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MORBIDITY AND NEUROPSYCHIATRIC EVALUATION IN PATIENTS DISCHARGED FROM ICU AFTER RECOVERY FROM SARS-COV-2 INFECTION

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Abstract:

INTRODUCTION: The novel coronavirus SARS-CoV-2 causing COVID-19 disease is genetically similar to other strains of the coronavirus family, which are severe acute respiratory syndrome corona virus (SARS-CoV-1) and Middle-East respiratory syndrome corona virus includes (MERS-CoV). Nearly, 35% of symptomatic persons with positive outpatient SARS-CoV-2 test results who reported after 2-3 weeks after testing had not recovered to their prior level of health. Some individuals experience severe neuropsychiatric and musculoskeletal COVID-19 symptoms, including myalgia, psychosis, olfactory and gustatory deficits, and cerebrovascular accidents. Post-COVID syndrome symptoms that include neuropsychiatric and musculoskeletal include sleep disorders,encephalopathy, chronic headache, delirium, brain fog, and small joint arthritis.

AIM AND OBJECTIVE: To study the trend of comorbidities development in post COVID patients and neuropsychiatric, behaviour changes, new illnesses like Diabetes Mellitus, Hypertension, IHD, Cardiomyopathy and other co morbidities assessment in COVID recovered patients.

MATERIAL AND METHOD: Observational Cross-sectional study. Period of collection of data was 1 ½ year, 30 COVID discharged patients who were previously admitted under the Department of General Medicine, Dhiraj General Hospital, Smt. B K Shah Medical Institute and Research Centre, Piparia, Vadodara 391760.

DISCUSSION: The early identification of the medical and neuropsychiatric sequelae and its risk factors will help us prevent , early diagnosis and effective management of the post covid

effects. Detailed history and findings of the clinical examination were collected in the proforma. Telephonic conversations were done with the patients regarding their well-being and current health status. Patient's mental status post COVID recovery was assessed using the Hospital Anxiety and Depression scale(HADS).

CONCLUSION: Fatigue, was the most common finding, followed by anxiety/depression, PTSD, cognitive deficits, and sleep disturbances were commonly reported in most of the studies. This study, 18 (60%) had no comorbidities, 4 (13.33%) had Hypothyroid, 3 (10%) had diabetes and hypertension, 3 (10%) had Diabetes and 2 (6.6%) had hypertension. In this study, the mean value of Anxiety score in this study was 4.27 (± 2.5). The mean value of Depression score in the study was 4.27 (± 2.68) ranged between 2 and 12 and none of the subjects had Neuro deficit.

Keywords: SARS-CoV-2, COVID-19, Comorbidity, Neuropsychiatric Sequelae, Post-Covid Effect

Introduction: The novel coronavirus disease (COVID-19) pandemic started in December 2019 in Wuhan, China, and widely spread like wildfire across the globe, and created a significant morbidity and mortality. Globally, as of 10 November 2022, there have been 630,387,858 confirmed cumulative cases of COVID- 19, including 6,583,163 cumulative deaths, as reported by the World Health Organization. (1)

The novel coronavirus SARS-CoV-2 causing COVID-19 disease is genetically similar to other strains of the coronavirus family, which are severe acute respiratory syndrome corona virus (SARS-CoV-1) and Middle-East respiratory syndrome corona virus includes (MERS-CoV). (2, 3)

This pandemic has demonstrated a broad spectrum of presentations ranging from asymptomatic disease to severe respiratory failure, myocardial injury, and death. Up to 20-30% of patients hospitalized with COVID-19 have evidence of myocardial involvement manifested by elevated troponin levels. It involves multiple organs and lung injury is one of the most Common clinical manifestations. Even in young adults and children without underlying chronic medical issues, COVID-19 can occasionally cause extended symptoms. There are numerous case reports of patients who contract COVID-19 yet do not recover their prior health. The clinical course of COVID-19 after a less severe disease is poorly understood. (4–6)

Nearly, 35% of symptomatic persons with positive outpatient SARS-CoV-2 test results who reported after 2-3 weeks after testing had not recovered to their prior level of health. 20% (1 in 5) of healthy adults between the ages of 18 and 34 reported that their symptoms persisted. High blood pressure, obesity, and mental health issues are risk factors for the continuation of symptoms. (7–10)

