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Correlation of CORADS scoring with Psychiatric Co-morbidities in acute phase of COVID infection: A cross—sectional study

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Abstract

Background: There is a mutual relationship between COVID infection and mental illness. There is increase in the overall prevalence of psychiatric conditions in this pandemic. Yet, there is dearth in the literature on the relation between psychiatric morbidity and severity of COVID (assessed by CORADS score). Hence, we aimed to assess the various psychiatric conditions seen in the COVID patients, and the association of various factors with the CORADS severity score. **Materials and Methods:** It is a cross-sectional observational study conducted in stable COVID patients who were admitted in the hospital and are referred to psychiatric department for consultation during February, 2021 to April, 2021. After confirmation of COVID-19 through RTPCR, HRCT was done for CORADS scoring and a detail neuropsychological evaluation was conducted in these patients. **Results:** Among 100 responses, 67 patients were analyzed in detail. On Kruskal Wallis test, there was statistically significant association between CORADS score and age of the individual, history of personality traits and anxiety (*p*-value 0.001, 0.049 & 0.040 respectively). Around 43% of the sample were diagnosed with organic mood disorders, following with anxiety distress and cognitive disorders were more prevalent. Age -wise distribution of sample shows that anxiety was more seen in the individuals above 30 years of age. **Conclusion:** With the background of the upcoming mental health pandemic post COVID, it is the duty of the treating doctor to screen a patient diagnosed with COVID for comorbid psychiatric illnesses. This will help the patients to alleviate the symptoms and improve their functional outcome.
Keywords: COVID-19, Anxiety, CORADS score, sleep disturbance.

Introduction

The current pandemic of novel corona virus or COVID- 19 is due to the virus, SARS-CoV-2, which has varied clinical presentation with patients being asymptomatic to having severe infection like severe acute respiratory syndrome (SARS)[1], with the symptoms ranging from headache, sore throat, dry cough, fever, dyspnea to more severe manifestation causing confusion, chest pain, pneumonia and other complications which requires in-patient care[1-4].

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Neuropsychological manifestations in this pandemic may be due to direct involvement of central nervous system due to virus or due to the changes in one's lifestyle due to social isolation and lockdowns.

Recent literature shows that exposure to corona virus leads to neuropsychiatric and psychopathological implications such as Post-Traumatic Stress Disorder (PTSD), depression, panic disorder, anxiety disorders, mood disorders and obsessive-compulsive disorder owing to an infection-triggered Central Nervous system[5-7]. Furthermore, sleep disturbances, fear of social isolation, fear of illness and uncertainty of the future were the significant psychological stressors that were observed as a result of the virus[1,8,9].

There is limited research available on psychiatric comorbidities and their association with severity of COVID or CORADS score. In this scenario, along with the prevalence of psychiatric illness in COVID

survivors in the acute phase, there is a need to know about how the severity of the infection can also have its effect on mental health. Hence, we aimed to assess the various psychiatric conditions seen in the COVID patients, and the association of various factors with the CORADS severity score.

Materials and Methods

This is a cross-sectional observational study conducted in an in-patient COVID clinic, Hyderabad, Telangana. The study was conducted from February, 2021 to April, 2021 (3 months duration). Inclusion criteria were stable COVID positive patients with a confirmed positive report on Reverse-Transcription polymerase chain reaction (RT-PCR) ona nasopharyngeal/ oropharyngeal swab, who were admitted in the hospital, referred from Emergency department and other non-psychiatric department. Participants who were pregnant were excluded from the study. All patients were explained about the nature of research and informed consent was obtained.

Data Collection

All inpatients fulfilling inclusion criteria during the recruitment time, who were conscious and oriented were taken into the study. Demographic data such as age, gender was recorded. Neuropsychological examination and laboratory evaluations were performed using personal protective equipment in all patients. Patients were reassured about the confidentiality.

A total of 67 in patients who were diagnosed positively with COVID-19 were investigated. In addition to the RT-PCR test, HRCT was performed to identify CORADS classification among the participants who were tested positive and laboratory tests were administered as a standard procedure in all patients; this included a routine blood analysis, D-dimer levels, C- Reactive Protein levels, Vitamin D levels and serum procalcitonin. Neuropsychological assessment was performed through direct interview by a team of trained neuropsychiatrists working in the COVID clinic in Hyderabad, Telangana.

Statistical Analysis

Statistical analysis of the collected data was carried out with SPSS for Windows version 23[10]. In order to summarize demographic data, descriptive statistics was administered. Psychiatric diagnosis was considered as primary outcome. CORADS score was considered as primary explanatory variable. Qualitative variables were analyzed by frequency and percentage. Further, non-parametric tests such as Kruskal Wallis test were performed in order to compare the variables.

