Original Article

Coronavirus Phase and Major Influencing Factors in Determining Anxiety, Depression, and Posttraumatic Stress Disorder in Patients with COVID-19

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Abstract

Objectives: We investigated the prevalence and risk factors of psychological distress, depression, anxiety, and posttraumatic stress disorder (PTSD) among COVID-19 inpatients during the initial and peak coronavirus phase in the largest public sector hospital in India. **Methods:** With a prospective observational design, we included 761 male and female COVID-19-hospitalized patients. The Self-Reporting Questionnaire, Primary Care PTSD Screen for *DSM-5* (PC-PTSD-5), and Hospital Anxiety and Depression Scale were used. **Results:** Totally, 612 males and 149 females had a mean age of 36.68 ± 11.72 (mean ± standard deviation) years. The prevalences of psychological distress, anxiety, depression, and PTSD symptoms for the total sample were 12.6%, 19.2%, 19.2%, and 8.4%, respectively. Significant differences existed in the prevalence of psychological distress, anxiety, and depression between the initial coronavirus and peak coronavirus phase (13.7% vs. 11%, $\chi^2 = 9.37$ $p < 0.01$), 22.1% vs. 14.7%, $\chi^2 = 23.04$, $p < 0.01$), 21.04% vs. 16.3%, $\chi^2 = 15.78$, $p < 0.01$) but not in that of PTSD. Except for psychological distress, there was no gender difference. Coronavirus phase and employment status had significant interaction effects ($p < 0.01$) on anxiety and depression. **Conclusion:** Younger age, males in full-time jobs, in marital relationship, poor socioeconomic status were the risk factors, and comorbidity was the important risk factor. The result of this study could highlight the need for compulsory mental health screening and necessary medical/non-medical mental health support to all admitted patients.

Key words: mental health, multivariate analysis, prevalence, time-period
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Introduction

The global COVID-19 pandemic has had serious consequences on health as well as well-being, daily life functioning, economy, and livelihood. The COVID-19 pandemic has temporarily eroded social support systems and has taken a toll on various aspects of mental health. COVID -19 pandemic has been found to be associated with stress, anxiety, depressive symptoms, insomnia, denial, anger, and fear globally [1]. Several studies have reported an increased prevalence of anxiety and depression [2-4], psychological distress [1, 5, 6], and fear [7] in people with previous history of mental illness [8] and health-care workers [9].

Diverse adverse mental health effects of COVID-19 pandemic on coronavirus-infected patients have been reported. Expectedly, few evidence suggested that the patients with COVID-19 showed symptoms of anxiety [10, 11], psychological distress [12], and depression [10-12]. The initial studies on the mental health of COVID -19 patients are few, with mostly being small sample size [13-17]. But a recent large-scale (N = 62,354) study from the USA has

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reported increased diagnoses in all major anxiety disorder categories [18].

The prevalence of anxiety and depressive symptoms among COVID-19 patients has varied from 18.6% [19], to 24.6% [14], to 34.72% [15], and to 38.8% [13]. Similarly, the prevalence of depressive symptoms among COVID-19 patients has also varied from 13.4% [19], to 27.9% [14], to 28.47% [15], and to 45.9% [13]. Again, high prevalences of anxiety (42.7%) and depression (65.7%) have been found among COVID-19 discharged patients in China [20]. The evidence of post-traumatic stress symptoms/disorders has varied widely from a scaring high prevalence of 96.2% in 714 COVID-19 patients online before being discharged from quarantine [21] to 72% among COVID-19 survivors (compared to 53% of control subjects) in an Egyptian study [22] to 42.1% [23] a low prevalence of 12.2% in 41 COVID-19-positive inpatients during hospitalization [24] to 7% among 285 Chinese adult patients [20] and 4.6% among 2,091 participants [25]. The prevalence of posttraumatic stress disorder (PTSD) three months after COVID-19 in Italy has been 10.4%, and 8.6% of those have also had a diagnosis of subthreshold PTSD, leading to remarkable levels of distress and impairment [26]. In contrast, a relatively higher prevalence of PTSD symptoms (29.5%) has been reported from an Italian online survey [27]. In addition to those figures, the prevalence of PTSD symptoms has been estimated at 32.2% in the results of a recent meta-analysis [7].

