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ORIGINAL ARTICLE

Psychiatric Morbidity Among Patients Recovered from COVID-19 Pneumonia: A Cross Sectional Telephonic Survey

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Abstract

Background: Mental health issues among COVID-19 survivors can have broader public health implications, including decreased quality of life, impaired functional recovery, increased healthcare utilization, and higher mortality rates. **Aims and Objectives:** The aim of this study was to evaluate the psychiatric morbidities among the persons treated and recovered from COVID-19. **Materials and Methods:** A cross sectional telephonic survey was undertaken in hundred patients infected with COVID-19 pneumonia, treated and discharged from a tertiary care centre. Depression, anxiety, PTSD symptoms were assessed using PHQ-2, GAD-2, PTSD screen for DSM-5 respectively. Sleep quality was assessed using single item sleep quality scale. Overall quality of life and health satisfaction was assessed using WHOQOL-BREF. **Results:** Mean age of study participants is 46.15 years and study sample included 62% of males. Admitted patients had mean CT severity score of 40% lung involvement. On the measures of sleep quality, twelve were having fair range and two participants had poor sleep quality. 24% and 31% of participants had anxiety and depressive symptoms respectively while 14% had symptoms of PTSD. **Conclusion:** Post covid sequelae is an important concern to be addressed, larger studies are required to assess the psychiatry morbidity accurately. Further sequential assessments would help to delineate the natural course of post covid psychiatric sequelae.

Keywords: COVID-19 pneumonia, Depression, Anxiety, PTSD

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Graphical Abstract

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Aims: The aim of this study was to evaluate the psychiatric morbidities among the persons treated and recovered from covid 19.

Methods
 A cross sectional telephonic survey was undertaken in hundred patients infected with COVID 19 pneumonia, treated and discharged from a tertiary care centre. Depression, anxiety, PTSD symptoms were assessed using PHQ-2, GAD-2, PTSD screen for DSM-5 respectively. Sleep quality was assessed using single item sleep quality scale. Overall quality of life and health satisfaction was assessed using WHOQOL-BREF. All statistical analysis was computed using SPSS VERSION 20.0. Ethical clearance from the Institutional ethics committee was obtained. Ref no: KIMS/PG/2021/28, verbal informed consent and ensuring confidentiality was done through phone call.

Results: main table

Variable	Age	CT severity	Sleep	GAD total	PHQ total	WHO-QOL- overall	WHO-QOL- health
Age		R=0.20 P=0.06	R=0.10 P=0.30	R=0.21* P=0.04	R=0.24* P=0.02	R= -0.17 P=0.10	R= -0.16 P=0.11
CT severity	R=0.20 P=0.06		R=0.33** P=0.001	R=0.33** P=0.001	R=0.18 P=0.08	R= -0.12 P=0.22	R= -0.15 P=0.14
Sleep	R=0.10 P=0.30	R=0.33** P=0.001		R= -0.58** P<0.001	R= -0.55** P=0.001	R=0.48** P=0.00	R=0.25** P=0.00
GAD total	R=0.21* P=0.04	R=0.33** P=0.001	R= -0.56** P=0.001		R=0.70** P=0.001	R= -0.56** P=0.001	R= -0.59** P=0.001
PHQ total	R=0.24* P=0.02	R=0.18 P=0.08	R= -0.55** P=0.001	R=0.70** P=0.001		R= -0.57** P=0.001	R= -0.68** P=0.001
WHO-QOL- overall	R= -0.17 P=0.10	R= -0.12 P=0.001	R=0.48** P=0.001	R= -0.58** P=0.001	R= -0.57** P=0.001		R=0.72** P=0.001
WHO-QOL- health	R= -0.16 P=0.11	R= -0.15 P=0.14	R=0.63** P=0.001	R= -0.59** P=0.001	R= -0.68** P=0.001	R=0.73** P=0.001	
Days of hospital stay	R=0.25** P=0.004	R=0.48** P=0.001	R= -0.22** P=0.031	R=0.31** P=0.002	R=0.18 P=0.067	R= -0.121 P=0.229	R= -0.21* P=0.040

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Conclusion: Post covid sequelae is an important concern to be addressed, larger studies are required to assess the psychiatry morbidity accurately. Further sequential assessments would help to delineate the natural course of post covid psychiatric sequelae.