Some individuals experience severe neuropsychiatric and musculoskeletal COVID-19 symptoms, including myalgia, psychosis, olfactory and gustatory deficits, and cerebrovascular accidents. Post-COVID syndrome symptoms that include neuropsychiatric and musculoskeletal include sleep disorders,encephalopathy, chronic headache, delirium, brain fog, and small joint arthritis. (11)

Fatigue, myalgia, headache, dysautonomia, and cognitive impairment are examples of persistent abnormalities (brain fog). Similar to survivors of other pathogenic coronaviruses, 30–40% of COVID-19 survivors have reported having anxiety, sadness, sleep issues, and PTSD. (12–14)

Justification of the study:

COVID-19 survivors are at the risk of long term sequelae, which when identified early, will be managed effectively. COVID-19 survivors were at higher risk of psychiatric sequelae compared to the general population, but the symptoms generally improved over time. Hence the early identification of the medical and neuropsychiatric sequelae and its risk factors will help us Prevent ,early diagnosis and effective management of the post covid effects. There are very few studies on this topic, especially in the Indian context. Therefore this study aims to study the trend of comorbidities development in post COVID patients and neuropsychiatric assessment in COVID recovered patients.

AIM:

- To study the trend of comorbidities development in post COVID patients and neuropsychiatric assessment in COVID recovered patients.

OBJECTIVES:

Primary Objectives:

- To analyze the emergence of new illnesses like Diabetes Mellitus, Hypertension, IHD, Cardiomyopathyand other co morbidities
- To study the Neuropsychiatric changes and behaviour changes COVID recovered patients.

Secondary Objectives:

- To analyze complaints developed if any, among the COVID recovered patients.

METHODOLOGY:

Study Subjects: 30 COVID discharged patients who were previously admitted under the Department of General Medicine, Dhiraj General Hospital, Smt. B K Shah Medical Institute and Research Centre, Piparia, Vadodara 391760.

Design of The Study: Observational Cross-sectional study**.**

Study Period: Period of collection of data – 1 ½ year (between 2020-December and 2022-June).

Study Area: Department of General Medicine, Dhiraj General Hospital, Smt. B K Shah Medical Institute and Research Center, Piparia, Vadodara

Sampling Procedure: Convenient Sampling.

Inclusion Criteria: Post COVID recovered patients. Age >=35 years

Exclusion Criteria: COVID patients or non-COVID-infected patients, Age <35 years, Patients who are not giving consent

Sample Size: According to Zi-Qiang Meng et al study, (15) considering the prevalence of Prevalence of Anxiety (using HADS) in COVID recovered patients as 59.6% with an absolute precision of 17.5% and 95% confidence interval, the sample size is estimated to be,

N = Z^2 1-α/2 *p * (1 - p)/d2

Z1-α/2 - two tailed probability for 95% confidence interval = 1.96

P (%) - prevalence of Prevalence of Anxiety (using HADS) in COVID recovered patients = 0.596 d (%) - precision or allowable error for Prevalence of Anxiety (using HADS) in COVID recovered patients = 0.175

N = 1.96^2 * 0.596 * (1 - 0.596) / 0.175^2N = 30.2

Hence the total estimated minimum sample size required for the study is 30.

Ethical Considerations: Approval from Institutional Ethical Committee, of Smt. B K Shah Medical Institute and Research Center, Piparia, Vadodara 391760, was obtained before the start of the study.

Source of Funding: self

Conflict of Interest: Nil.

Study Procedure: Informed written consent was obtained from all the patients. Patient

confidentiality was ensured and maintained the same, by using patient registration numbers instead of patient names. All eligible patients were included in study after taking signature and approval on informed written consent forms, after explaining all the details and benefits of the study.

Co-morbidities like DM-II, HTN, hearing loss, anosmia, gastrointestinal complications, arterial and venous thromboembolic complications and affection of other organ systems were assessed by performing basic investigations (routines). Patients who got admitted in COVID ward and of age >35 years were included in the study.

