Original Research Article

An Observational Study on Changes in Psychological Parameters in Covid 19 Recovered Patients

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Abstract

The rapid escalation of COVID-19 pandemic resulted in a World Health Organization (WHO)-declaring public health emergency of international concern. The present study aimed to measure the prevalence of depression, anxiety, stress, post-traumatic stress disorder and cognitive impairment among the covid19 recovered patients. This observational study included patients with a history of COVID-19 who were admitted in the IPD of Medical College & Hospital, Kolkata. Data was collected from the patients after 14 days from recovering from COVID Patients were assessed through three questionnaire, Depression, Anxiety and Stress Scale - 21 (DASS-21), PTSD Checklist PCL-5 and Montreal Cognitive Assessment (MOCA). Statistical analysis showed significant differences between Anxiety and PTSD score of male and female patients. Significant difference was found in the depression, anxiety and PTSD score, when comparison was made on the basis severity level of Covid. Significant difference was found in the depression, stress and MOCA score, when comparison was made on the basis of educational status of patients. Duration of hospital stay and oxygen therapy were positively associated with anxiety, depression, stress and score while MOCA scores were found to be negatively associated. The result of the present study showed that no significant difference in the psychological variables was observed when comparison was made in terms of comorbidity. In conclusion, we should pay special attention to the mental health status of female patients, severe type individuals as we provide treatments to the COVID-19 patients.

Keywords: covid 19 recovered, PTSD, stress, cognitive impairment

Introduction

The outbreak of coronavirus disease 2019 (COVID-19) first emerged in Wuhan, Hubei Province, China, in December 2019. The rapid escalation of COVID-19 pandemic resulted in a World Health Organization (WHO)-declaring public health emergency of international concern. The

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pandemic was greatly associated with psychological complications and its unknown nature and the lack of a specific vaccine or medication for it was also rapidly increasing people's anxiety, fear, and distress in societies. Preliminary data suggested that patients with COVID-19 might experience delirium, depression, anxiety, insomnia[1]. A systematic review of psychiatric sequelae of COVID-19 highlighted high rates of depression (10.0 and 68.5%), anxiety (5.0 and 55.2%), and acute stress reaction (10.0 to 28.0%) symptoms, as well as high rates of insomnia (26.0 to 52.2%). Even months after recovery, 7.0 to 36.4% of patients endorsed symptoms suggestive of post-traumatic stress disorder (PTSD), and 40.0 to 69.0% reported persistent fatigue 2 to 3 months after discharge, with a significant impact on their activities of daily living and quality of life[2]. There is a relatively high frequency of cognitive impairment several months after patients contracted COVID-19. Impairments in executive functioning, processing speed, category fluency, memory encoding, and recall were predominant among hospitalized patients. The relative sparing of memory recognition in the context of impaired encoding and recall suggested an executive pattern. This pattern was consistent with early reports describing a dysexecutive syndrome after COVID-19 and had considerable implications for occupational, psychological, and functional outcomes[3]. It is well known that certain populations (eg, older adults) may be particularly susceptible to cognitive impairment after critical illness, however, in the relatively young cohort in the present study, a substantial proportion exhibited cognitive dysfunction several months after recovering from COVID-19. Available literature from the previous epidemics of infectious diseases suggested that the occurrence of post-traumatic stress disorder, depression, and anxiety disorders in patients admitted with SARS (2002) and Middle East Respiratory Syndrome (MERS, 2012) during the post-illness/recovery stage[4]. Considering the importance of the issue the present study aimed to measure the prevalence of depression, anxiety, stress, PTSD and cognitive impairment among the covid19 recovered patients.

Methodology

Study design and setting: This observational study included patients with a history of COVID-19 who were admitted in the IPD of Medical College & Hospital, Kolkata, between July 2021 and March 2022. Patients diagnosed with covid 19 and over 18 years age and among them who were clinically stable after 14 days from discharge were included in the study post covid clinic. Exclusion criteria were major preexisting neurological conditions that can affect cognitive functioning. In this study, according to the inclusion criteria, 477 patients were included in the study, purposive sampling technique was followed. Infomed consent was taken from the patients participating in the study.