Introduction

As of mid-April 2022, the global COVID-19 caseload surpassed 500 million, with over 6.1 million recorded fatalities [1]. Post-COVID-19 symptomatology affects a considerable proportion of survivors, ranging from 13% to 60% within the general population. These symptoms encompass a diverse array of sequelae affecting respiratory, gastrointestinal, functional, neurocognitive, and urinary systems [2-4]. Persistent physical and psychological challenges afflict COVID-19 survivors akin to those observed in SARS patients, enduring even years post-hospital discharge. Notably, a substantial number of survivors report post-discharge mental health issues, including fatigue, insomnia, diminished quality of life, anxiety, despair, and post-traumatic stress disorder [5,6].

Despite the growing recognition of these challenges, research on COVID-19 survivors one year post-discharge remains

sparse, with predominant focus on physical health outcomes [7]. Notably, findings from a singular study conducted at Jinyintan Hospital revealed significantly elevated levels of anxiety and depression among 1,276 survivors at the 12-month mark compared to the general population [8]. The paucity of comprehensive investigations underscores a significant knowledge gap regarding the enduring mental health implications of COVID-19, necessitating further research endeavors.

From early stages of COVID-19 pandemic, concerns have been raised about the fact that, patients who survived COVID-19 are at an increased risk of psychological problems within 3 months after infection, which is widely predicted and not yet accurately measured [3]. Pooled data from meta-analysis studies also estimated and given evidences of occurrence of psychiatric morbidities among the people infected with COVID-19 [4]. This highlights the need to address

the mental health needs and not to ignore psychological dimensions in this group of patients [9,10].

This study investigating the mental health impact of COVID-19 on survivors is crucial due to the pandemic's unprecedented scale, unique stressors, and long-term consequences. With millions affected globally, understanding the psychological implications is paramount for comprehensive public health management. Utilizing telephonic surveys ensures efficient data collection while adhering to safety measures. By examining survivors one year post-discharge and comparing with similar conditions like SARS, this study not only highlights the enduring nature of mental health challenges but also informs targeted interventions. Its clinical relevance lies in guiding healthcare providers to identify and address psychiatric morbidities, ultimately enhancing patient outcomes and promoting overall well-being amidst this global crisis. The aim of this study is to evaluate the psychiatric morbidities among the persons treated and recovered from COVID-19 through telephonic survey.

Materials and Methods

A cross sectional survey was undertaken through a phone call at department of psychiatry, at a tertiary care centre at Chengalpattu district. Sample for the study was obtained from data acquired from medical records department. Study duration lasted about 2 months (1st July 2021- 31st august 2021). Study population constitutes patients who got treated for COVID-19 pneumonia and discharged from same institution. The study included (a) patients infected by COVID-19 pneumonia, (b) treated as an inpatient. Patients who did not respond to phone call after three attempts were excluded from the study. Participant sociodemographic details were obtained through semi structured questionnaire proforma. Ten item structured screening questionnaire developed from standardized questionnaires (Generalized anxiety disorder-2, Patient health questionnaire-2, Primary care-PTSD screen for DSM-5, WHO-Quality of life, single item sleep quality scale) was used for screening of Psychiatric sequelae.

