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Assessment of post-COVID syndrome manifestations among COVID-19 patients in Pathanamthitta district of Kerala

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Abstract
The study was carried out on post-COVID patients in the Pathanamthitta district of Kerala by assessing the Dietary Diversity Score (DDS), comorbidities, and symptoms during and after COVID, fatigue, stress, and insomnia. For six months, a community-centered prospective cohort research was conducted among 250 subjects. The gender profile indicated 42% men and 58% women, the age-wise distribution showed that 56% of them were between the age of 18 and 29 years. In 23% of subjects the Dietary Diversity Score was high. The most common comorbidities identified were hypertension (39.2%), diabetes mellitus (36%), obesity (26.6%), and renal disease (24%). The most common COVID symptoms among subjects were dry cough (94%), fatigue (92.8%), loss of taste or smell (92%), headache (92%), dyspnea (92%), and diarrhea (72.4%). Fever (59.2%), chest pain (55.2%), and skin rashes (48.4%) were the additional symptoms reported. The most prevalent post-COVID symptoms among subjects were joint discomfort (93.2%), followed by weakness (90%), shortness of breath (89.2%), sore throat (86.8%), and lack of appetite (86.4%) respectively. 1.6% of subjects reported subthreshold sleeplessness throughout the infection period, 24% of patients indicated they were completely fatigued, and 47.8% of patients indicated a slight degree of stress. In the post-COVID period, 49.6% of subjects indicated subthreshold insomnia, 52.4% indicated moderate stress, and 55.2% reported feeling severely stressed. Karl Pearson Analysis using correlation and Analysis of Variance (ANOVA) among variables during post-COVID, the coefficients for various parameters for the participants were assessed. Post-COVID is associated with comorbidities and illness severity. There were noticeably more COVID-19 survivors who experienced stress, sleeplessness, and new-onset fatigue. Because COVID-19 affects numerous systems and has an effect on health and well-being, understanding its long-term effects is just as crucial as addressing its immediate symptoms.

Keywords: COVID-19, comorbidities, fatigue, insomnia, post-COVID syndrome

Introduction
Infection with a novel coronavirus strain causes the severe respiratory condition coronavirus disease. Most persons reported experiencing diarrhea, loss of taste or smell, fatigue, headache, sore throat, shortness of breath, loss of speech or movement, or confusion. Some of the less frequent symptoms include skin irritation, rash, discoloration of the fingers or toes, itchy or red eyes, and skin rash. After three weeks, COVID-19 symptoms are classified as post-acute, and after 12 weeks, they are classified as chronic (Anjana *et al*., 2021) [2]. A healthy prior nutritional condition and a balanced diet will assist to reduce the intensity of symptoms while the infection is present. In reality, COVID affects fatigue, stress, and sleep. A significant number of patients with COVID-19 experience prolonged symptoms, known as post-COVID. Hence, relatively little is known about symptom makeup and severity, expected clinical course, impact on daily functioning, and return to baseline health. Many patients have not yet recovered (mainly from systemic and neurological/cognitive symptoms), have not returned to previous levels of work, and continue to experience significant symptom burden. Most post-COVID patients were not hospitalized. It is essential these patients' persisting symptoms are acknowledged, and that they get support from their family, employer, and a multidisciplinary medical team. In Kerala, particularly in the Pathanamthitta district, meager research has been conducted on COVID or post-COVID. The study was conducted with the objectives of – studying the socio-demographic profile of the selected post-COVID patients, assessment of nutritional status of post-COVID patients using anthropometric assessment and Dietary Diversity Score (DDS) and evaluate the health and well-being of study subjects by assessing comorbidities, symptoms during COVID and the post COVID period, as well as fatigue, stress, and insomnia.

