Original Article

Assessment of depression, anxiety and stress in COVID-19 infected individuals and their families

Jyoti Prakash [a], Ankit Dangi [b], Kaushik Chaterjee [c], Prateek Yadav [a,*], Kalpana Srivastava [d], V.S. Chauhan [a]

[a] Professor, Department of Psychiatry, Armed Forces Medical College, Pune, India
[b] Clinical Tutor, Department of Psychiatry, Armed Forces Medical College, Pune, India
[c] Professor & Head, Department of Psychiatry, Armed Forces Medical College, Pune, India
[d] Scientist 'G', Department of Psychiatry, Armed Forces Medical College, Pune, India

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ABSTRACT

Background: Pandemics have been associated with widespread psychological distress in the normal population due to quarantine and lockdown, however there are only few studies on psychiatric symptoms in COVID infected patients and their families. This study was planned to assess the depressive, anxiety and stress symptoms in individuals and their families infected with COVID19, during current pandemic.

Methods: A cross-sectional, observational study was conducted on hospitalised, COVID infected patients and their immediate family members. Ninety-three, COVID patients and fifty-four family members were studied through Google forms which contained socio-demographic proforma and Depression Anxiety Stress Scale-21 (DASS21). Collected data was tabulated to assess depression, anxiety and stress symptoms in the given population and study their relation with various sociodemographic variables.

Results: Almost one-third of the sample showed increased score on depression and anxiety subscales and one-fifth on stress subscales. 30—45% of the family members studied had higher score on either of the subset. There was also a high correlation between the scores of depression, anxiety and stress subset in the study sample.

Conclusion: This study, reflects high magnitude of depression, anxiety and stress symptoms in these patients and their families which alert us to the need for definitive interventions in these affected individuals.

Introduction

Coronavirus disease 2019 (COVID-19), was first reported in China in the later part of 2019. Since then it has affected more than 100 million people worldwide. By Feb 2021, the infection has led to more than two and a half million deaths worldwide.[1] India with a count of over 11 million on 07 Mar 2021, had the second highest number of cases in the world.[2] Due to such high count, unprecedented restrictions and uncertainties prevailing

during this pandemic, the mental health of the general population is expected to be affected adversely. An Indian study reports high level of anxiety, preoccupations with the thoughts of the virus and the need for mental health care in 80% of the study population.[3] Studies on quarantine show adverse psychological effects with symptoms of post-traumatic stress, confusion, and anger.[4,5]

Pandemic and quarantine have significant adverse effects on mental health of general population and the persons infected with the disease.[6] When an individual or his/her family member gets infected; the uncertainty, threat to well-being and fear that recovery might be difficult,[7] is expected to take a toll on the mental health. The most common psychiatric diagnosis after COVID-19 diagnosis is an anxiety disorder, followed by mood disorders.[8] A Chinese study found the prevalence of anxiety and depression in patients to be 18.57% and 13.36% respectively.[9] Even after recovery from this infectious disease, the psychopathological symptoms might prevail. Self-reported anxiety and depressive symptoms were found to be around 40% and 30% respectively in patients a month post treatment.[10] A review on psychological symptoms in recovery from this infectious also had revealed similar distress related to survival, fear that they might infect others, related stigma and a general psychological distress.[11]

During consultation liaison psychiatry, in our hospital, the symptoms of stress, depression or anxiety were overtly visible in the patients suffering with the infection, and also in their relatives. As the literature on the psychosocial issues in COVID infected population is still scarce and the disease is still novel and evolving, it was felt prudent to conduct a research to understand the true magnitude of common psychiatric problems. Thus a study was planned to screen COVID-19 patients and their family member for symptoms of depression, anxiety and levels of stress.

Material and methods

This was a cross-sectional, questionnaire based observational study. The study population consisted of all COVID-19 patients or their relatives reporting to a tertiary care, COVID hospital between Sep 2020 to Feb 2021. After ethical committee clearance, patients suffering from COVID infection and their immediate family members were contacted. Keeping in mind high infectivity of the virus and safety of the researchers, Google forms were sent through social media to the admitted patients or their family members. The questionnaire informed about the voluntary individual participation and consent was obtained.