Age, sex, medical history and time duration of all the study participants, after the discharge period were assessed. Detailed history and findings of the clinical examination were collected in the proforma. Telephonic conversation were done with the patients regarding their well-being and current health status. For all patient's emergence of any new comorbidity were assessed and attenders were enquired about the well-being of the recovered patient.

Also, a questionnaire was asked to be answered yes/no in the format given below for analysis of the patient's mental status post COVID recovery. The following table represents the Hospital Anxiety and Depression scale (HADS) (16)

Hospital Anxiety and Depression Scale (HADS)

Tick the box beside the reply that is closest to how you have been feeling in the past week.
Don't take too long over you replies: your immediate is best.

D	A		D	A	
		I feel tense or 'wound up':			**I feel as if I am slowed down:**
	3	Most of the time	3		Nearly all the time
	2	A lot of the time	2		Very often
	1	From time to time, occasionally	1		Sometimes
	0	Not at all	0		Not at all
		I still enjoy the things I used to enjoy:			**I get a sort of frightened feeling like 'butterflies' in the stomach:**
0		Definitely as much		0	Not at all
1		Not quite so much		1	Occasionally
2		Only a little		2	Quite Often
3		Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			**I have lost interest in my appearance:**
	3	Very definitely and quite badly	3		Definitely
	2	Yes, but not too badly	2		I don't take as much care as I should
	1	A little, but it doesn't worry me	1		I may not take quite as much care
	0	Not at all	0		I take just as much care as ever
		I can laugh and see the funny side of things:			**I feel restless as I have to be on the move:**
0		As much as I always could		3	Very much indeed
1		Not quite so much now		2	Quite a lot
2		Definitely not so much now		1	Not very much
3		Not at all		0	Not at all
		Worrying thoughts go through my mind:			**I look forward with enjoyment to things:**
	3	A great deal of the time	0		As much as I ever did
	2	A lot of the time	1		Rather less than I used to
	1	From time to time, but not too often	2		Definitely less than I used to
	0	Only occasionally	3		Hardly at all
		I feel cheerful:			**I get sudden feelings of panic:**
3		Not at all		3	Very often indeed
2		Not often		2	Quite often
1		Sometimes		1	Not very often
0		Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			**I can enjoy a good book or radio or TV program:**
	0	Definitely	0		Often
	1	Usually	1		Sometimes
	2	Not Often	2		Not often
	3	Not at all	3		Very seldom

Please check you have answered all the questions

Scoring:
Total score: Depression (D) _____ Anxiety (A) _____
0-7 = Normal
8-10 = Borderline abnormal (borderline case)
11-21 = Abnormal (case)

Table 3.Hospital Anxiety and Depression scale (HADS

STATISTICAL METHODS USED:

I. Descriptive Statistics used:

1. Numerical variables such as Age, HADS scores, etc., are represented in mean, std. dev., median, and mode. Histograms are applied wherever necessary.
2. Categorical variables like gender, comorbidities, severity, Prevalence of anxiety and depression, etc., are represented in frequencies &percentages. Pie-charts and bar charts are used as necessary.
3. Data was collected and entered in MS-excel sheet and analyzed using IBM-SPSS software version 22.

II. Inferential Statistics:

1. When a HADS score is compared with the Numerical variables, Pearson's correlation test isused.
2. When a HADS score category and presence of Depression and anxiety are compared with a categorical variable, the variables are represented in both by tables and bar diagrams. For test of significance, chi-square test is used.
3. P-value lesser than 0.05 were considered as cut-off for statistical significance.

RESULTS

1. Age (in years)

The mean Age (in years) among the study population was 48.47(±9.09) ranging from 35 to 72 years.

1. Table 4. Age (in years)

Age (years)	
Mean value	48.47
Median value	46
Standard Deviation	9.09
Range value	37
Minimum value	35
Maximum value	72

2. Age categories

Among the subjects, in this study, 13 (43.33%) were belonging to 41-50 yrs., 7 (23.33%) were belonging to 51 - 60 yrs and 6 (20%) were belonging to < 40 yrs age category.