Methodology
The survey was open to individuals 18 years of age and older who experienced symptoms consistent with COVID-19, including those with and without positive SARS-CoV-2 diagnostic or antibody test results. The analysis was limited to respondents with illnesses lasting longer than 28 days and whose onset of symptoms occurred between July 2021 and January of 2022. The only other exclusion criteria for all groups were age less than 18 and current pregnancy and lactation (or pregnancy during COVID-19). Data were collected using an interview schedule. Specific information, such as contact numbers and addresses was gathered from ASHA workers and the district's DMO. The sociodemographic profile, anthropometry and nutritional evaluation, assessment of comorbidities, symptoms during and after COVID, stress, fatigue, and sleep all were reviewed by an interview schedule. Between 0 and 6 months after the initial infection, the post-COVID symptoms in various systems, including chest pain or burning, weakness,

joint pain, sore throat, dry cough, and lack of appetite, were evaluated. On a 4-point Likert scale from not present, mild, moderate, to severe, participants were asked to score each COVID symptom based on their best knowledge. COVID-19 is expected to have a significant impact on nutritional status as well as physical, cognitive, mental, and social health status in persons with the mild disease. Individual stress levels were assessed using the Perceived Stress Scale (PSS-10-C). The scale poses a number of direct questions regarding the level of stress that is now experienced. Each time, the respondents were asked how frequently they suffered from a certain condition. The PSS-10-C consists of ten items, each of which has five potential responses: never, rarely, occasionally, almost always, and always. Items 4 through 5 and 8 are evaluated from 4 to 0 while items 1 through 10 are graded directly from 0 to 4. (Campo-Arias *et al*., 2020) [4]. There is a correlation between the PSS score and the stress level. A score of 0 to 13 was deemed to be low stress. In contrast, scores between 27 and 40 indicated significant levels of felt stress. Scores between 14 and 26 indicated moderate stress. Using the Chalder Fatigue Scale (CFQ-11), weariness or fatigue was evaluated. 11 items are rated on a 0–3 ordinal scale. The CFQ-11 uses a new scoring technique called bimodal scoring, in which each response is split into two groups: 0 (0 to 1) or 1. (2-3), resulting in a scale from 0 to 11. Stavem and others (2012). One can distinguish between "cases" and "non-cases" of fatigue using the CFQ 11. The respondent is given a global binary tiredness score, which goes from 0 to 11, rather than the physical or mental fatigue subscales, as used in this study. A score of 3 or less on the global binary fatigue scale shows that a person is not tired, whereas a score of 4 or more indicates extreme tiredness (Jackson, 2015) [7]. The Insomnia Severity Index assesses the severity of the subjective signs, effects, and level of dysfunction brought on by these sleep disturbances (ISI). The ISI consists of seven domains, including (a) the severity of sleep onset (initial), (b) sleep maintenance (middle), (c) early morning awakening (terminal) problems, (d) the level of patient satisfaction with current sleep pattern, (e) impact on daily activities, (f) observed by others/interfering with quality of life, and (g) the level of distress caused by the sleep problem. The results should be interpreted as follows: no insomnia (0–7), subthreshold insomnia (8–14), moderate insomnia (15–21), and severe insomnia (22–24). (2–28) (Sayed *et al*., 2021) [5]. DDS makes a list of everything they ate or drank in the past two days (meals and snacks), both during the day and at night. The IDDS (Individual Dietary Diversity Score) is made up of the following steps: new food group variables for those food groups that need to be aggregated were created to form a total of nine food groups. In the IDDS, for example, the food group "Starchy basics" is made up of "Cereals" and "White roots and tubers." By merging the answers to "Cereals" and "White roots and tubers," a new variable called "Starchy staples" was formed. Dietary Diversity Score (DDS) of less than four was considered as having poor dietary diversity. A score between 6 and 9 represents good diversity. Each food group was only counted once when calculating DDS. The information obtained from the study subjects using the tool created was merged and correctly interpreted. When necessary, statistical analysis that might show the relationships between the different variables was applied. Data were gathered, checked, and stored using the Statistical Package for the Social Sciences (SPSS) Windows application, version 22.0. The findings are discussed in the study's subsequent section. The approach of the study, which rates the variables, is exploratory. The collected data consists of both quantitative and qualitative information. As a result, both qualitative and quantitative methodologies are used in the study's data analysis. Parametric statistics, such as independent ANOVA, correlation, and one-way analysis of variance, were used to compare the components taken into account at different levels of the demographic data. The 0.05 cutoff was chosen as the a priori threshold for statistical significance. Pearson Correlation analysis was deemed to be the most effective way to study the relationship between the two variables, which were ratio-scaled and interval-scaled, respectively. Correlation coefficients also display the magnitude and direction of correlations, making them useful for testing hypotheses. The researcher used Pearson Correlation to ascertain the relationship between the variables.