Individuals with previous history of any mental disorder, lack of mobile or internet access, those unable to complete online survey and those not willing to provide consent were excluded from the study. Study group completed the socio-demographic proforma and depression anxiety stress scale-21 (DASS21). This scale consists of total 21 questions, seven in each domain. It is based on tripartite model of psychopathology.[12] DASS- 21 has been found to have good validity and reliability and has been used previously in psychiatry research related to SARS and COVID.[13,14] Cronbach's alphas were found

to be 0.85 for stress subscale, 0.75 for anxiety and 0.80 for depression subscales.[15,16]

The information from the two questionnaires was used to assess prevalence of stress, anxiety and depression symptoms in the study group and its relation to various socio-demographic variables. The variables were recorded in Microsoft excel and statistical software (SPSS version 22) was used for the analyses. Categorical variables were summarized as frequencies and percentages, while continuous variables as medians and inter-quartile range (IQR; 25th to 75th percentiles). The main outcome of the study (DASS score) was not normally distributed; Mann–Whitney U test was applied for the continuous variables analysis, for consistency. The categorical variables were analyzed using Chi-square statistic or Fischer exact test. The correlation between two continuous variables was analyzed using Spearson's correlation along with its 95% CI. $p < 0.05$ was considered statistically significant. All patients who scored above cut off on the DASS 21 were offered quality care as per extant medical guidelines.

Results

After excluding the participants with incomplete forms and those who did not give consent, total of 147 patients/relatives participated in the study. The socio-demographic profile (Table 1) shows that about 70% of the respondents were male. Ninety three (63%) participants were patients infected with COVID-19, while fifty four (37%) patients were family members of those infected. The age of the study participants ranged from 18 to 74 years, with a median of 34 years (IQR: 27–41years). Thus, the study sample mainly consisted of young adult age-group. Twenty-nine people (19.7%) of the study population had one or more chronic medical condition (diabetes/hypertension/chronic respiratory disease/malignancy). Sixty seven of the subjects (45.6%) had family-members who were more than 65yrs of age.

Table 2 shows distribution of subjects based on various categories in DASS-21 i.e. normal, mild, moderate, severe and extremely severe categories in subsets of depression, anxiety and stress. Out of the total 147 participants, 49 (33.33%) had higher scores on depression-subset, 55 participants (37.4%) on anxiety and 29 (19.72%) on stress-subset. Thus two-third of the study population had a normal score on depression and anxiety subscale, and four-fifth had normal score on stress subscale. Table 3 shows the scores in each subset in COVID infected patients and family members of the infected patients. The table shows, 40% of the total family members (n = 54), had elevated scores on depression, 46% on anxiety and 30% on stress. Many participants had higher scores on more than one subset. Table 5 shows the median and inter quartile range of these scores and association with each of the variables studied. Table 6 shows the number of participants with elevated scores distributed according to the socio-demographic variables. Table 7 shows the correlation between the scores in each subset. It showed high correlation among the subsets, meaning people scoring higher on one subset also have higher scores on the other two subsets.

Table 1 – Socio-demographic profile of the study sample.

Variables		People infected in the family			p value
		Self (n = 93)	family member of infected (n = 54)	Total	
Gender	Female	23 (24.7%)	20 (37%)	43 (29.2%)	0.114
	Male	70 (75.3%)	34 (63%)	104 (70.8%)	
Any member >65 years in family	No	57 (61.3%)	23 (42.6%)	80 (54.4%)	**0.028**
	Yes	36 (38.7%)	31 (57.4%)	67 (45.6%)	
Chronic disease in family members	No	79 (84.9%)	39 (72.2%)	118 (80.3%)	0.062
	Yes	14 (15.1%)	15 (27.8%)	29 (19.7%)	
History of taking prophylactic medications	No	55 (59.1%)	38 (70.4%)	93 (63.3%)	0.173
	Yes	38 (40.9%)	16 (29.6%)	54 (36.7%)	
Age (years)[a]		32 (26–37)	35 (28–54.3)	34 (27–41)	**0.018**
Family size[a]		4 (4–6)	5 (3–6)	4 (4–6)	0.998

Chi-square test or Fischer exact test.
The significant values i.e. p<0.05 is bold.
[a] Median (IQR) analysed using Mann Whitney U test.

Table 2 – Frequency of score of depression, anxiety and stress in study sample (N = 147).

	Mild	Moderate	Severe	Extrmely severe	Total
Depression	13	16	8	12	49 (33.33%)
Anxiety	16	14	0	25	55 (37.4%)
Stress	5	8	10	6	29 (19.72%)

Table 3 – DASS-21 score in the study sample (two groups; N = 147).

