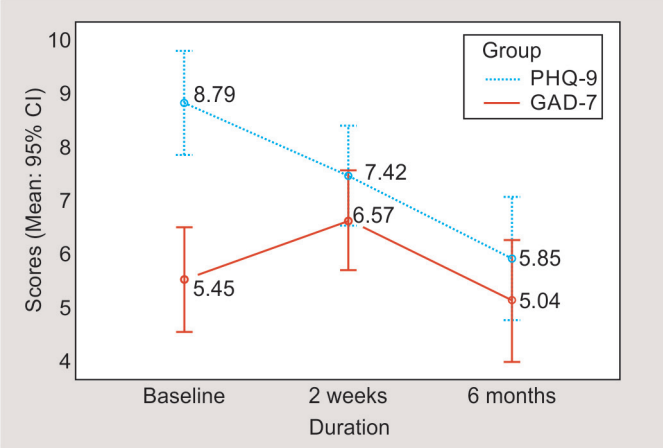

Fig. 1: Trends of PHQ-9 and GAD-7 scores over period from discharge to 2 weeks and 6 months. PHQ-9, patient health questionnaire-9; GAD-7, generalized anxiety disorder-7

(i.e., depression level was reduced) at 2 weeks as well as 6 months from baseline for all variables and their subgroups whereas GAD-7 score (anxiety level) was either the same or became worst between baseline to 2-weeks, but it reduced between baseline to 6-months for all variables and their subgroups.

Discussion

This prospective study among COVID-19 ICU survivors with follow-up of 6-months showed that the majority of survivors had mild degrees of depression and anxiety at the time of discharge and only a few had clinically significant depression and anxiety. These depression scores showed a gradual decline over a period of 6 months. However, the anxiety scores showed an increase at 2 weeks from discharge followed by a decrease at 6 months post-discharge.

Prior to conducting this study, there were no short-term or long-term follow-up studies on depression and anxiety among COVID-19 ICU survivors. Statistics from early in the pandemic indicated approximately 20% of individuals infected with SARS-CoV-2 developed a severe illness that required hospitalization and out of these 25% of the patients required an stay and most required mechanical ventilation.[11–13]

Studies from the initial days of the COVID-19 pandemic showed varying degrees of stress, anxiety, and depression. There were 16.5% general population who showed moderate-to-severe depressive symptoms and 28.8% anxiety during the imposed compulsory restrictions.[14] Similarly, self-isolations of individuals for 14 days during the COVID-19 epidemic, resulted in higher anxiety and was positively correlated with stress while negatively correlated to the quality of sleep[15]

A cross-sectional study on the prevalence of depression and anxiety in a study from northern India also showed depression rates of 27 and anxiety of 67%. However, the study population had mild category disease.[16] Another multicentric cross-sectional study showed clinically significant depression and anxiety in 12.7 and 21.4% among survivors of moderate-to-severe COVID-19 illness; however, the majority of cases (83.5%) were having a mild disease.[17] Our center was designated level-III COVID-19 care center and hence we admitted the majority of patients with moderate-to-severe COVID-19 illness requiring ICU requiring higher oxygen support and also in the earlier days of the COVID-19 pandemic there was the unpredictable course of the disease. The reported depression was mild in 50.5%, moderate in 25.3%, moderately severe in 9.9%, and severe in 3.3%; and reported anxiety was mild in 46.1%, moderate in 4%, severe in 5.5% among illness survivors at the time of discharge. The reasons for the higher prevalence of milder categories of depression and anxiety at the time of discharge in our study could be multifactorial. During the initial admission time, the majority of patients were disheartened by the fact of COVID-19 stigma, and the virulence of the disease, requiring complete isolation from the family in