Moreover, the mental health impact of COVID-19 pandemic may vary in age, sex, employment and financial status, education, existing physical and mental health conditions, as well as more importantly other individual risk factors such as COVID-19-positive diagnosis, severity, and hospitalization. Among the predictors of anxiety and depression poor socioeconomic status [28], financial stress due to COVID-19 [25], lower education [29], and societal stigma [30], severity of coronavirus infection [31], women [20, 29], poor socioeconomic status [32], and young individuals [33] have been found to be the key risk factors for PTSD among coronavirus-infected patients.

Few studies have been found to have remarkable increased mental distress during each of the COVID-19 waves compared with the pre-COVID-19 period [34]. Similarly, the research was conducted in two stages on 285 Polish primary and secondary schoolteachers and was found that teachers experience at least mild levels of stress, anxiety, and depression, both during the first as well as the second waves of the COVID-19 pandemic in Poland [35]. A study in the initial stage of the 2020 coronavirus pandemic in Spain has been found that the presence of depression is 18.7%, that of anxiety is 21.6%, and PTSD is 15.8% [36]. However, till date, majority of studies published on psychological distress, PTSD, anxiety, and depression did not have any COVID-19-hospitalized patients as sample groups in different phases of pandemic, such as COVID-19 in-patients in two different time points or drawing two samples from the same recruitment pool, e.g., mild versus severe infections. Consequently, such studies cannot differentiate whether elevated rates of self-reported anxiety, distress, depression, and PTSD are due to direct effects of coronavirus infection and its treatment, or indirect traumatic effect of some environmental variables such as acute stress, fear, and anxiety in the COVID-19 environment. But we understand that an early assessment of post-traumatic stress symptoms during hospitalization may reflect temporary acute stress disorder rather than PTSD. Although peri-traumatic stress symptoms are similar to post-traumatic stress symptoms, they are temporary and milder and do not usually need treatment, but the findings will have policy implications for enhancing hospital services for mental health. To our knowledge, not a single study has been reported on the mental health status of COVID-19-hospitalized patients during the initial phase and later when COVID-19 was in its peak in India. We also wanted find out how sociodemographics played a key rôle in the prevalence of psychological distress, anxiety, and depression in response to these two time points. Moreover, the risk factors for psychological illness associated with COVID-19 are not yet determined fully, especially in a unusual socioeconomic environment due to COVID-19. Moreover, we found that out risk factors for COVID-19 patients who were above the cutoff on all variables not for the entire sample which might not be as specific as this is to highlight the need for upscaling mental health services. We did not come across any published report on COVID-19 inpatients' detailed mental health and risk factors of mental health in response to two different time points factors and this will be a comprehensive study from India to report the variation in prevalence. In this study, we intended to (a) investigate the prevalence and risk factors of psychological distress, PTSD symptoms, depression, and anxiety of hospitalized COVID-19 patients during the initial and peak phase of coronavirus infection, and (b) find out the interaction effects of coronavirus infection, phases and sociodemographic variables on psychological distress, PTSD, depression, and anxiety.

Methods

Study procedures and subjects

With a prospective observational research design and convenient sampling method, 761 male and female consenting hospitalized COVID-19 non-ICU adult patients (18 years and above) were recruited for this study after the institute ethics committee approval of India's largest tertiary care government hospital in New Delhi (protocol number = No-IEC-320/27.04.2020, RP 14/2020 and date of approval = May 2, 2020) with the stipulation of obtaining informed written consents from all study participants.

The data were collected in three Indian languages, Hindi (n = 500), Tamil (n = 88), and English (n = 173). While tools were already available in Hindi and English as used in many Indian research, 3 psychiatry postgraduate and senior residents whose native language was Tamil translated these tools into Tamil following the WHO back translation method. A list of chronic diseases such as thyroid, diabetes, hypertension, respiratory illness other than COVID-19, cancer, chronic

kidney diseases, organ transplant, diseases of digestive system, etc. was included to collect information on the status of co-morbid physical illnesses. History of psychiatric illnesses was taken separately.