Results

The current study included in-patients who were hospitalized in a COVID clinic where neuropsychiatric evaluation and face-to-face interviews were performed. In this process, a total of 100 responses were collected, of which 67 responses (67%) were analyzed. The mean age of the participants was 42.38 years (*SD=15.81*). Around two-thirds of the sample are elderly (>50 years), followed by 23.9% in the range of 21 – 30 years, 20.9% in 31 – 40 years and 19.4% in the age of 41-50 years. Least sample was noted in the age group of 10 -20 years.

In total, 35 participants (52.2%) were male and 32 (47.8%) were female; therefore, observing a near equivalent distribution of males and females in the study population (Table – 1).

The thorax HRCT severity scores were screened and it was found that nearly 46% of the participants scored moderately while presenting for COVID positive symptoms. Among the participants (*n=67*), it was observed that the positive COVID cases were nearly equally distributed across the CORADS score variables (Table – 2).

At the time of admission, preliminary diagnosis run by neuropsychiatrists revealed that the majority of COVID inpatients were diagnosed with organic mood disorders (43.28%), almost equivocally with anxiety distress (19.42%) and cognitive (delirium) disorders (17.91%) (Table – 3). Overall patients with age > 50 years account for around one third (31.34%) of the psychiatric comorbidities in the sample (Table – 3). Among the patients, maximum burden (67.1%) was found with anxiety distress after testing positive for COVID, followed by sleep disturbances and mood disturbances (Figure-2).

On Kruskal Wallis test, age of the individual, history of personality traits and anxiety was found to have statistically significant association with CORADS score (*p*-value 0.001, 0.049 & 0.040 respectively) (Table-4). Apart from age, this can be due to the difference in the precautions taken by individuals with various personality traits and it also shows the bidirectional relationship between COVID infection and psychiatric diagnosis (Anxiety).

Table 1: Age and Gender distribution of the study population (n=67)

Clinical Staging		N=67	%
CORADS Staging	Corads 3	17	25.4
	Corads 4	16	23.9
	Corads 5	19	28.4
	Corads 6 (RT-PCR Positive)	15	22.4
HRCT Severity	Mild (<8)	17	25.4
	Moderate (9-14)	31	46.3
	Severe (>15)	19	28.4

Table 2: Clinical Staging of the study population (n=67)

Variables		N=67	%
Age (years)	10-20 years	3	4.5
	21-30 years	16	23.9
	31-40 years	14	20.9
	41-50 years	13	19.4
	>50 years	21	31.3
Gender	Male	35	52.2
	Female	32	47.8

Table 3: Age wise Neuropsychiatric Evaluation in the sample (n=67)

	Psychiatric Diagnosis							
	Organic Mood disorder	Organic Anxiety disorder	Organic Psychosis	Cognitive disorder including delirium	Dementia	Substance Use disorders	Functional Somatic Symptoms Disorder	Total (%)
10-20 years	2	1	0	0	0	0	0	3 (4.5%)

21-30 years	7	6	0	0	0	2	1	16 (23.8%)
31-40 years	9	3	0	1	0	1	0	14 (20.9%)
41-50 years	6	2	2	2	0	1	0	13 (19.4%)
> 50 years	5	1	2	9	4	0	0	21 (31.3%)
Total	29(43.2%)	13(19.4%)	4(6.0%)	12(17.9%)	4(6.0%)	4(6.0%)	1(1.5%)	67

Table 4: Association of various factors with CORADS score on HRCT (Kruskal Wallis test)

	Age	Gender	Presence of anxiety	History of Alcohol Consumption	HTN	DM	Psychiatric disorder	History of personality traits	Psychiatric Diagnosis
Chi-Square	15.667	5.839	8.294	2.549	3.363	7.639	1.876	7.870	1.106
p-Value	.001*	.120	.040*	.467	.339	.054	.598	.049*	.776

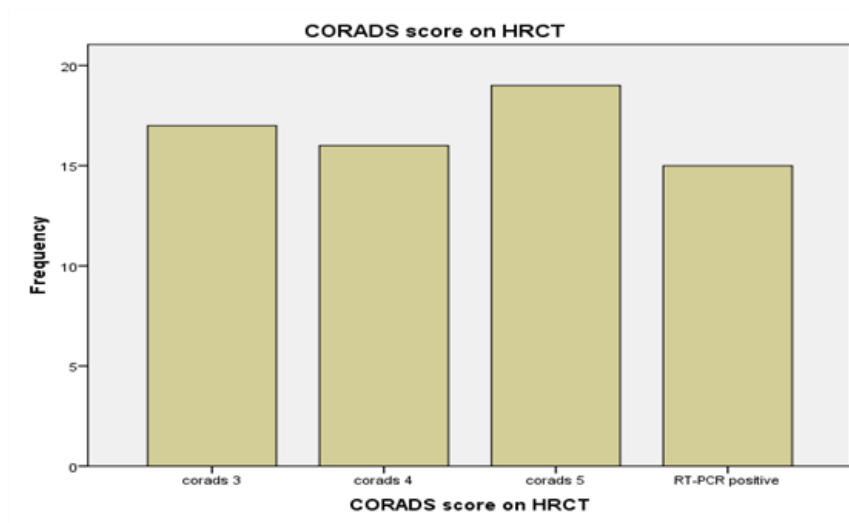*P- value <0.05 is considered statistically significant