Patient's demographic information was collected as much as possible using Case Record Form. Patients were assessed by three questionnaire, Depression, Anxiety and Stress Scale - 21 (DASS-21), PTSD Checklist PCL-5 and Montreal Cognitive Assessment. SPSS version 16 was used for statistical analysis.

Results and Discussion

Table 1. Socio demographic data

Variables		Frequency	Percentage
SEX	Male	277	58.1
	Female	200	41.9
RESIDENCE	Rural	39	8.2
	Urban	302	63.3
	Suburban	136	28.5
RELIGION	Hindu	444	93.1
	Muslim	31	6.5
	Others	2	.4

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FAMILY TYPE	Nuclear	332	69.6
	Joint	145	30.4
FAMILY INCOME	Low	96	20.1
	Medium	274	57.4
	High	107	22.4
EDUCATION	Primary Education	78	16.4
	Secondary Education	163	34.2
	Higher Secondary	79	16.6
	Graduate and above	157	32.9
COMORBIDITIES	Yes	300	62.9
	No	177	37.1
SEVERITY OF COVID(based on SpO2)	Mild	287	60.2
	Moderate	143	30
	Severe	47	9.9

A total of 477 patients participated in the current study. The age of the study participants ranged from 18 to 88 years. Their average age was 51.86 ± 15.38 years. Out of 477 participants, 277 (58.1%) were male and 200 (41.9%) were female. 39 (8.2%) participants were from rural area, 302 (63.3%) were from urban area and 136 (28.5%) were from suburban area. 444 (93.1%) respondents were Hindu, 31 (6.5%) were Muslim and 2 (0.1%) participants belong to other religion. 332 (69.6%) were belonging to nuclear family while rest of 145(30.4%) were from the joint family. Among the patients, 96 having low family income, 274(57.4%) having medium and 107 (22.4%) having high family income. 157 (32.9%) participants having a college education or above, 79 (16.6%) having a high school education, 163 (34.2%) having secondary education and 78(16.4%) having primary or below education. Oxygen saturation was a key clinical index for evaluating the severity of patients with COVID-19. In this study, 287 (60.2%) patients were mild type, 143 (30.0%) patients suffered from moderate symptoms of covid,47 (9.9%) patients were severe type, but there were no critically ill patients. All the patients were cured and discharged. In addition, we examined the comorbidities of patients with COVID-19, with 300 (62.9%) having comorbidities (such as diabetes and hypertension).

Table-2: Descriptive statistics of depression, anxiety, stress, PTSD and MOCA

		Frequency	Percentage	Mean	SD
Depression	Normal	166	34.8	15.38	10.58
	Mild	57	11.9		
	Moderate	105	22		
	Severe	63	13.2		
	Extremely severe	86	18		
Anxiety	Normal	204	42.8	9.81	7.1
	Mild	67	14		
	Moderate	114	23.9		
	Severe	41	8.6		
	Extremely severe	51	10.7		

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Stress	Normal	89	18.7	17.90	7.55
	Mild	180	37.7		
	Moderate	154	32.3		
	Severe	43	9		
	Extremely severe	11	2.3		
Post-traumatic stress disorder	Yes	306	64.2	19.46	11.85
	No	171	35.8		
MOCA	Normal control group	419	87.8	24.09	3.56
	Mild cognitive impairment group	53	11.1		
	Alzheimer dementia group	5	1		

A total of 204 (42.8%) patients had normal levels of anxiety, 67 (14%) participants showed mild anxiety, 114 (23.9%) showed moderate anxiety, 41 (8.6%) showed severe anxiety and 51 (10.7%) showed extremely severe anxiety. With regards to depression, the mean score was 15.38 (SD=10.58). A total of 166 (34.8%) respondents showed normal levels, 57(11.9%) had mild depression, 105 (22%) had moderate depression, 63 (13.2%) had severe depression and 86 (18%) had extremely severe depression. Finally, the mean score for stress was 17.90 (SD=7.55). 89 (18.7%) showed normal stress level, 180 (37.7%) showed mild stress, 154 (32.3%) had moderate stress, 43 (9%) severe stress and 11 (2.3%) showed extremely severe stress. The mean score for PTSD was 19.46 (SD=11.85). 306 (64.2%) patients showed post-traumatic stress disorder. The mean for MOCA was 24.09 (SD=3.56). A total of 419 (87.8%) respondents showed no cognitive impairment, 53 (11.1%) showed mild cognitive impairment and 5 (1%) showed Alzheimer dementia.