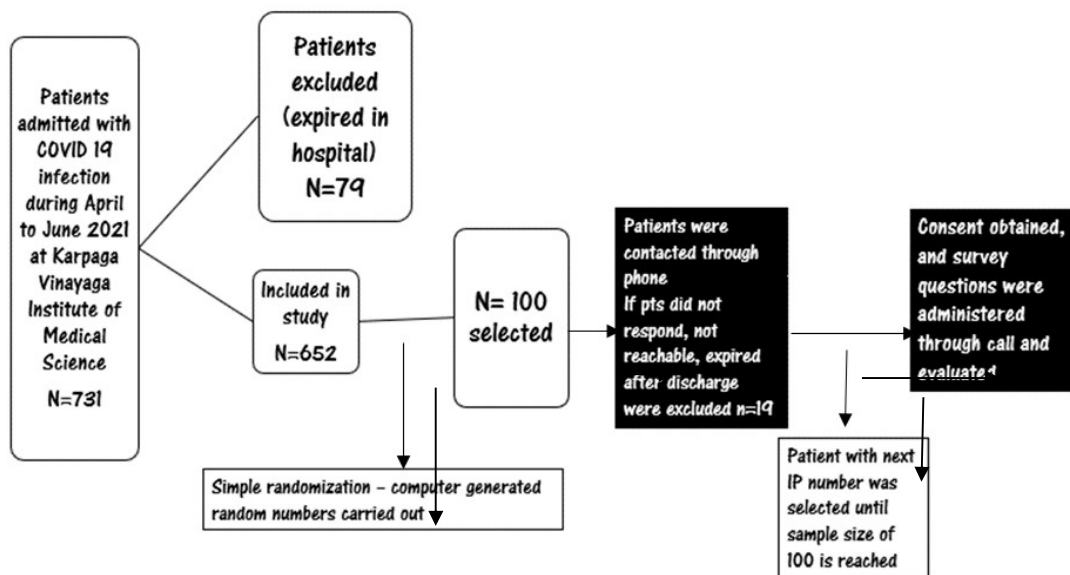


Figure 1. Methodology flow chart

From medical records department data of patients affected by COVID-19 pneumonia is obtained according to IP number. Patients who recovered and discharged from hospital during the month of 1st April -30th June 2021 due to COVID-19 pneumonia infection which came to about 731 patients during that time period, were selected and enrolled in the study. Sample size calculation was done using the formula, $n = Z^2PQ/d^2$, $N=100$, where, $z=2$, $P=50$, $Q=50$, $d=10$, Simple Randomisation was carried out and 100 patients were selected. Patients were individually called over the phone, and survey questionnaires which includes sociodemographic details, GAD-2, PC-PTSD-5, PHQ-2, WHO-QOL, Single item sleep quality scale were administered after getting verbal informed consent. In GAD-2, a threshold score of 8 serves as a conventional marker denoting clinically notable anxiety symptoms within the general populace. A score of 5 might signify mild anxiety, while 10 indicates a moderate level, and 15 represents severe manifestations [11]. PC-PTSD-5 a cut off 3 or more with signifies trauma exposure and cut off 4 or more says clinically notable PTSD [12]. When utilizing the PHQ-2 as a screening tool for depression, a score of 3 stands out as the recommended threshold for optimal sensitivity and specificity in identifying potential cases of major depressive disorder. Any score equal to or exceeding this cutoff suggests a higher likelihood of meeting diagnostic criteria for depression, thereby prompting further assessment and intervention [13].

Patients who did not attend, not willing to participate in study and not given consent was excluded, and the patient with next IP number was called and

surveyed until the sample size of 100 is reached. Totally 119 patients were called through phone out of which 14 did not respond to phone call, 2 were not reachable through call, and 3 patients expired after discharge from hospital and they were excluded from the study.

Statistical Analysis

All statistical analysis was computed using SPSS VERSION 20.0. Descriptive statistics were used to describe study variables; Mean, standard deviation, Median, Range was used for continuous variables and Frequency & Percentages were used for categorical variables. For estimating association between independent variables and outcome, spearman correlation was used.