Table 5. Age categories

Age categories	**Frequency**	**Percent**
Less than 40 years	6	20
41 to 50 years	13	43.33
51 to 60 years	7	23.33
Greater than 60 years	4	13.33
Total	30	100

3. Gender

Among the study population, 16 (53.33%) were Males and 14 (46.67%) were Females

Table 6. Gender

Gender	**Frequency**	**Percent**
Males	16	53.33
Females	14	46.67
Total	30	100

4. Comorbidity

Among the subjects, 18 (60%) had no comorbidity, 4 (13.33%) had Hypothyroid, 3 (10%) had diabetes mellitus and hypertension, 3 (10%) had Diabetes mellitus and 2 (6.6%) had systemic hypertension.

Table 7. Comorbidity

Comorbidity	Frequencies	Percentage
Nil	18	60
Diabetes mellitus	3	10
Systemic Hypertension	2	6.67
Diabetes with hypertension	3	10
Hypothyroid	4	13.33
Total	30	100

8. Body Mass Index (kg/m2)

The mean Body Mass Index in the study was found to be 23.65 (± 2.5) kg/m2 and the values ranged between 20.1 to 30 kg/m2

Table 8. Body Mass Index (kg/m2)

Body Mass Index (kg/m2)	
Mean value	23.65
Median value	23
Std. Dev.	2.5
Range	9.9
Minimum value	20.1
Maximum value	30

9. BMI class

Among the subjects, 24 (80%) were Normal and 6 (20%) were Overweight

Table 9. BMI class

BMI class	Frequency	Percent
Normal	24	80
Overweight	6	20
Total	30	100

10. Haemoglobin (g %)

The mean Hemoglobin (in g %) in the study subjects was found to be 12.2 (± 1.51) ranging from 8.6 to 14.5 g%.

Table 10. Haemoglobin (g %)

Haemoglobin (g %)	
Mean value	12.2
Median value	12.25
Std. Deviation	1.51
Range	5.9
Minimum value	8.6
Maximum value	14.5

11. Anaemia

Among the subjects, 11 (36.67%) had Anemia

Table 11. Anaemia

Anemia	Frequency	Percent
Yes (Hb < 12)	11	36.67
No (Hb > 12)	19	63.33
Total	30	100

12. Total cell Count

The mean value of Total cell Count in the study was observed to be 6997 (± 1979.94) ranged between 3250 and 11200.

Table 12. Total cell Count

Total cell Count	
Mean value	6997
Median value	6800
Std. Devi.	1979.94
Range	7950
Minimum value	3250
Maximum value	11200

13. Serum Creatinine

The mean Serum Creatinine in the study was 0.82 (± 0.28) mg/dl ranged between 0.4 and 1.6 mg/dl.

Table 13. Serum Creatinine

Serum Creatinine (mg/dl)	
Mean value	0.82
Median value	0.8
Std. Deviation	0.28
Range	1.2
Minimum value	0.4
Maximum value	1.6

14. SGPT

The mean value of SGPT values among the study population was 26.9 (± 9.88) U/L ranging from 12 to 46 U/L.

Table 14. SGPT

SGPT (U/L)	
Mean value	26.9
Median value	26
Std. Dev.	9.88
Range	34
Minimum value	12
Maximum value	46

15. HbA1C (%)

The mean value of HbA1C (%) in the study population was 6.19 (± 0.93) ranging from 5 to 8.8.

Table 15. HbA1C (%)

HbA1C (%)	
Mean value	6.19
Median value	5.95

Std. Dev.	0.93
Range	3.8
Minimum value	5
Maximum value	8.8

16. HbA1C level

In this study, 15 (50%) had > 6% and 15 (50%) had < 6%

Table 16. HbA1C

HbA1C	Frequency	Percent
> 6%	15	50
< 6%	15	50
Total	30	100

17. Urine routine

Among the subjects, 26 (86.67%) had Normal urine examination, 1 (3.33%) had Albumin - 3+ & Sugar - 4+, 1 (3.33%) had Albumin -1+ and 2 (6.66%) had increased pus cells

Table 17. Urine routine

Urine routine	Frequency	Percent
> 10 Pus cells	2	6.66
Albumin - 3+, Sugar - 4+	1	3.33
Albumin -1+	1	3.33
Normal	26	86.67
Total	30	100

18. D-Dimer

The mean value of d-Dimer was 767.9 (± 1171.41) ranged between100 and 4000.