Table-3: Correlation matrix

	Depression	**Anxiety**	**Stress**	**PTSD**	**MOCA**
Depression	1	.53	.72	.69	-.34
Anxiety	.53	1	.57	.65	-.22
Stress	.72	.57	1	.66	-.31
PTSD	.69	.65	.66	1	-.29
MOCA	-.34	-.22	-.31	-.29	1
Age	.34	.18	.19	.19	-.31
Number of days staying in Hospital	.025	.14	.090	.061	-0.37
Duration of Oxygen therapy	.081	.23	.098	.091	-.02

Positive correlation was found between the score of age and depression, anxiety, stress and PTSD. A negative association was found between the age and MOCA score. Duration of hospital stay and oxygen therapy were positively associated with anxiety, depression, stress and PTSD score while MOCA scores were found to be negatively associated. A correlation co-efficient of 0.23 was found between number of days of oxygen therapy and anxiety score, which indicated a positive association between these two variables. The depression, anxiety, stress and PTSD scores were positively associated with each other, only the MOCA score were found to be negatively associated with all these variables.

Table-4: Comparison between the male and female patients in terms of depression, anxiety, stress, PTSD and MOCA

Sex	Depression		Anxiety		Stress		PTSD		MOCA	
	Mean	t-value	Mean	t-value	Mean	t-value	Mean	t-value	Mean	t-value
Male	15.09	0 .69*	8.77	3.84**	15.25	2.75*	17.71	3.85**	24.57	3.44*
Female	15.78		11.26		16.85		21.88		23.44	

**Difference is significant at 0.01 level

*Difference is insignificant

No significant difference was found in case of depression, stress and MOCA score among male and female. The PTSD score for female patients (M =21.88) was higher than male patients (M =17.71). Female patients were more suffering from post-traumatic stress disorder than male patients ($p < 0.01$). Female patients were more suffering from anxiety than male patients ($p < 0.01$).

Table 5: Comparison between the mild, moderate and severely affected covid patients in terms of depression, anxiety, stress, PTSD and MOCA

Severity of Covid	Depression		Anxiety		Stress		PTSD		MOCA	
	Mean	F-value	Mean	F-value	Mean	F-value	Mean	F-value	Mean	F-value
Mild	14.31	3.70**	8.82	7.67**	17.15	3.61*	18.01	5.58**	24.40	2.63*
Moderate	17.24		11.06		18.91		21.89		23.62	
Severe	16.30		12.09		19.36		20.89		23.68	

**Difference is significant at 0.05 level

*Difference is insignificant

The depression score for moderately affected patients (M =17.24) was higher than the patients who had mild (M =14.31) and severe (M= 16.30) level of Covid. The PTSD score for moderately affected patients (M =21.89) was higher than the patients who had mild (M =18.01) and severe (M= 20.89) level of Covid. The anxiety score for severely affected patients (M =12.09) was higher than the patients who had mild (M =8.82) and moderate (M= 11.06) level of Covid. Patients who had severe level of Covid are more suffering from anxiety, while the patients who had mild Covid are the least sufferer ($p < 0.05$).

Table – 6: Comparison between the covid patients on the basis of educational status in terms of depression, anxiety, stress, PTSD and MOCA

Level of Education	Depression		Anxiety		Stress		PTSD		MOCA	
	Mean	F-value	Mean	F-value	Mean	F-value	Mean	F-value	Mean	F-value
Primary	18.31	7.59**	10.62	2.44*	19.69	5.71**	21.96	3.95*	20.83	61.11**
Secondary	17.35		10.60		19.04		20.92		23.15	
H.S	13.11		9.70		16.03		17.56		25.57	
Graduate and above	13.03		8.65		16.75		17.66		25.95	

**Difference is significant at 0.01 level

*Difference is insignificant

Patients with primary level of education experienced more depression (M= 18.31) and stress (M=19.69) than patients who had higher level of education ($p<0.01$).