DASS-21		Self (n = 93)	Family member of infected (n = 54)	p value
Depression	Normal	66 (71%)	32 (59.3%)	0.138
	Elevated	27 (29%)	22 (40.7%)	
Anxiety	Normal	63 (67.7%)	29 (53.7%)	0.214
	Elevated	30 (32.3%)	25 (46.3%)	
Stress	Normal	80 (86%)	38 (70.4%)	0.082
	Elevated	13 (14%)	16 (29.6%)	
Depression score		2 (0–5.5)	3 (0–8)	0.139
Anxiety score		2 (0–5)	3 (0–10)	0.146
Stress score		3 (1–6)	3.5 (0–11)	0.205

Chi-square test or Fischer exact test.
Median (IQR) analysed using Mann–Whitney U test.

Table 4 – DASS-21 score in the study sample (three groups; N=147).

DASS-21	Only Self infected (n = 68)	family member of infected (n = 54)	Self and Family member infected (n = 25)	p value
Depression				
Normal	51 (75%)	32 (59.3%)	15 (60%)	0.16
Mild	6 (8.8%)	3 (5.6%)	4 (16%)	
Moderate	6 (8.8%)	8 (14.8%)	2 (8%)	
Severe	1 (1.5%)	4 (7.4%)	3 (12%)	
Extremely Severe	4 (5.9%)	7 (13%)	1 (4%)	
Anxiety				
Normal	47 (69.1%)	29 (53.7%)	16 (64%)	0.151
Mild	7 (10.3%)	8 (14.8%)	1 (4%)	
Moderate	7 (10.3%)	3 (5.6%)	4 (16%)	
Extremely Severe	7 (10.3%)	14 (25.9%)	4 (16%)	
Stress				
Normal	59 (86.8%)	38 (70.4%)	21 (84%)	0.288
Mild	3 (4.4%)	1 (1.9%)	1 (4%)	
Moderate	2 (2.9%)	5 (9.3%)	1 (4%)	
Severe	2 (2.9%)	7 (13%)	1 (4%)	
Extremely Severe	2 (2.9%)	3 (5.6%)	1 (4%)	

Chi-square test or Fischer exact test.

Discussion

This study is among the very few to study psychological issues in COVID infected patients and their close contacts. There were high levels of depression, anxiety and stress in the study sample. Anxiety symptoms were most prevalent among the three subsets and were present in 37% of the study population. Depression was present in 33% of the study sample and around 20% scored higher on the Stress subscale. Interesting to note is that almost half of the subjects, who had high scores on anxiety subscale, were in extremely-severe category. As anxiety can cause physiological stress-response in the body which can decrease immunity leading to increased severity of infection[17]; the need of intervention cannot be over-emphasized. Study on similar population showed that in patients suffering from COVID infection, the prevalence of anxiety and depression ranged from 24% to 42% and 22%–30% respectively.[10,18] In another study, done on admitted COVID patients in Iran, which used DASS scale, almost all the patients had scores above normal on all subsets. However, in that study about one-third had a past history of psychiatry disorder, which was excluded in our study and medical co-morbidity was high, as compared to ours. Both of these can

Table 5 – Association of DASS-21 scores with different variables.

Variables		N	Depression		Anxiety		Stress	
			Median (IQR)	p value	Median (IQR)	p value	Median (IQR)	p value
Gender	F	43	3 (0–7)	0.292	3 (1–7)	0.08	5 (1–8)	0.081
	M	104	2 (0–6)		2 (0–5)		3 (0.3–6)	
Any member >65 years in family	No	80	2 (0–6)	0.61	2 (0–5)	0.946	3 (1–6.8)	0.682
	Yes	67	2 (0–7)		2 (0–6)		3 (0–7)	
Chronic disease	No	118	2 (0–6)	0.323	2 (0–5)	0.188	3 (1–6)	0.098
	Yes	29	4 (0–9.5)		3 (0–12.5)		5 (1–12)	
Prophylaxis	No	93	2 (0–6)	0.291	2 (0–5)	0.123	3 (0.5–7)	0.577
	Yes	54	2 (0–8.5)		2.5 (1–7)		3.5 (1–7)	

Mann–Whitney U test.