Table 18. D-Dimer

D-Dimer	
Mean value	767.9
Median value	292
Stan. Dev.	1171.41
Range	3900
Minimum value	100
Maximum value	4000

19. USG findings

In this study, 28 (93.33%) had Normal and 2 (6.67%) had B/L Kidneys raised echo texture

Table 19. USG findings

USG findings	Frequency	Percent
Normal	28	93.33
B/L Kidneys raised echo texture	2	6.67
Total	30	100

20. Depression

The mean value of Depression score in the study was 4.27 (± 2.68) ranged between 2 and 12

Table 20. Depression score

	N	Mean value	Stan. Dev.	Minimum value	Maximum value
Depression score	30	4.27	2.68	2	12

Table 21. Depression

Depression	Frequency	Percent
Abnormal	2	6.67
Borderline	1	3.33
Normal	27	90
Total	30	100

21. Anxiety

The mean value of Anxiety score in this study was 4.27 (± 2.5) ranged between 1 and 12.

Table 22.Anxiety score

	N	Mean value	Stan. Dev.	Minimum value	Maximum value
Anxiety score	30	4.27	2.5	1	12

Among the subjects, 27 (90%) were Normal, 2 (6.67%) had Borderline anxiety and 1 (3.33%) had anxiety.

Table 23. Anxiety

Anxiety	Frequency	Percent
Abnormal	1	3.33
Borderline	2	6.67
Normal	27	90
Total	30	100

22. Neuro deficit

None of the subjects had Neuro deficit.

Table 24. Neuro deficit

Neuro deficit	Frequency	Percent
None	30	100

23. D-Dimer with Anxiety

The mean d-Dimer among Abnormal anxiety was 4000 which is higher than mean among Borderline anxiety which was 2240 followed by no anxiety with a mean of 539.15 and the difference was statistically significant ($p < 0.05$).

Table 25. D-Dimer with Anxiety

	Anxiety	N	Mean	Std. Deviation	ANOVA p value
D-Dimer	**Abnormal**	1	4000	0	
	Borderline	2	2240	2489.02	0.001
	Normal	27	539.15	818.19	

24. D-Dimer with Depression

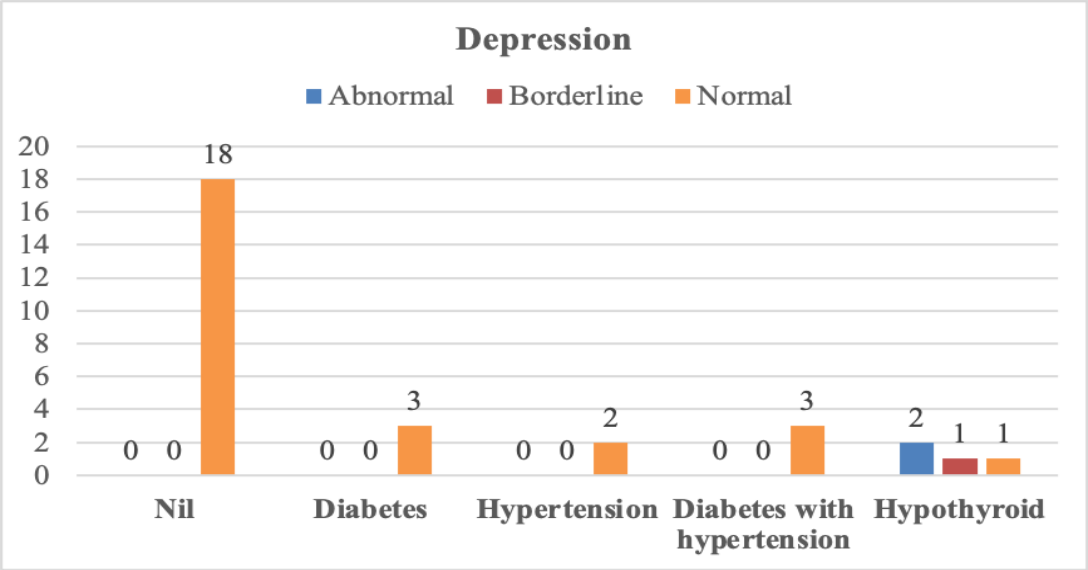
The mean D-Dimer among no depression was 806.15 which is higher than mean among depression which was 495.5 followed by Borderline depression with a mean of 280 and the difference was statisticallysignificant ($p < 0.05$).