Results

Among 100 participants diagnosed with COVID19 pneumonia recruited for the study, mean age of participants is 46.15 years (SD, and 62% were males and 38% were females, 46 people were belonging to rural area and 54 were from urban area. ICU admission was required for 24 participants and 76 were treated at normal wards. About 43 individuals involved in the study required oxygen support, and median duration of hospital stay was 7 days and minimum duration of stay being one day and maximum being 28 days. Admitted patients had mean CT severity score of 40% lung involvement (minimum 8% and maximum score being 90%), 46 participants had mild involvement (less than 33%), 40 of them had moderate lung involvement (33-66%) and 14 of them had severe lung involvement (above 66%) (Table 1).

On analysing sleep quality using single item sleep quality scale which categorizes quality of sleep into terrible, poor, fair, good, excellent (on a scale ranging from 0-10), 51 participants found

to have sleep quality describing to be excellent, 35 reported having good sleep quality, 12 were having fair range and poor sleep quality was reported by 2 participants (Table 1)

Table 1. Distribution of socio-demographic data among the study participants (N=100)

S. No	Variable	Frequency	Percentage
1.	Age		
	20-40	35	35%
	41-60	52	52%
	61-80	13	13%
2.	Sex		
	Male	62	62%
	Female	38	38%
3.	Area		
	Urban	54%	54%
	Rural	46%	46%
4.	ICU admission		
	Required	24	24%
	Not required	76	76%
5.	Oxygen support		
	Required	43	43%
	Not required	57	57%
6.	Severity of lung involvement		
	Mild	46	46%
	Moderate	40	40%
	Severe	14	14%
7.	Sleep quality		
	Terrible	0	0%
	Poor	2	2%
	Fair	12	12%
	Good	35	35%
	Excellent	51	51%

Among the participants 76% were found to have no anxiety symptoms, and 23% of participants were experiencing anxiety symptoms and 1 participant qualifying for disorder diagnosis. For assessing depression patient health questionnaire 2 was administered and 69% reported no symptoms suggestive of depression, 28% reported depressive

symptoms but not amounting to disorder diagnosis and 3 participants qualified for disorder diagnosis. Among the participants 98 did not experience PTSD symptoms and 2 qualifies for the diagnosis. Of about 45% of the study participants reported very good overall quality of life, 37% reported to be good and 18% were neither satisfied nor reported to be bad. And 43% of study

participants reported to have very good health satisfaction, 34% rated it to be good, 21% were neither satisfied nor dissatisfied, 2% rated it to be poor (Table 2)

Correlation between age, CT severity, GAD, PHQ, WHO-QOL-overall, WHO-QOL -health, duration of hospital stay was established by using spearman correlation.

It was found that as the age increases there is a significant positive correlation with generalised anxiety symptoms and depressive symptoms measured by PHQ-2 and duration of hospital stay. As the CT severity score increases there is a significant positive correlation with sleep quality and

generalised anxiety symptoms and duration of hospital stay also increases. Sleep quality was found to have significant negative correlation with GAD symptoms, depressive symptoms.

GAD has significant positive correlation with depressive symptoms, and significant negative correlation between overall quality of life and health. Depressive symptoms have significant negative correlation with overall quality of life and overall health. Overall quality of life and health and sleep have significantly positively correlation. Number of days of hospital stay has positive correlation with GAD symptoms and negative correlation with sleep and overall health (Table 3)

Table 2. Distribution of study variables among the study participants (N=100)

S.no	Variable	Frequency	Percentage
1.	Generalized anxiety disorder		
	Not at all	76	76%
	Anxiety symptoms	23	23%
	GAD	1	1%
2.	Depression		
	Not at all	69	69%
	Depressive symptoms	28	28%
	Depression	3	3%
3.	PTSD		
	Not at all	86	86%
	PTSD symptoms	12	12%
	PTSD	2	2%
4.	Overall-QOL		
	Very poor	0	0
	Poor	0	0
	Neither good nor poor	18	18%
	Good	37	37%
	Very good	45	45%
5.	Health satisfaction		
	Very poor	0	0
	Poor	2	2%
	Neither good nor poor	21	21%
	Good	34	34%
	Very good	43	43%