Table 6 – Number of subjects with elevated DASS 21 score in each Variable group.

Variables		Elevated Score	Normal Score	p value
Depression				
Gender	Male (n = 104)	33 (31.73%)	71 (68.3%)	0.522
	Female (n = 43)	16 (37.2%)	27 (66.8%)	
Any member >65 years in family	No (n = 80)	28 (35%)	52 (65%)	0.639
	Yes (n = 67)	21 (42.9%)	46 (46.9%)	
Chronic disease	No (n = 118)	38 (31.3%)	80 (68.7%)	0.558
	Yes (n = 29)	11 (38%)	18 (62%)	
Prophylaxis	No (n = 93)	27 (29%)	66 (71%)	0.147
	Yes (n = 54)	22 (40.7%)	32 (59.3%)	
Anxiety				
Gender	Male (n = 104)	34 (32.2%)	70 (67.8%)	0.066
	Female (n = 43)	21 (48.8%)	22 (51.2%)	
Any member >65 years in family	No (n = 80)	30 (37.5%)	50 (62.5%)	0.981
	Yes (n = 67)	25 (37.3%)	42 (62.7%)	
Chronic disease	No (n = 118)	42 (35.6%)	76 (64.4%)	0.357
	Yes (n = 29)	13 (44.8%)	16 (55.2%)	
Prophylaxis	No (n = 93)	31 (33.3%)	62 (66.7%)	0.18
	Yes (n = 54)	24 (44.4%)	30 (65.6%)	
Stress				
Gender	Male (n = 104)	17 (16.3%)	87 (83.7%)	0.109
	Female (n = 43)	12 (27.9%)	31 (72.1%)	
Any member >65 years in family	No (n = 80)	14 (17.5%)	66 (82.5%)	0.458
	Yes (n = 67)	15 (22.4%)	52 (77.6%)	
Chronic disease	No (n = 118)	19 (16.1%)	99 (83.9%)	**0.026**
	Yes (n = 29)	10 (34.5%)	19 (65.5%)	
Prophylaxis	No (n = 93)	17 (18.2%)	76 (81.2%)	0.563
	Yes (n = 54)	12 (22.2%)	42 (77.8%)	

Chi-square test or Fischer exact test.
The significant values i.e. p<0.05 is bold.

possibly explain the difference.[19] Table 3 shows the scores of each subset in COVID patients and family member of COVID patients. In the family member group, 30–45% had a high score in any one of the three subsets. This shows that the prevalence of symptoms is relatively greater when a family member is affected. Since there was no study describing these symptoms in family member of COVID patients we could not compare our results. We also divided the sample into three groups to see the prevalence when both self and family member are infected (Table 4). The observation shows that the proportion of subjects with elevated scores is higher in a group if a family member is also infected, when compared to self alone.

Increased number of family members being infected is distressing and affects with the multiple preoccupations, like, care required for the ill, arrangements of day to day living, management of children in the house etc. There is also a compulsion to follow social restriction and restraining oneself for safety of the unaffected family members. All of these create a psychological burden. In this study it was also found that if another family member apart from self is affected the median score of the said subject (Table 3) in all the three subsets increases, although not significant. No other studies came to our notice which had analysed this factor.

Both depression and anxiety are known to be more prevalent in females. In this study, higher proportion of females had elevated scores on anxiety and stress and also a higher median in the three subsets, although these were not statistically significant. Other studies have found higher frequency of anxiety and depression in the female population.[20,21] However similar studies for stress levels in COVID, could not be found.

Having a chronic medical condition is a known factor which increases the severity of COVID infection.[6] This was evident here too, with significant number of people with a chronic disorder having higher score on the stress subscale (Table 6). Similarly, a study on hospitalised COVID patients with high comorbidity status, showed much higher proportion of psychological distress.[19] COVID infection affects

Table 7 – Correlation between depression, anxiety and stress scores of DASS 21 in the study sample.

	Anxiety	Stress
Depression	*Correlation Coefficient* = 0.79806 The P-Value is significant at <0.00001.	*Correlation Coefficient* = 0.80082 The P-Value is significant at <0.00001.
Anxiety	— —	*Correlation Coefficient* = 0.82029 The P-Value is significant at <0.00001.