Table 26. D-Dimer with Depression

	Anxiety	N	Mean	Std. Deviation	ANOVA p value
D-Dimer	**Abnormal**	1	4000	0	
	Borderline	2	2240	2489.02	0.001
	Normal	27	539.15	818.19	

25. Comparison of Comorbidities with the Depression

Comparing the Comorbidities with Depression distribution, Hypothyroid had higher proportion of Abnormal Depression with 50% and Borderline Depression with 25%. Other comorbidities had no Depression. The difference in Depression distribution between different Comorbidities was statistically significant ($p < 0.05$) indicating hypothyroidism had a significant association with depression.



26. Comparison of Comorbidities with the Anxiety

Comparing the Comorbidities with Anxiety distribution, Diabetes with hypertension had 33.33% of Abnormal Anxiety and Borderline Anxiety each, and only hypertension had 50% of borderline anxiety. The difference in Anxiety distribution between different Comorbidities was statistically significant ($p < 0.05$) indicating hypertension had a significant association with anxiety

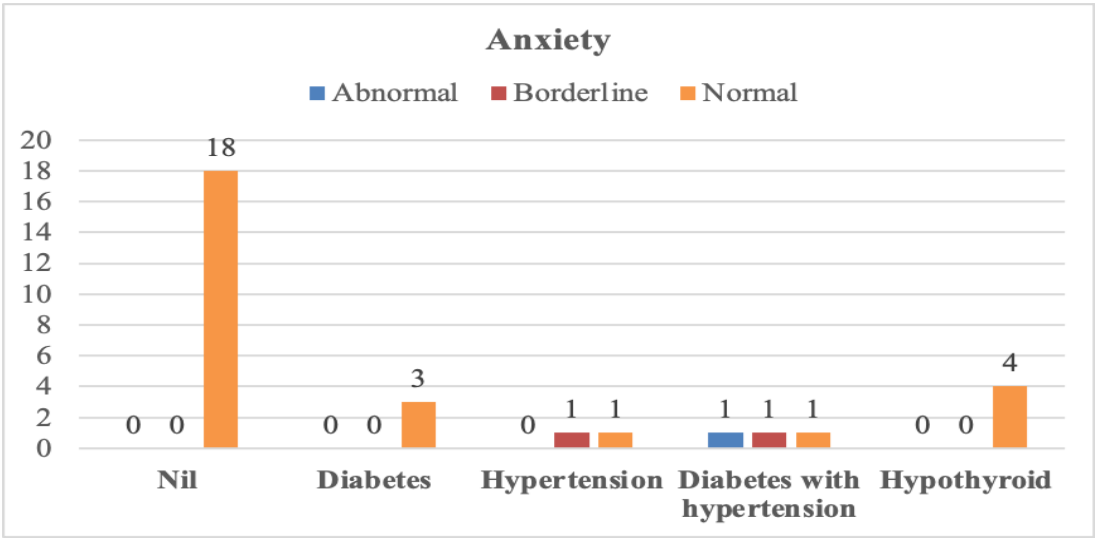


Figure 38. Comparison of Comorbidities with the Anxiety

DISCUSSION

COVID-19 survivors are at the risk of long term sequelae, which when identified early, will be managed effectively. COVID-19 survivors were at higher risk of psychiatric sequelae compared to the general population, but the symptoms generally improved over time. Hence the early identification of the medical and neuropsychiatric sequelae and its risk factors will help us prevent, early diagnosis andeffective management of the post covid effects.

The main objective of the study is to study the trend of comorbidities development in post COVID patients and neuropsychiatric assessment in COVID recovered patients. This is an Observational Cross- sectional study, among 30 COVID discharged patients who were previously admitted under the Department of General Medicine, Dhiraj General Hospital, Smt. B K Shah Medical Institute and Research Center, Piparia, Vadodara 391760.