Table-7: Comparison between Comorbid and non-comorbid patients in terms of depression, anxiety, stress, PTSD and MOCA

Co-mor	Depression		Anxiety		Stress		PTSD		MOCA	
	Mean	t-value	Mean	t-value	Mean	t-value	Mean	t-value	Mean	t-value
Yes	15.91	1.39	10.28	1.88	18.41	1.93	19.82	.857	24.04	-.434
No	14.48		9.02		17.03		18.85		24.19	

While comparison made on the basis of comorbidities of the patients, no significant difference was found on the score of depression, anxiety, stress, PTSD and MOCA.

Discussion

Findings of our study suggested that 65.2% of the participants were suffering from mild to severe level of depression, 57.2% were having anxiety related problems and 81.3% were experiencing stress after recovering from Covid 19 disease. The prevalence of anxiety symptoms in the 3-month period post-discharge was similar to the reported prevalence during the hospitalization period. The prevalence of depression was highly variable across studies conducted within 3 months of hospital discharge (9–66%)[1,5].There were several reasons for experiencing these psychological problems, one reason may be the invasive procedures required while addressing the complications of COVID-19. Some of the anxiety could be due to the information being broadcast in the mass media regarding the scenarios of the dead bodies being piled up for cremation and crisis for ventilator requirements across the country. Uncertainty about health status, follow-up of patients, treatment care, and inefficiency in these communities could also increase the vulnerability of such communities to the psychological effects of COVID-19[6].

Result showed that 64.2% of the overall participants experienced symptoms related to post traumatic stress disorder. Our findings are similar with the studies which found approximately 1 out of 10 people hospitalized for COVID-19 experienced PTSD symptoms or met criteria for a PTSD diagnosis, 3 out of 10 experienced insomnia and 2 out of 10 experienced obsessive-compulsive symptoms within 3 months of leaving the hospital[4].

In the present study, we also measured the cognitive performance of the patients after recovering from covid 19 infection. The result showed that 87.8% of the overall participants had no cognitive impairment while 11.1% patients suffered from mild cognitive impairment. There was a relatively high frequency of cognitive impairment several months after patients contracted COVID-19. Impairments in executive functioning, processing speed, category fluency, memory encoding, and recall were predominant among hospitalized patients. This pattern was consistent with early reports describing a dys-executive syndrome after COVID-19 and has considerable implications for occupational, psychological, and functional outcome.

Findings of the study suggested that female patients were suffering more from anxiety and PTSD than male patients ($p < 0.01$).This goes in line with the studies where in terms of patient characteristics, in comparison to male patients, females were associated with worse depression and anxiety symptoms during hospitalization and worse depression, anxiety, obsessive-compulsive, and insomnia symptoms post-discharge[1].

Positive correlation was found between the score of age and depression, age and anxiety, age and stress, age and PTSD. The correlation coefficient value indicates that aging was positively associated with depression, stress, anxiety and PTSD.

The result of the present study showed that no significant difference in the psychological variables was observed when comparison was made in terms of comorbidity which was consistent with other study.

Duration of hospital stay and oxygen therapy were positively associated with anxiety, depression, stress and PTSD score while MOCA scores were found to be negatively associated. Receipt of ICU care was associated with depression symptoms post-discharge.

Findings suggested patients with low educational

status are suffering more from depression and stress. Earlier study showed lower educational level and family income were associated with stronger negative psychological effects. In this study it was found that mainly family income predicted stress.

Significant difference was found in the depression, anxiety and PTSD score, patients who had severe level of Covid are more suffering from anxiety, while the patients who had mild Covid are the least sufferer ($p < 0.05$). Patients who had moderate symptoms of Covid are more suffering from depression and PTSD, while the patients who had mild Covid are the least sufferer ($p < 0.05$). This is in accordance with, COVID-19 severity was associated with worse anxiety, PTSD, and depression symptoms post-discharge.

Conclusion

In conclusion, these results highlight the great negative psychological impact that the patients were facing after recovering from COVID-19 disease. In conclusion, we should pay special attention to the mental health status of female patients, severe covid affected individuals as we provide treatments to the COVID-19 patients. Anxiety, depression, and physical symptoms can also progress into chronic psychological problems. In the long run, these acute psychological problems would finally develop into chronic mental disorders, and even PTSD. Therefore, a mental health check-up or screening of all admitted patients should be considered. Cognitive Behavioural Therapies (changing cognitive distortions, improving emotional regulation), activity scheduling and behaviour activation, creating a social-support network to increase positive experiences could help reduce the mental health problems.

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Conflict of Interest: Nil

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