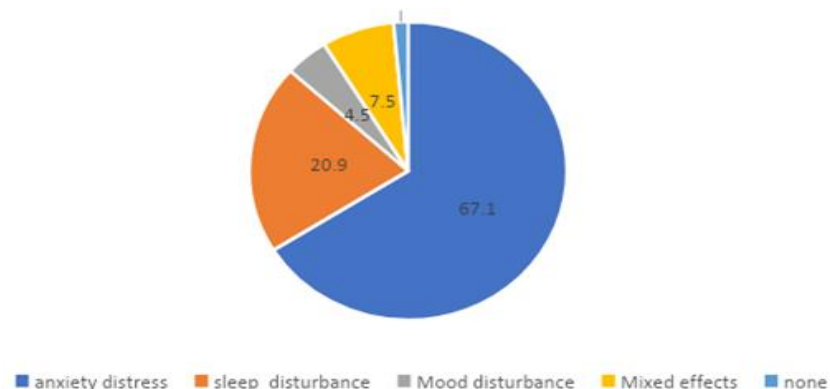**Fig. 1: Distribution of the sample based on CORADS score**

Fig. 2: Prevalence of various psychiatric symptoms in the sample (n=67)

Discussion

The current study focused on presence of psychiatric comorbidity in patients with COVID-19. In the present research, age at presentation has significant association to the CORADS score. Similar observation was noted by Farghaly et.al, who concluded that age can be considered as significant risk factor for severity of the illness irrespective of the gender, which was seen in CT scan by CORADS score[11].

Our study showed significant association between history of personality traits and anxiety with CORADS score. Though there are many studies conducted on COVID and its effect on mental health or prevalence of psychiatric morbidities, there was no data on association between psychiatric comorbidity and CORADS score.

Organic mood disorder is the common diagnosis seen in present study, followed by anxiety and cognitive disorders. According to Iqbal Y et al (2020), Delirium (26%) is the most common psychiatric

comorbidity seen in patients during acute phase of illness, whereas insomnia (70%) is the common psychiatric manifestation noted, followed by anxiety (64%)[12]. This is in contrast to other studies in which delirium or cognitive disturbance is the common presentation. The inclusion of stable COVID patients in to the study might be one reason for this variation.

Research conducted in previous epidemic or pandemic shows the effect of viral infection on mental health. I.W.C. Mak et al[13] have done a cohort study to see the long-term psychiatric sequalae during SARS epidemic in 2013. They concluded that post-Sars, prevalence of any psychiatric disorder was 33.3%. Common conditions noted were post-traumatic stress disorder (PTSD) in 25% and Depressive disorders in 15.6%. Another prospective study was done by T-P. Su et al in 2005 on the psychological adaptation and prevalence of psychiatric comorbidity in nurses working in SARS caring unit during an outbreak[14]. It revealed that those working in the SARS caring unit experienced greater psychological distress and negative feelings, depression (38.5%), insomnia (37%) when compared to those who work in non-SARS units. This shows the difficulties in psychological adaptation to an epidemic which can be the reason for psychiatric disorders.In this study, anxiety symptoms are more in individuals more than 30 years age. This is in concordance with an Indian study done by Dar et al in 2021 on psychiatric comorbidities in covid survivors[15]. They concluded that older individuals are at higher risk to develop depression and anxiety when compared to younger population.

The study however has a few limitations where it presents a small sample size. No objective measurement such as rating scales were used, to confirm the presence of neuropsychiatric symptoms. There is a possible degree of examiner bias in the study. Furthermore, the study could have achieved better understanding of the neuropsychiatric symptoms, if testing and evaluations were performed post-recovery; therefore, placing additional focus on long-term remission of psychological symptoms and behavioral changes in the inpatients.

Conclusion
Considering the bidirectional relationship between COVID19 infection and mental health, it is recommended that we screen the patients infected with COVID-19 for the presence of psychiatric comorbidity during the acute phase as well as for any long-term neuropsychiatric sequelae. This helps in attenuating the severity of symptoms, thereby leading to better quality of life.

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