Table 3: Percentage change in scores at 2 weeks and 6 months from baseline

	PHQ-9		*GAD-7*	
Variable	*B/L to 2W (n =77)*	*B/L to 6M (n = 66)*	*B/L to 2W (n = 77)*	*B/L to 6M (n = 66)*
Change in score (%)	−12.5 (−40, 0) ($p < 0.001$)	−42.8(−72.5, 22.62) ($p < 0.001$)	0 (0, 50) ($p = 0.004$)	-40 (−100, 36.7) ($p = 0.215$)
Age group				
≤40(25)	0.00 (−25.56, 1.25) ($p = 0.86$)	−33.33 (−60.23, 9.73), ($p = 0.129$)	0.00 (0.00, 62.5)($p = 0.109$)	−50 (−10, 33)
41–60(38)	−23.08 (50, 0)($p < 0.01$)	−53.49 (−57.22, −4.16), ($p < 0.01$)	0.00 (0.00, 50.00), ($p < 0.01$)	−50 (−100, 25), ($p = 0.173$)
>60(28)	−6.25 (−38.12,14.88)	44.44 (−71.57, 35.35), ($p = 0.68$)	11.11 (−2.78, 54.16), ($p = 0.089$)	28.57 (−100, 22.22), ($p = 0.512$)
Gender				
Male (62)	−20 (−41, 0) ($p < 0.01$)	−41.43 (−73.75, 12.50), ($p < 0.01$)	6 (5, 8) ($p < 0.01$)	4 (0, 7) ($p = 0.358$)
Female (29)	0 (−26.70, 0) ($p = 0.120$)	−55.56 (−83.33, 54.76), ($p = 0.170$)	0 (0, 56.33) ($p = 0.047$)	−42.22 (−92.85, 93.75), ($p = 0.807$)
Marital status				
Married (79)	−5.55 (−38.12, 1.25) ($p < 0.01$)	−43.65 (−73.75, 12.50), ($p < 0.01$)	0 (0, 50) ($p < 0.01$)	−48.53 (−100, 31.24), ($p = 0.356$)
Unmarried/others (12)	−27.27 (−42.86, −8.33) ($p < 0.01$)	−11.11 (−81.82, 68.75), ($p = 1.00$)	0 (−33.33, 100) ($p = 1.00$)	0 (−53.33, 87.5) ($p = 0.269$)
Education				
Primary (16)	0 (−24.30, 25) ($p = 0.910$)	−60 (−100, 38.09) ($p = 0.155$)	0 (0, 100) ($p = 0.057$)	(−100 −00, 33) ($p = 0.651$)
Secondary (16)	−18.88 (−40.18, 0) ($p = 0.169$)	−40 (−80, 16.38) ($p = 0.88$)	−13.89 (−25, 64.58), ($p = 0.281$)	−32.14 (−100, 0) ($p = 0.251$)
Tertiary (59)	−13.46 (−42.86, 0) ($p < 0.01$)	−42.86 (−68.33, 22.62), ($p < 0.01$)	0 (0, 50) ($p < 0.01$)	−34.28(−66.67, 68.75), ($p = 0.983$)
Residence				
Rural (30)	−4.16 (−21.25, 7.32) ($p = 0.212$)	−40 (−80, 33.33) ($p = 0.016$)	0 (0, 31.24) ($p = 0.105$)	−63.33 (−100, −12.50), ($p = 0.169$)
Urban (61)	−22.22 (−50, 0) ($p < 0.01$)	−41.25 (73.65, 19.64), ($p < 0.01$)	5.55 (0, 100) ($p < 0.01$)	−14.29 (−69.05, 53.33), ($p = 0.764$)
Family type				
Joint (28)	−13.33 (−41.93, 8.75) ($p < 0.01$)	−55.56 (−84.44, −1.66), ($p < 0.01$)	0 (2.77, 37.50) ($p = 0.029$)	−66.67 (−100, −12.5), ($p = 0.126$)
Nuclear (63)	−12.50 (−50, 0) ($p < 0.01$)	−26.78 (−65.91, 41.52), ($p = 0.160$)	0 (0, 81.25) ($p < 0.01$)	0 (-50, 100) ($p = 0.236$)
Comorbidities				
Yes (46)	−12.91 (−39.37, 0) ($p < 0.01$)	−45.45 (−73.23, 8.33), ($p < 0.01$)	0 (0, 45.83) ($p < 0.01$)	−34.28 (−100, 34.99), ($p = 0.204$)
No (45)	−12.50 (−41.43, 0) ($p = 0.031$)	−26.78 (−72.91, 59.37), ($p = 0.551$)	0 (−9.37, 87.5) ($p = 0.113$)	−50 (−100, 125) ($p = 0.587$)