Operationalizing initial and peak coronavirus phase in India

There is no uniform definition of coronavirus phase and country specific variations largely depend upon the number of COVID-19 cases in a particular country. Officially, COVID-19 wave-1 started from end of March 2020 and second wave started from March 2021. Within the wave-1, there were two demarcated phases in strict lockdown and phased lockdown depending upon the number of positivity rate. Sample of initial coronavirus phase (n = 461) was collected from COVID-19 patients hospitalized during the period from April 27 to July 26, 2020 during which the number of new cases per day in the entire country was up to 50,000 (highest being 49,981 on July 26, 2020) and sample of peak coronavirus phase (N = 300) was collected during the period of July 27 to September 30, 2020 when the number of new cases per day was increased up to 1,00,000 (highest in year 2020 being 97,894 cases on September 16, 2020) [37]. We referred the initial phase as Time-1 data, and the peak phase as Time-2 data in results tables.

Meaurements

Self-reporting Questionnaire-20

Self-reporting Questionnaire (SRQ-20) [38] A total of 20 dichotomous (true or false) items assessing psychological distress was included. Researchers have adapted the SRQ to a variety of settings and have validated that it is able to detect common mental disorders across cultural contexts with reasonable accuracy across the world. The cutoff score for SRQ for India (≥ 8).

Hospital Anxiety and Depression Scale

Hospital Anxiety and Depression Scale (HADS) is a reliable instrument to screen for clinically significant anxiety and depression in patients attending a general medical clinic [39]. This scale contains 14 questions, including 7 each for rating anxiety and depression. A score of 0–7 on either subscale is regarded as normal, that of 11 or higher indicates probable presence of the particular mood disorder, and that of 8–10 as suggestive of presence of the respective state. Hindi and Tamil versions were used where needed, though these have not been validated earlier.

Primary care PTSD screen for *DSM-5*

Primary care PTSD screen for *DSM-5* (PC-PTSD-5) is a 5-item screening measure designed to identify respondents with probable PTSD [40]. The scale begins with an item designed to assess whether the respondent has had any exposure to traumatic events. If a respondent denies exposure, the PC-PTSD-5 is complete with a score of 0. But if a respondent indicates that they have experienced a traumatic event over the course of their life, the respondent is instructed to respond to five additional yes/no questions about how that trauma exposure has affected them over the past month. A cut-point of 3 on the PC-PTSD-5 (e.g., respondent answers "yes" to any 3 of 5 questions about how the traumatic event(s) has (have) affected them over the past month) was considered optimally sensitive to probable PTSD.

Statistical analysis

We used descriptive analysis, t-tests for group comparison, Chi-square to see the differences in observed and expected occurrence, and analysis of variance. Study data were analyzed using Statistical Software for Social Science version 21.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The differences were considered significant if the p-values were smaller than 0.05.

Results

We recruited 461 out of 761 patients (response rate is 60.58 %) during initial and 300 out of 381 patients (response rate is 78.74%) during peak period. Although 1,138 COVID-19 non-ICU hospitalized patients consented to participate only 761 (initial coronavirus phase n_1 (%) = 461 (60.6); peak coronavirus phase n_2 (%) = 300 (39.4) valid data sheets with a response rate of 66.87% were considered for analysis. The data exclusion was done due to various reasons such as presence of one incomplete filled-in or missing scale, data sheets filled in only with sociodemographic, and items left in each scale. The sample had a (mean ± standard deviation) = (36.68 ± 11.72) years with 612 males and 149 females. The sex and age composition of the sample during initial coronavirus phase (mean age = 35.94 years) and peak coronavirus phase (mean age = 37.81 years) along with details of background information is presented in Table 1.

Table 1 shows sociodemographic characteristics and comorbidity status of COVID-19 patients. Table 2 presents prevalence of psychological distress (SRQ), anxiety (HADS-A), and depression (HADS-D), PTSD (PCLC) between initial coronavirus and peak coronavirus phase. Table 3 is to compare the study data of SRQ, PC PTSD -5, HADS across sociodemographic risk factors. Table 4 describes the impact of comorbidity on SRQ, HADS anxiety and depression and their stepwise multivariate regression analysis is listed in Table 5.