Spearson's correlation test.

multiple organ system and thus the severity of the primary disease might increase, with presence of comorbidities,[22] which affects the physical and mental health status of an individual. Thus not only the frequency of this group to have a higher score is more, also the medians in each of the subset is likely to be higher than the sample not having chronic disorder. These findings have implication in Consultation Liaison Psychiatry practice; where more psychological burden to be expected in COVID patients with medical comorbidities.

Many candidate drugs like Hydroxychloroquine, Ivermectin etc were projected as prophylactic medication for COVID and included in various guidelines. Since there are certain studies which refuted the prophylactic claim, no conclusive statement has still been made.[23–26] One-third of our study population (54 of 147) took prophylactic medication, which included Hydroxychloroquine, or NSAIDs or their combination, the source of their prescription or requirement was not enquired in the questionnaire. Higher overall score was found in this sample compared to those who did not take prophylaxis (Table 6). More than 40% of these subjects had higher scores on depression or anxiety scales. We could not find any other study which had studied this aspect. This needs to be researched in future studies and could probably be due to the feeling of failure or perceiving loss of faith in further medication etc as their initial attempt to avoid infection had failed.

The scores in each of the subset of depression, anxiety and stress correlated significantly with each other (Table 7) showing that individuals who scored higher in one subset also had higher score on other two. Thus there is a significant overlap of symptoms in the same individual. This highlights the tripartite model of psychopathology that these symptoms arise in unison and management needs an expert consultation. Generally the anxiety symptoms might be more evident due to autonomic involvement or a certain depressive symptom might take a forefront, but analysing the presence of other underlying psychopathology and level of stress perception in the individual requires a thorough psychiatry review.

There could be varied reasons for the increased psychopathology in our study sample. A case report from Korea stated disease related isolation and media showing people's reactions, as source of stress.[27] Apparently social isolation and inadequate contact with loved ones during stay in hospital or during quarantine could be a reason.[28] Apart from the psychological and social causes, biological causes can also be the reason for depression or anxiety state, like the hyperinflammatory state during the infection or an immunological reaction or even direct effect of the virus or relation to the compromised vascular state in the patient. The link between inflammation and depression is well established.[29] Apart from the above reasons for anxiety; the hypochondrical concern has also been suggested.[30]

Highlight of this study is that it measures the level of three sets of psychiatry symptoms in patients suffering from active COVID infection. There are not many studies available in current scenario and we could not find any such study in the Indian population. Thus the findings of the study will be beneficial for a more holistic assessment and management of the patient. Information about mental health status of those patients who had taken prophylactic medications and had still become positive, and those who have other family members affected was studied apparently for the first time in this population, and although the results were not significant, this definitely gives a wider realm of possibility to explore in subsequent researches.

There are a few limitations of this study. The cross-sectional nature makes it difficult to draw any long term conclusions. It was not possible to use methods of sampling due to the pandemic and possibility of selection bias remains in this online question based study which excluded people not conversant with the technology. Also the clinical interviews and assessments had to be bypassed due to ethical considerations and safety of health workers. Additionally, as the study was done in service hospital catering primarily to servicemen and their dependents, the findings here, may not be generalizable to population at large.

With these findings it is recommended that patients with COVID infections, and their family members, whether hospitalised or in quarantine be screened for psychiatry symptoms. This has been shown to be beneficial in medically ill patients.[31] Psychiatric comorbidity, especially depression has been shown to have poor patient outcome and increases the need for hospitalisation.[32] Lessons learnt from the earlier pandemics have shown that the psychiatry symptoms persist even till twelve months in the affected groups.[11,33] These patients should be given adequate opportunity for psychiatric counselling through certain online features, telemedicine etc apart from the pharmacological intervention, wherever deemed required. Certain techniques like progressive muscle relaxation has shown to be beneficial to control anxiety in COVID patients.[34] It is also suggested that a prospective cohort of patients be established and measure of mental health be made a routine in these patients.

Conclusion

There is increased prevalence of anxiety, depression and stress in COVID affected patients and their family members. Female gender, presence of chronic illness, number of family members affected and use of prophylactic medication affected the severity of psychiatric morbidity adversely. Adequate screening, early diagnosis and timely management of these symptoms may reduce the burden of these symptoms and their impact on COVID disease. Sensitisation of clinicians towards this possibility and the need for expert psychiatry care for these patients will prove beneficial in reducing these symptoms.

Disclosure of competing interest

The authors have none to declare.

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