Observed PHQ-9 score (%) and GAD7 score (in %) was calculated with respect to maximum score. Further baseline score was subtracted from 2 weeks score and 6 months score. The negative scores showing decreasing level whereas positive score showed increasing level of depression (PHQ-9) or anxiety (GAD-7) from baseline; Significant when $p < 0.05$, Wilcoxon signed rank test used; Significant when $p < 0.05$, PHQ-9, Patient Health Questionnaire-9; GAD-7, Generalized anxiety disorder-7; B/L, Baseline; 2W, 2 weeks; 6M, 6 months

the hospital. However, with the advent of the digital era, they were in real-time emotional touch with family members and friends using popular social media video chatting services on a demand basis. This wider use of digital technology could have helped bring a whole new level of family and emotional support apart from engaging in leisure activities. This could have been the most effective influential factor in curtailing depression and anxiety. Other factors could be emotional, and mental support provided by health care professionals with good doctor-patient and nursing staff-patient ratios including support staff, better logistics involved in the patient care, and regular daily briefing to the family member of the affected patients about the prognosis. Another significant factor could be, that the Government of India made free treatment available including pricier medicines. These could be the factors that effectively diminished the untoward effects of associated ICU care. Hence, though the majority of admitted cases were critically ill, there was a lesser prevalence of a severe form of depression and anxiety.

Studies from non-COVID-19 ICU survivors have shown that critical illness survivors are at a heightened risk for experiencing psychological symptoms during and following their ICU stay.[18] During the first year of recovery, almost 33% of ICU survivors suffered from depression and anxiety.[19] Post-traumatic stress disorder (PTSD) was also prevalent among ICU survivors.[20] Critically ill patients are at risk of exhibiting impaired memory, attention, and executive functions with significant cognitive impairment and decreased quality of life due to stress, anxiety, insomnia and varying degree of depression; and decreased socialization.[21]

There are only limited studies available measuring mental health outcomes on depression, anxiety, stress, and fatigue among COVID-19 survivors. Among COVID-19 survivors, post-illness sequelae of depression and anxiety are significant. Xiao et al., documented persistent mild depression (89.1%) and milder form of anxiety (91.2%) even at 6-months post-illness, but the majority of cases were having a milder form of the disease.[22] Another study showed the persistence of significant depression and anxiety among females, pre-illness psychiatric history, and those requiring oxygen support even at 3-months post-illness recovery.[23]

Our study also showed age group 41–60 years, males, urban higher educated population, married, joint family, and people with comorbidities were more likely to suffer from depression during ICU stay but, these depression scores decreased significantly at 2-weeks, and 6-months post-discharge. However, anxiety significantly increased in the age group 41–60 years, both genders, married, with higher education, urban population, both nuclear and joint family, and among patients with comorbidities at 2 weeks but decreased significantly at 6-months post-discharge.

There was an increase in anxiety at 2 weeks among the general public following isolations.[24] This was attributed to feelings of the emotional reaction of shock, sadness, and disbelief, and even fear of death due to COVID-19 infection in a few patients. In our study, also there was a significant increase in anxiety, but the study population included severe disease survivors. Dong and Bouey et al., pointed out that countries with high caseloads of COVID-19 infection can have true mental health crises along with the health crisis due to COVID-19 infection. They suggested including large-scale psychosocial management interventions along with mental health care plans to be part of future disaster management plans.[25]

However, a meta-analysis of non-COVID-19 critical illness survivors showed better quality of life at 3-months of discharge and the actual impact of mental health disturbance post-3-months ICU stay is crucial as some anxiety and physiological disturbance is not considered pathological in the first few weeks following discharge.[26] Previous epidemics of SARS and MERS have shown significant depression (33%), anxiety (30%), and PTSD as high as 39% even at 6 months.[27] However, in our study, there was a lesser prevalence of severe degree of depression and anxiety during discharge, immediately at 2-weeks and 6-months post-discharge. However, COVID-19 moderate-to-severe disease survivors exhibited persistent significant mild depression and anxiety even at 3-months post-recovery in up to 78.3% of patients. The study of the Brazilian population highlighted that COVID-19 survivors were at heightened risk of developing significant mental behavioral issues in the long term.[28]