Discussion

While the psychological impact of diagnosis and the treatment course of COVID-19 positive people is a global mental health concern [41], studies do confirm it by reporting findings of positive association between depression and heightened C-Reaction protein markers among COVID-19 patients as compared to non- COVID-19 controls [42]. But the epidemiology of mental health conditions might vary widely among such patients depending upon various dynamic and interconnected factors. The overall findings will be discussed in the light of available literature.

The prevalence of psychological distress, anxiety, and depression among COVID-19-hospitalized patients in our

Table 1. Sociodemographic characteristics and comorbidity status of COVID-19 patients (n = 761)

	Initial coronavirus phase 461 (60.6), n_1 (%)	Peak coronavirus phase 300 (39.4), n_2 (%)
Age groups (years)		
18-30	178 (38.6)	89 (29.7)
31-45	175 (38.0)	135 (45)
46-60	96 (20.8)	66 (22)
Above 60	12 (2.6)	10 (3.3)
Age group (years), mean ± SD		
Total age group	35.94 ± 11.62	37.81 ± 11.79
18-30	25.1 ± 3.59	25.11 ± 3.91
31-45	36.63 ± 4.10	37.14 ± 4.31
46-60	50.98 ± 3.39	51.70 ± 4.20
Above 60	67.75 ± 2.16	68.30 ± 11.79
Sex		
Male	367 (79.6)	245 (81.7)
Female	94 (20.4)	55 (18.3)
Relationship status		
Currently married/in a relationship	303 (65.7)	247 (82.3)
Single/not in relationship	158 (34.3)	53 (17.7)
Education status		
Below bachelor's degree	248 (53.8)	193 (64.3)
≥ Bachelor's degree and above	213 (46.2)	107 (35.7)
Employment status		
No full-time job	155 (33.6)	94 (31.3)
Full-time job	306 (66.4)	206 (68.7)
Socioeconomic status		
Upper	33 (7.2)	13 (22.3)
Middle	302 (65.5)	220 (73.3)
Lower	126 (27.3)	13 (4.3)
Accompanying comorbidity		
Yes	94 (20.4)	70 (23.3)
No	367 (79.6)	230 (76.7)

SD, standard deviation; n (%), number (percentage)

study is similar to earlier reports [7, 42]. This prevalence in our study is similar in methodology and sample setting to a study done in a Chinese hospital [19]. But the prevalences in our study (Table 2) are comparatively less than the findings reported from Pakistan [14], China on HADS [15], and depression on PHQ-9 ≥ 5, and anxiety on GAD-7 ≥ 5 [13] for COVID-19 patients. And this could be due to primarily the difference in sample size in this study and studies from China and Pakistan and the patients included in these studies. Only non-ICU patients were included in our study whereas the sample was not well-described in those studies.

The prevalence of PTSD symptoms for the total sample in our study is in line with previous studies in China [20, 29]. Interestingly, like other variables, there were no main effects of time, age and gender on PTSD symptoms. This could be due to the fact that the diagnosis of COVID-19 and hospitalization were perhaps equally traumatic across time, age, and gender.

The findings on higher prevalence of psychological distress, anxiety and depression in our sample (Table 2) during initial months of COVID-19 could be due to the following factors:

Negative impact of lockdown on mental health during the initial period in our study is similar to findings of positive and negative emotional sentiments [43], heightened level of despair [44], increased prevalence of anxiety and depression [2, 41], fear related symptoms [7], and psychological distress [2, 5, 6], among general population, people with previous history of mental illness [8], and health-care workers [9]. Extrapolating from the research on impact of lockdown and quarantine on general people, it is prudent to assume that the effect of such situation can be worse for COVID-19-hospitalized patients. Studies do report the inconveniences caused by quarantine and social isolation to general well-being had negative mental health consequences not only in this COVID-19 pandemic [45], but also during previous similar outbreaks [46]. Moreover, since impact of lockdown and unlock on the mental health status of COVID-19 patients during has not been reported yet, our findings on the higher prevalence of psychological distress, anxiety and depression among the COVID-19 patients during the coronavirus phase were in line of these studies.