Detailed history and findings of the clinical examination were collected in the proforma. Telephonic conversations were done with the patients regarding their well-being and current health status. Patient's mental status post COVID recovery was assessed using the Hospital Anxiety and Depression scale(HADS)

In this study, the mean Age (in years) among the study population was 48.47 (± 9.09) ranging from 35 to 72 years. In this study, 13 (43.33%) were belonging to 41 - 50 yrs, 7 (23.33%) were belonging to 51- 60 yrs and 6 (20%) were belonging to < 40 yrs age category.

Gender:

Depressive and/or anxiety symptoms following COVID-19 infection are more likely to occur in females. (17–21) In this study, 16 (53.33%) were Males and 14 (46.67%) were Females. **Qing Han et al**, observed that patients who were female were more likely to be associated with the experiencing the neuropsychiatric sequelae after a year.(22) **Yoonjung Kim et al**, observed that, Female gender was the risk factor associated with the long-term sequelae, including mental and psychological elements.(23)

In Comorbidities:

This study, 18 (60%) had no comorbidities, 4 (13.33%) had Hypothyroid, 3 (10%) had diabetes and hypertension, 3 (10%) had Diabetes and 2 (6.6%) had hypertension. **Qing Han et al**, observed that patients who had more severe initial illnesses were more likely to be associated with the experiencing the sequelae after a year. (22)

Ahmed Samir Abdelhafiz et al, observed that the majority of post-COVID-19 symptoms, were present in 87.63% of people, with fatigue (60.86%), being the most common symptom. The existence of post-COVID symptoms was significantly correlated with female sex, the presence of comorbidities, and lower level of education, longer COVID-19 duration, as well as severe and critical forms of the COVID-19 infection. (24)

In this study, among the comorbidities, Diabetes with hypertension had significantly higher levels of Abnormal Anxiety and Borderline Anxiety. Among the comorbidities, Hypothyroid had significantly higher proportion of Abnormal Depression and Borderline Depression.

Shivdas Naik et al, observed that 22% of the recovered patients reported long-lasting COVID symptoms, and 9.9% of these lasted for longer than three months after their COVID-19 diagnosis. Myalgia, tiredness, and dyspnoea are among the spectrum of symptoms that are most frequently experienced. Patients were also more likely to experience extended COVID if they had hypothyroidismand hypoxia (room air SpO2 < 93%) during an acute illness. (25)

BMI (kg/m2):

Zev M. Nakamura et al, observed that obesity increased risk for PTSD among the COVID survivors. (64) In our study, the mean Body Mass Index in the study was found to be 23.65 (± 2.5) kg/m2 and the values ranged between 20.1 to 30 kg/m2. Among the subjects, 24 (80%) were Normal and 6 (20%)were Overweight

Haemoglobin (g %) & Total Count:
In this study, the mean Hemoglobin (in g %) in the study subjects was found to be 12.2 (± 1.51) ranging from 8.6 to 14.5 g%. Among the subjects, 11 (36.67%) had Anemia (Hb < 12). In this study, the mean value of Total cell Count in the study was observed to be 6997 (± 1979.94) ranged between 3250and 11200.

Serum Creatinine & SGPT:
In this study, the mean Serum Creatinine in the study was 0.82 (± 0.28) mg/dl ranged between 0.4 and 1.6 mg/dl. In this study, the mean value of SGPT values among the study population was 26.9 (± 9.88)U/L ranging from 12 to 46 U/L.

HbA1C (%):
COVID-19 and type 2 diabetes mellitus have a bidirectional relationship. Diabetes affects post covid syndrome through several pathophysiological pathways. In diabetic patients, COVID-19 can amplify or worsen tachycardia, sarcopenia (and muscle exhaustion), and micro vascular dysfunction (and organ damage)**.** (26–28) In this study, the mean value of HbA1C (%) in the study population was 6.19 (± 0.93) ranging from 5 to 8.8. Among the subjects, 15 (50%) had > 6% and 15 (50%) had < 6%.

Urine routine:
In this study, 26 (86.67%) had Normal urine examination, 1 (3.33%) had Albumin - 3+ & Sugar - 4+, 1 (3.33%) had Albumin -1+ and 2 (6.66%) had increased pus cells.