A study from Portugal evaluated depression and anxiety among ICU survivors of COVID-19 over a 1-year period and found that depression and anxiety were significantly more prevalent in the younger population and males were prone for persistence of symptoms even at 1-year. This group also reported more cognitive symptoms, ICU delusions, fear of COVID-19 sequelae, sleep problems, and somatic pain. Males have a higher tendency to have stronger activation of innate pro-inflammatory markers and an impaired immune system results in a higher prevalence of chronic subclinical systemic inflammation and resulting cognitive sequelae.[29] Our study also showed similar trends in the persistence of symptoms among males. Such cognitive sequelae usually manifest as impairments in memory, attention, and executive functions, with survivors reporting an inability to manage medications and finances and difficulty with reading comprehension and following conversations with friends and family.[21] Patients with COVID-19 and severe respiratory failure with deep sedation often have prolonged delirium and later this becomes an important risk factor for cognitive impairment affecting patients' quality of life.

Analyzing the COVID-19 survivorship experience demands and implementation of evidence-based critical care interventions, lower ICU sedation, combined with robust rehabilitation programs which should begin in the ICU and continue after discharge is the solution.[24] For better survival and to decrease the prevalence of subclinical and clinical depression and anxiety among survivors, the multidisciplinary team consisting of a team of intensivists/critical care specialists, psychiatrists, and clinical and social psychologists should deliver evidence-based critical care interventions as required, as well as early and sustained comprehensive rehabilitation strategies targeting physical and neuropsychological recovery along with adequate social support. Social psychologists play a major role in complete rehabilitation and integration into society.

Limitations and Strengths of Study

It is one of the earliest studies evaluating depression and anxiety among COVID-19-ICU survivors prospectively over a 6-month period from the Indian population. Our study included severe COVID-19 disease survivors. This study has a few limitations. The study included COVID-19 survivors whose baseline parameters were taken at the time of discharge. Hence, the reported prevalence of depression and anxiety may not be reflective of the mental impacts of disease prior to or during admissions. Our study may be biased by the quality healthcare delivery during the hospital stays. Hence, a lower prevalence of higher degrees of depression and

anxiety should be cautiously interpreted. This was single-center study hence multiple factors affecting depression and anxiety may be skewed. The sample size was relatively smaller considering the pandemic size; however, it was worth noting that the social, routine health care services and logistics were disrupted beyond imagination, and hence conducting large-scale multicentric study would not have been possible. This was also one of our study limitations as four other centers which initially expressed interest in the study later withdrew from the study without any clarifications. There was increased use of digital services during the pandemic including social media engagements among family members, but in our study, we could not assess whether this could have been the reason for lower incidence of severe degrees of depression and anxiety. Further studies need to conducted to assess impact of effect of digital/social media/virtual mental rehabilitation services on mental outcomes. Another limitation of study was, we could not evaluate the factors associated with or preventing stress and anxiety post discharge. There was no control group and data for depression and anxiety in non-COVID-19 ICU for comparative analysis.

Conclusion

This study showed severe COVID-19 ICU survivors suffered from a mild form of depression and anxiety for longer periods of time. Males, middle-aged groups, joint families, higher educated populations, and people with comorbidities were at higher risk of developing depression and anxiety, and also there was the persistence of these symptoms even at 6-months post-illness. The predominantly higher prevalence of a milder form of depression and anxiety could be multifactorial and needs to be further assessed in future studies. In the event of a future epidemic or pandemic, multiple strategies such as mental rehabilitation programs could be included in the disaster management task force aiming for better psychological support for patients and society to decrease the higher rates of post-illness psychosomatic disorders.

Supplementary Material

The supplementary material is available online on the website of https://www.ijccm.org.

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