Nevertheless, all necessary and possible measures on various fronts including media-driven rigorous public

Table 2. Prevalence of psychological distress (Self-reporting Questionnaire), anxiety (hospital anxiety and depression scale-anxiety), and depression (hospital anxiety and depression scale-depression) between initial coronavirus and peak coronavirus phase

Dependent variable	Initial coronavirus phase, *n* (%)	Peak coronavirus phase, *n* (%)	χ^2 Significance level
SRQ (cutoff ≥ 8) (*n* = 96, 12.6%) (% out of 761)			
Above cutoff (*n* = 96)	63 (13.7)	33 (11)	9.37**
Male (*n* = 57)	37 (10.1)	20 (8.2)	5.07*
Female (*n* = 39)	26 (27.7)	13 (23.6)	4.33*
18-30 year (*n* = 42)	30 (6.5)	12 (4)	7.71**
HADS-A (cutoff ≥ 8) (*n* = 146, 19.2%) (% out of 761)			
Anxiety > cutoff (*n* = 146)	102 (22.1)	44 (14.7)	23.04**
Male (*n* = 122)	85 (23.2)	37 (15.1)	18.88**
Female (*n* = 24)	17 (18.1)	7 (12.7)	4.16*
Mild (*n* = 95)	70 (73.7)	25 (26.6)	21.31**
Moderate (*n* = 42)	29 (69)	13 (31)	6.05**
18-30 year (*n* = 55)	44 (9.5)	11 (3.7)	19.80**
31-45 year (*n* = 51)	34 (7.37)	17 (5.66)	5.66*
HADS-D (cutoff ≥ 8) (*n* = 146, 19.2%) (% out of 761)			
Depression > cutoff (*n* = 146)	97 (21.04)	49 (16.3)	15.78**
Male (*n* = 110)	73 (19.9)	37 (15.1)	11.78**
Female (*n* = 36)	24 (25.5)	12 (21.8)	4.00*
Mild (*n* = 102)	67 (65.7)	35 (34.3)	10.03**
Moderate (*n* = 40)	28 (70)	12 (30)	6.40**
18-30 year (*n* = 46)	33 (7.2)	13 (4.3)	8.69**
31-45 year (*n* = 56)	36 (7.8)	20 (6.7)	4.57*

*$p < 0.05$; **$p < 0.01$, significantly different between two phases, tested using Chi-square test
HADS-A, Hospital Anxiety and Depression Scale-Anxiety; HADS-D, Hospital Anxiety and Depression Scale-Depression; SRQ, Self-reporting Questionnaire

education programs and government-controlled COVID-19 websites, daily updates to reduce fear and change negative public behavior, doorstep delivery of food, money and grocery supply to the poor, special rail and road transport arrangements for migrated population, reducing financial burden on citizens through monthly installment benefits, etc., to preserve the mental health and morale of all the citizens [47], during the initial phase of COVID-19 can be considered as indirect mental health initiatives. However, the system to provide direct mental health service to the hospitalized patients was not in place during these initial months. Contextually, it is worthwhile mentioning here that, in addition to the factors described above, the provision of mental health service by our hospital (such as regular tele-counselling, tele-psychiatric consultation, more mental health referral from COVID-19 clinicians, 24 × 7 presence of a psychiatrist in COVID-19 ward, etc.) regularly to hospitalized patients towards the beginning of August 2020 could also be another key factor in less anxiety, distress and depression among these hospitalized COVID-19 patients in our hospital.

By middle of September 2020 although the situation was grave and scary in the number of daily cases in India. Despite that, several factors such as heightened fear [7], perceived stigma, [25] and rumors around COVID-19 [48], were reportedly reduced due to dissemination of more scientific information regarding existence of effective treatment and low death rate (1.41% in India) (www.timesofindia.indiatimes.com/india/covid-at-1-28-death-rate-in-2nd-wave-still-lower-than-in-first-wave/articleshow/84490743.cms; www.worldometers.info/coronavirus). The data on low death rate, high recovery rate could have affected the trust of patients on effective treatment, thus lowering their anxiety and distress. Electronic media also played a significant role in dissemination of scientific information on stigma, fear, vaccines, treatment, death/recovery rate and safe health practices through various means to reduce rumors around COVID-19. This could also have a positive impact on the hospitalized patients in our sample.