Results and Discussion

The results of the study wi4th respect to sociodemographic profile of the subjects (Table 1) indicated that, of the 250 subjects, 105 (42%) were male and 145 (58%) female. Approximately half of the participants in this research (56 percent) were between the ages of 18 and 29. 16.4% of the participants were between the ages of 30 and 39. Only 11 percent of the participants were between the ages of 40 and 49. About 11% of the individuals were between the ages of 50 and 60, with the remaining 6% of the subjects being beyond 60. About 58 percent of the subjects were female, while the remaining 42 percent were male. In terms of educational attainment, 49% of the respondents had completed their graduation, 18% of the subjects were post-graduates. 24 percent of the subjects had higher secondary education and 9% had secondary level respectively.

Table 1: Socio-demographic status of study subjects (n=250)

Socio-Demographic Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	105	42
Female	145	58
Age (Years)		
18 – 29	140	56
30 – 39	40	16
40 – 49	27.5	11
50 – 59	27.5	11
Above 60	15	6
Educational Attainment		
PG and above	45	18
Graduation	122.5	49
Higher Secondary	60	24
Secondary	22.5	9

On studying the BMI categories of the subjects (Table 2), 3.2% subjects were underweight, 59.6% had a normal BMI, 32% were overweight, and 5.2% were obese by the WHO cut off for BMI. By the Asia-Pacific BMI classification, 3.2% subjects were underweight, 58.4% were normal, 23.2% were overweight, and 15.2% were obese.

Table 2: Anthropometric assessment of the subjects by BMI classification (n=250)

BMI	WHO (BMI)	Percentage (%)	Asia-Pacific (BMI)	Percentage (%)
Underweight	< 18.5	3.2	< 18.5	3.2
Normal	18.5 – 24.9	59.6	18.5 – 22.9	58.4
Overweight	25.0 – 29.9	32	23.0 – 24.9	23.2
Obese	≥ 30.0	5.2	≥ 25.0	15.2

On evaluating the Dietary Diversity Score (DDS) (Fig. 1) majority of the subjects (63 %) had a medium Dietary Diversity Score (Score 4 or 5), 23 percent had a high Dietary Diversity Score (Score >6), and only 14 percent had a low Dietary Diversity Score (Score 3) as they consumed three or fewer food groups.

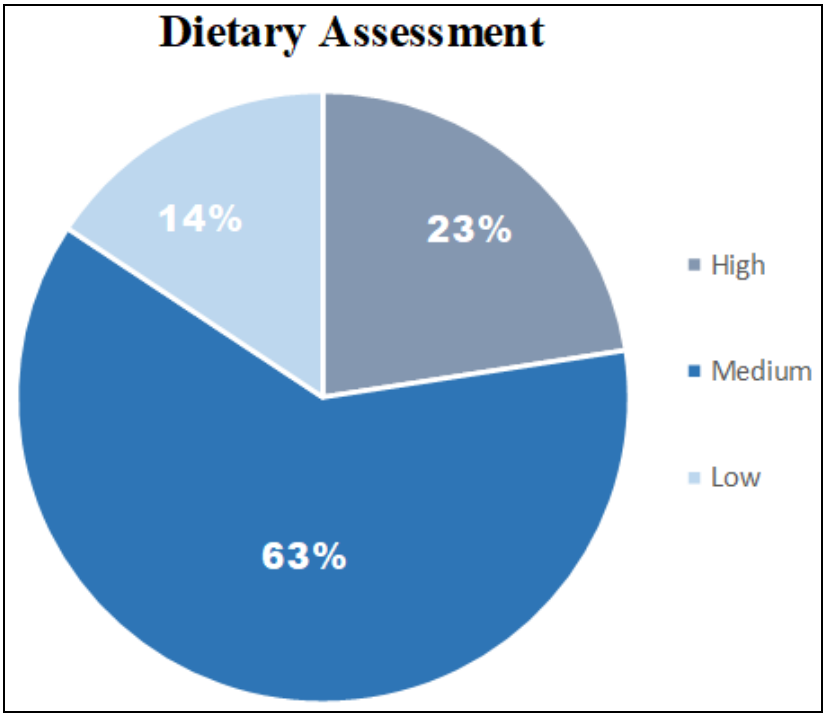

Fig 1: Distribution of subjects by Dietary Diversity Score (DDS)