Table 3. Correlation between Age, CT Severity, sleep quality, GAD Total, PHQ Total, WHO-QOL-Overall, WHO-QOL-Health (N=100)

Variable	Age	CT severity	Sleep	GAD total	PHQ total	WHO-QOL-overall	WHO-QOL-health
Age		R=0.20 P=0.06	R=0.10 P=0.30	R=0.21* P=0.04	R=0.24* P=0.02	R= -0.17 P=0.10	R= -0.16 P= 0.11
CT severity	R=0.20 P=0.06		R=0.33** P=0.001	R=0.33** P=0.001	R=0.18 P=0.08	R= -0.12 P=0.22	R= -0.15 P=0.14
Sleep	R=0.10 P=0.30	R=0.33** P=0.001		R= -0.56** P<0.001	R= -0.55** P<0.001	R=0.48** P=0.00	R=0.63** P=0.00
GAD total	R=0.21* P=0.04	R=0.33** P=0.001	R= -0.56** P=<0.001		R=0.70** P=<0.001	R= -0.56** P=<0.001	R= -0.59** P=<0.001
PHQ total	R=0.24* P=0.02	R=0.18 P=0.08	R= -0.55** P=<0.001	R=0.70** P=<0.001		R= -0.57** P=<0.001	R= -0.68** P=<0.001
WHO-QOL-overall	R= -0.17 P=0.10	R= -0.12 P=0.22	R=0.48** P=<0.001	R= -0.56** P=<0.001	R= -0.57** P=<0.001		R=0.73** P=<0.001
WHO-QOL-health	R= -0.16 P= 0.11	R= -0.15 P=0.14	R=0.63** P=<0.001	R= -0.59** P=<0.001	R= -0.68** P=<0.001	R=0.73** P=<0.001	
Days of hospital stay	R=0.29** P=0.004	R=0.48** P=<0.001	R= -0.22** P=0.031	R=0.31** P=0.002	R=0.18 P=0.067	R= -0.121 P=0.229	R= -0.21* P=0.040

(Spearman Correlation Test)

*Correlation is significant at the 0.05 level (2- tailed)

**Correlation is significant at the 0.01 level (2-tailed)

Discussion

Very few studies have been done regarding psychiatric morbidity in patients affected by COVID-19 in India, most of the studies were done mainly on impact of COVID-19 on mental health in general population. To our knowledge only 4 studies have been done on patients affected by COVID-19 and psychiatric mental health consequences [14-17]. Previous studies have reported majority of patients in post covid state, experience symptoms

of sleep disturbances, symptoms suggestive of PTSD, depression, anxiety even after 1 month after infection [17]. These previous findings further kindle the need to evaluate the psychiatric sequelae related to COVID-19.

But in our current study only nearly 14% had problems with sleep quality, and patients with depressive, anxiety symptoms and PTSD symptoms were reported by few participants which is contradicting with previous studies done

on COVID-19 infected patients post discharge. In General population prevalence of anxiety in adults is 2.9% but in our study it comes to around 1%, depression prevalence in general population is 5-7% but in our study it is estimated to be about 3% which is quite lower in comparison, Asian countries prevalence of PTSD is about 0.5%-1% in general population which correlates with our findings which comes to about prevalence of 2%, and about 10-20% of individuals complain insomnia symptoms in primary care settings which also correlates with our findings which comes to about 12% [18-20]. So, comparing these data's, we can come to a conclusion that is there is no much increase in these symptoms as a sequel due to COVID-19 infection.

And the correlation in our study suggestive of increase in CT severity and sleep quality and GAD symptoms suggests the need for care for patients with moderate to severe lung involvement at an early stage, in parallel with COVID-19 treatment, and this impact in sleep quality has effects further on overall quality of life and overall health of participants involved in the study which further signifies the attention which needs to be given to these individuals at the earliest. Additionally, it has been found that as the age advances the occurrences of GAD and depressive symptoms were significant, which indicates the need for care in elderly populations who are infected with COVID-19 pneumonia at an early stage to curb the occurrences of these psychiatric morbidities.