People perhaps developed more mental readiness to face the situation due to various smaller factors (such as the concept of COVID 19-warriors and consequent applause to them, the gradual increase in surge capacity of existing hospitals and the new make shift COVID-19 hospitals to admit patients, acceptance of information on COVID-19 will continue to be there and we have to live with it for some years). This increased mental readiness and was visibly evident in citizens' general and COVID 19-specific behavior such as number of voluntarily for COVID-19 medical tests, participation of sero-survey by the government, funny and relaxing videos on corona virus situation, initiating livelihood, engaging in more COVID-19-safe behavior etc. during the peak phase of COVID-19 in India [37].

The epidemiological distribution of mental health problems and associated factors are heterogeneous among the general

Table 3. Comparison of Self-reporting Questionnaire, primary care posttraumatic stress disorder screen for DSM-5, Hospital Anxiety and Depression Scale across sociodemographic risk factors

Dependent variables	Initial coronavirus phase		Peak coronavirus phase		*t*
	n	Mean ± SD	*n*	Mean ± SD	
SRQ					
Male	367	2.47 ± 2.87	245	1.94 ± 3.04	2.20*
Married/being in a relationship	303	2.92 ± 3.38	247	2.09 ± 3.28	2.92**
Not full-time job	155	2.25 ± 3.29	94	2.93 ± 3.75	2.44**
Full time job	306	3.08 ± 1.75	206	3.47 ± 2.95	4.53**
Middle class	302	2.98 ± 3.47	220	2.03 ± 3.22	3.16**
PC PTSD-5					
Male	367	1.31 ± 1.40	245	0.98 ± 1.36	2.95**
18-30 years	178	1.25 ± 1.37	89	0.91 ± 1.31	1.95*
31-45 years	175	1.29 ± 1.39	135	0.98 ± 1.34	1.99*
Married/being in a relationship	303	1.29 ± 1.40	247	1.04 ± 1.41	2.03*
Unmarried/not in relationship	158	1.30 ± 1.35	53	0.66 ± 1.01	3.14**
Below graduation	248	1.29 ± 1.40	193	0.89 ± 1.27	3.12**
Middle class	302	1.32 ± 1.36	220	0.99 ± 1.32	2.73**
Full time job	306	1.30 ± 1.36	206	0.88 ± 1.27	3.48**
HADS-A					
Male	367	4.90 ± 3.56	245	3.34 ± 3.59	5.09**
18-30 years	178	4.95 ± 3.59	89	3.34 ± 3.81	3.85**
31-45 years	175	4.38 ± 3.29	135	3.34 ± 3.48	2.69**
Married/in relationship	303	5.40 ± 3.46	247	3.36 ± 3.62	6.71**
Below graduation	248	4.70 ± 3.37	193	3.54 ± 3.89	3.76**
Above graduation	213	4.88 ± 3.55	107	3.70 ± 3.48	2.813**
Full time job	306	5.08 ± 3.57	206	3.42 ± 3.73	5.04**
Middle class	302	4.92 ± 3.49	220	3.33 ± 3.65	5.03**
HADS-D					
Male	367	4.52 ± 3.53	245	3.64 ± 3.39	3.06**
18-30 years	178	4.54 ± 3.59	89	3.34 ± 3.81	2.36**
Married/in a relationship	303	4.96 ± 3.67	247	3.72 ± 3.51	4.02**
Above graduation	213	4.74 ± 3.61	107	3.53 ± 3.44	2.87**
Full time job	306	4.79 ± 3.61	206	3.58 ± 3.50	3.76**
Middle class	302	4.83 ± 3.61	220	3.71 ± 3.62	3.49**
Comparison between gender, class and marital status					
SRQ					
Male versus female	612	2.26 ± 2.95	149	3.88 ± 4.31	5.43**
PC-PTSD-5					
Lower class versus upper class	124	1.24 ± 1.50	246	0.72 ± 1.02	2.25*
HADS-A					
Married versus single	302	4.48 ± 3.67	220	3.73 ± 3.59	2.54**