D-Dimer:
When COVID-19 is present, elevated D-dimer levels are correlated with more severe illness. 59.6% of patients with severe disease had levels of 0.5 g/mL or greater, compared to 43.2% of individuals with mild disease. (29) In this study, we considered d-dimer as the surrogate for the severity of the covid infection. The mean d-Dimer among the subjects was 767.9 (± 1171.41) ranging from 100 to 4000. Of the other variables, increased d-dimer levels showed a significant association with the presence of anxiety and depression.

USG findings:
In this study, 28 (93.33%) had Normal and 2 (6.67%) had B/L Kidneys raised echo texture.

Study variables:
Thor Mertz Schou et al, observed that Fatigue, was the most common finding, followed by anxiety/depression, PTSD, cognitive deficits, and sleep disturbances were commonly reported in most of the studies. (30) **Neha Chopra et al**, observed that the Fatigue (22.6%) was the most prevalent chronic symptom, followed by cough (9.4%) and myalgia (7.5%). (31) **Yoonjung Kim et al**, observed that, 65.7% of COVID-19-related long-term sequelae. Fatigue was the most common long-term sequelae (26.2%), including mental and psychological elements. (23)

Depression:
In this study, the mean value of Depression score in the study was 4.27 (± 2.68) ranged between 2 and 12. Among the subjects, 27 (90%) were Normal, 2 (6.67%) had depression and 1 (3.33%) had Borderline depression.
Qing Han et al, observed that Fatigue/weakness, dyspnoea, arthromyalgia, depression, anxiety, memory loss, concentration difficulties, and insomnia were the most common symptoms after 1 year follow-up. (22)
Sandeep Budhiraja et al, observed that nearly 40% of their study population had symptoms of long-COVID, which had no significant relationship with factors such as age, gender, comorbidities,

or the severity of the disease. In their study, all the patients reported minor symptoms like fatigue, myalgia, and Neuro psychiatric symptoms like depression, anxiety, "brain fog," and sleep disorder, as well as persistent breathlessness. (32)

Anxiety:

In this study, the mean value of Anxiety score in this study was 4.27 (± 2.5) ranged between 1 and among the subjects, 27 (90%) were Normal, 2 (6.67%) had Borderline anxiety and 1 (3.33%) had anxiety.

James B. Badenoch et al, found that sleep disturbance was the most commonly observed neuropsychiatric symptom, followed by fatigue, objective cognitive impairment, anxiety, and post-traumatic stress disorder. A difference in symptom prevalence based on hospitalisation status, severity, or follow-up time was either negligible or absent. (33)

Ghizal Fatima et al, observed that Fatigue (56.25%) was more common, followed by dyspnoea (74.3%) and symptoms disturbed sleep (64.3%) were present among the patients following month after COVID-19 infection. (34)

Neuro deficit:

In this study, none of the subjects had Neuro deficit. **Sanjay Kumar et al**, observed that Numerous COVID-19 survivors experience short-term neuropsychiatric and cognitive difficulties, which are diverse and impact a significant fraction of COVID-19 survivors. In the medium and long run, there will be an increase in individuals who were previously healthy but now have psychological and cognitive issues. (35)

In our study we did not had a follow up for studying progress or improvement, while **Thor Mertz Schou et al**, in their study concluded that the COVID-19 survivors were at higher risk of psychiatric sequelae compared to the general population, but the symptoms generally improved over time.(30)

LIMITATIONS

This is a cross sectional study design and hence the causality in the association of the study results were difficult to prove. The study data was collected based on the telephonic conversations, and hence the chance ofunderreporting of the symptoms are possible.

The study results can be influenced with the bias from the Confounding factors.

The sample size was smaller for the HADS abnormal scores, and hence it was not possible to studyassociations.

This study is conducted in a Hospital-based setting that too in a tertiary care teaching institution, hence thestudy results cannot be reflective of other healthcare settings.

In our study we did not had a follow up for studying progress or improvement of the symptoms. Rather wedid not have the data of the baseline morbidity before the Covid infection.

In this study, we considered D-dimer as the surrogate for the severity of the covid infection

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