It is also estimated that patients who had longer duration of hospitalisation, also had a greater probability of getting

sleep disturbance [21] and anxiety symptoms and problems with their overall health satisfaction which also implies adequate interventions to be given these people who have larger duration of hospital stay at least at the time of discharge [22]. To effectively address the mental health morbidity among COVID-19 survivors, it's crucial to implement comprehensive interventions throughout the continuum of care. This begins with systematic screening for anxiety, depression, and PTSD at hospital discharge, utilizing validated assessment tools to identify those in need of immediate support. Structured follow-up care, including regular telephonic or virtual check-ins, allows for ongoing monitoring and intervention. Prompt referral to specialized mental health services ensures access to evidence-based interventions such as psychotherapy and medication management. Psychoeducation, coping strategies, and peer support groups offer additional avenues for emotional validation and social connection. Moreover, connecting survivors with community resources and adopting an integrated care approach that considers holistic needs ensures coordinated support for long-term resilience and well-being.

The strengths of our study are that the study is conducted within the Indian context, which is notable as many previous studies have been conducted outside of India. This distinction suggests that the outcomes observed in our study may differ from those reported in other settings, potentially due to cultural factors such as coping strategies and the stigma associated with discussing mental health issues. In Indian culture, there may be a greater reluctance to openly discuss mental health

problems compared to Western societies. Furthermore, this study represents one of the few conducted within the Tamil Nadu population, specifically addressing mental health issues among individuals infected with COVID-19. The use of telephonic surveys in our research methodology is particularly advantageous during the current pandemic, as it offers a convenient and safe means of data collection for both healthcare providers and patients. This approach minimizes the risk of infection transmission while allowing for efficient data gathering in a timely manner [23].

Several limitations are noted in this study. Firstly, conducting evaluations at earlier stages during hospital admission could have provided additional insights into symptom presentation and allowed for a more comprehensive understanding of psychiatric morbidity. Serial assessments at 1, 4, and 12 weeks post-discharge would have enabled a more accurate estimation of prevalence and facilitated the study of symptom evolution and progression over time. However, due to challenges in data collection during the peak of the pandemic, such assessments were not feasible. Additionally, the telephonic interview method utilized in this study may have introduced confidentiality concerns, potentially serving as a barrier for participants to openly communicate about their symptoms, despite assurances of confidentiality. While face-to-face surveys might have been perceived as more reliable from the participants' perspective, logistical constraints, such as patients being evaluated post-discharge, made in-person assessments unfeasible. Moreover, the lack of information regarding premorbid psychiatric history poses a limitation, as it could have

provided valuable context for interpreting the findings. Lastly, while a diagnostic interview method could have provided definitive diagnoses, its implementation via phone calls is impractical and time-consuming. These limitations highlight the need for future research to address these methodological challenges while investigating psychiatric morbidity among COVID-19 survivors.

Conclusion

Addressing post-COVID sequelae is of paramount importance, particularly regarding mental health issues arising from this challenging infection. Early intervention strategies can play a pivotal role in mitigating these concerns. Overcoming the aforementioned limitations would significantly enhance the relevance and depth of our study. Given the scarcity of research in our country on this subject, there is a pressing need for more extensive and large-scale studies to assess the prevalence and impact of post-COVID morbidity on health and quality of life. Such studies are essential not only for preventing future occurrences of such morbidity in potential pandemics but also for informing policymakers in effectively addressing these issues.

Future Directions

Sequential assessments would help to delineate the natural course of post covid psychiatric sequelae.

Author Contribution

We confirm that this manuscript has been read and approved by all named authors. We declare that the manuscript is original and it is not being published or submitted for publication elsewhere

Ethical Declaration

Ethical clearance from the Institutional ethics committee was obtained. Ref no: KIMS/PG/2021/28, verbal informed consent and ensuring confidentiality was done through phone call.

Conflicts of interest

The authors declares that they do not have conflict of interest.

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