*$p < 0.05$, **$p < 0.01$, significantly different, tested using *t*-test
SRQ, self-report questionnaire; PC-PTSD-5, primary care posttraumatic stress disorder-DSM 5; HADS-A, Hospital Anxiety and Depression Scale-Anxiety; HADS-D, Hospital Anxiety and Depression Scale-Depression; SD, standard deviation

Table 4. Impact of comorbidity on Self-Reporting Questionnaire, Hospital Anxiety and Depression Scale Anxiety and Depression

Status of comorbidity	SRQ, mean ± SD	HADS-A, mean ± SD	HADS-D, mean ± SD	SRQ (cutoff ≥ 8), mean ± SD	PC-PTSD-5 (cutoff ≥ 3), mean ± SD
Present	*n* = 164, 4.02 ± 4.32	*n* = 164, 5.09 ± 4.13	*n* = 164, 5.38 ± 4.19	*n* = 96, 8.26 ± 3.99	*n* = 62, 0.89 ± 0.1.03
Absent	*n* = 597, 2.18 ± 2.87	*n* = 597, 4.05 ± 3.49	*n* = 597, 3.96 ± 3.38	*n* = 665, 3.70 ± 3.20	*n* = 699, 4.35 ± 0.063
t	6.43**	3.24**	4.52**	12.50**	26.07**

**$p < 0.01$, significantly different, tested using *t*-test
SRQ, self-report questionnaire [38]; PCLC, primary care PTSD; PC-PTSD-5, primary care posttraumatic stress disorder-DSM 5 [40]; HADS-A [39], Hospital Anxiety and Depression Scale-Anxiety [39]; HADS-D, Hospital Anxiety and Depression Scale-Depression [39]; SD, standard deviation

Table 5. Stepwise multivariate regression analysis

Dependent variables	Predictors	*R*	Sum of squire	df	β	*F*
SRQ	Comorbidity	0.29	42.03	1	0.620	6.33**
			451.45	68		
			493.48	69		
HADS-A	Depression	0.375	101.89	1	0.375	18.86**
			621.24	115		
			723.14	116		
	SRQ	0.438	138.71	2	0.252	13.52**
			584.42	114		
			723.14	116		
	Time (coronavirus phase)	0.469	159.37	3	0.172	10.64**
			563.77	113		
			723.14	116		
HADS-D	Anxiety	0.32	62.35	1	0.324	16.90**
			531.20	144		
			593.56	145		
	Gender	0.368	80.34	2	0.333	11.19**
			513.214	143		
			593.21	145		
	Age	0.400	95.16	3	0.159	9.04**
			498.39	142		
			593.56	145		
PC-PTSD 5	Employment	0.27	1.618	1	−0.270	4.71*
			20.57	60		
			22.19	61		

*$p < 0.05$; **$p < 0.01$, significantly different

df, degree of freedom; PCLC, primary care PTSD; HADS-A, Hospital Anxiety and Depression Scale-Anxiety; HADS-D, Hospital Anxiety and Depression Scale-Depression PC-PTSD-5, primary care posttraumatic stress disorder-DSM 5

public, COVID-19 patients, and healthcare providers [49]. It was interesting to look at the findings on prevalence of psychological distress, anxiety and psychological distress in the initial and peak coronavirus phase varying in terms of sociodemographic and other risk factors among COVID-19 patients (Table 3).

Finding of higher prevalence of psychological distress among females as compared to males in our study (Table 3) could be attributed to initial phase and its associated socioeconomic environments resulted, which was supported by findings from Pakistan. But there were no gender differences on depression, anxiety, and PTSD could be attributed to the fair amount of evidence suggesting the unusual situation of lockdown resulting in difficult daily life functioning, livelihood and financial loss, social isolation, difficulty in providing and receiving social support especially in the eventuality of hospitalization and death due to COVID-19, loss of freedom to mobility etc. which took a toll on various aspects of mental health in general and on COVID-19 patients in our study. The findings on patients in the age group of 18-30 years and 31-45 years during initial coronavirus phase had higher level of anxiety and depression were similar to findings from a study with university students during COVID-19 has been reported to have the same trend in China [25].

The finding that patients from lower background had more PTSD symptoms as compared to upper class people is in line with previous studies reporting poverty as a risk factor of PTSD symptoms in COVID-19 [32]. Not having a full-time employment emerging as a significant ($p < 0.01$) risk factor for PTSD in our study (Table 5) is also in similar line. Our findings corroborate the findings of COVID-19 pandemic resulting in increasing negative mental health effects due to employment insecurity, financial loss, perceived loss of freedom and social isolation, etc. [50]. Although the dynamics of relationship between employment and PTSD is not well-attempted in this study, still it can be assumed that there could be other intervening variable such as severity of COVID-19 symptoms or number of COVID-19 symptom were more in these patients who are at a clinically significant level of PTSD like few studies [22].

Our finding of married COVID-19 patients reporting higher anxiety than those who are not in a relationship can be due to the increased financial stress and apprehension [25] related to family dependency and responsibility on them, uncertainty of job continuity and fear of salary cut due to COVID-19.

A diagnosis of COVID-19 is associated with increased incidence of a first psychiatric diagnosis in the following 14–90 days compared with six other health events such as influenza, other respiratory tract infections, skin infection, cholelithiasis, urolithiasis, and versus fracture of a large bone even with no previous psychiatric history [18]. Therefore, it will be prudent to say that the existence of one or more comorbidity may increase the risk of psychiatric illness. The repeated emphasis on the widespread circulation of medical information on the heightened risk of death or worsening of the condition of COVID-19 patients with comorbid health

conditions could have been the reason for patients' heightened anxiety. Although the prevalence of depression was similar between both the groups, the prevalence of anxiety during the initial phase of COVID-19 pandemic was higher among the people who had comorbid health conditions. These findings in our study (Tables 4 and 5) to report comorbidity as a major risk factor of psychological distress, anxiety, and depression are in line of those studies reported similar findings earlier [51-53], highlighting those comorbid health conditions as risk factors for mental health during COVID-19.

Study implications

The findings are clinically important for the hospital administration for mandatory mental health services for the hospitalized COVID-19 patients. These services should be focused on anxiety management in a customized manner as sociodemographic variables are found to be the key risk factors in developing negative mental health conditions. A through assessment at intake on day 1 of hospitalization and again at the time of discharge can be useful for research, development, better service provision during hospital stays of COVID-19 patients, and scope for future follow-up with them.

Study limitations

The readers are cautioned not to over-interpret the findings of this study because it has the following five potential limitations:

- The COVID-19 sample was selected from one hospital only. Despite being the largest general hospital, the present findings could not be readily generalized to all hospitalized COVID-19 inpatients in India. Future studies need to include subjects from multiple large hospitals to increase the power of generalization of the study findings.
- We could not clinically evaluate the COVID-19 patients who were above the cutoff values on self-reported study tools. Hence, the mental health condition on these self-reported tools should be cautiously interpreted.
- Correlating findings with severity of COVID-19-symptoms could have explained the findings in a more meaningful way.
- Interviewing few cases who reported above cutoff scores on the self-reported tools could have been more enriching for future researchers.
- The first part of the PTSD screening tool did an initial screening of traumatic life incidents, and this incident may be some other traumatic event other than COVID-19. Hence, PTSD symptoms might have been the results of earlier incidents triggered by COVID-19.

Study summary

Higher prevalence and severity of psychological distress, anxiety, and depression during initial months of the pandemic among COVID-19 were found in hospitalized patients. Rôles of evolving scientific information on coronavirus pandemic, evolving definite treatments, inconveniences due to daily life and livelihood issues due to lockdown restrictions, and lack of mental health service provision to COVID-19 patients during the initial phase could be a few key factors in resulting anxiety and distress in COVID-19 patients. Younger age, males in full-time jobs, in marital relationship, poor socioeconomic status were the risk factors, and comorbidity was key risk factor. Those findings could highlight the need for compulsory mental health screening and necessary medical/nonmedical mental health support to all admitted COVID-19 patients.

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Conflicts of Interest

The authors declare no conflicts of interest.

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