On assessing the comorbidity among study subjects (Fig. 2), hypertension was the most common pre-existing comorbidity among COVID-19 patients (39.2 percent) followed by diabetes mellitus among 36 percent of the subjects. Obesity or overweight was observed among 29.6% of the subjects, while renal illness affected 24%. Cardiovascular illness affected 14% of the subjects followed by chronic lung disease (12.4 %), liver disease (10%) and cancer (7.6%) of the subjects respectively.

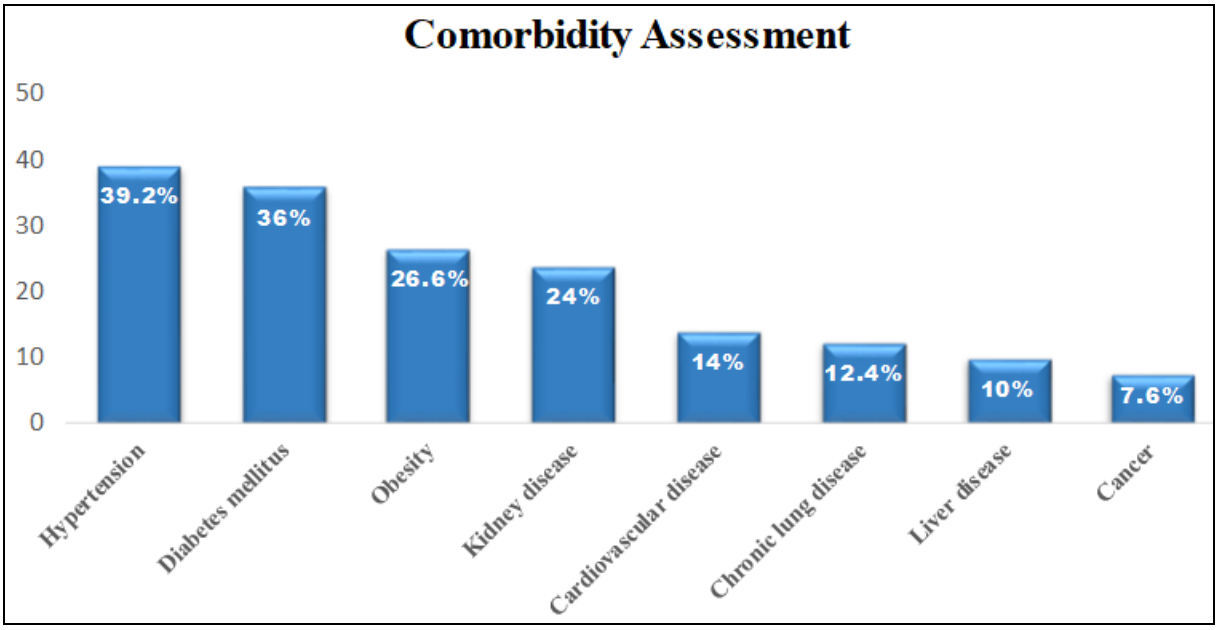

Fig 2: Assessment of Comorbidity among study subjects

The most common symptoms during COVID (Fig. 3) among the subjects were loss of taste (92%), dry cough (94%), headache (92%), tiredness (92.8%), and breathlessness (92%), followed by diarrhea (72.4%) and fever (59.2 percent). The least common symptoms among the research subjects were chest pain (55.2 percent) and skin rashes (48.4%). In a study conducted by Amin *et al*., [1] conducted among 439 people in Bangladesh who recovered from COVID-19 the most common symptoms reported by the study subjects were fever (93.60 percent), tiredness (88.80 percent), and cough (70.80 percent).

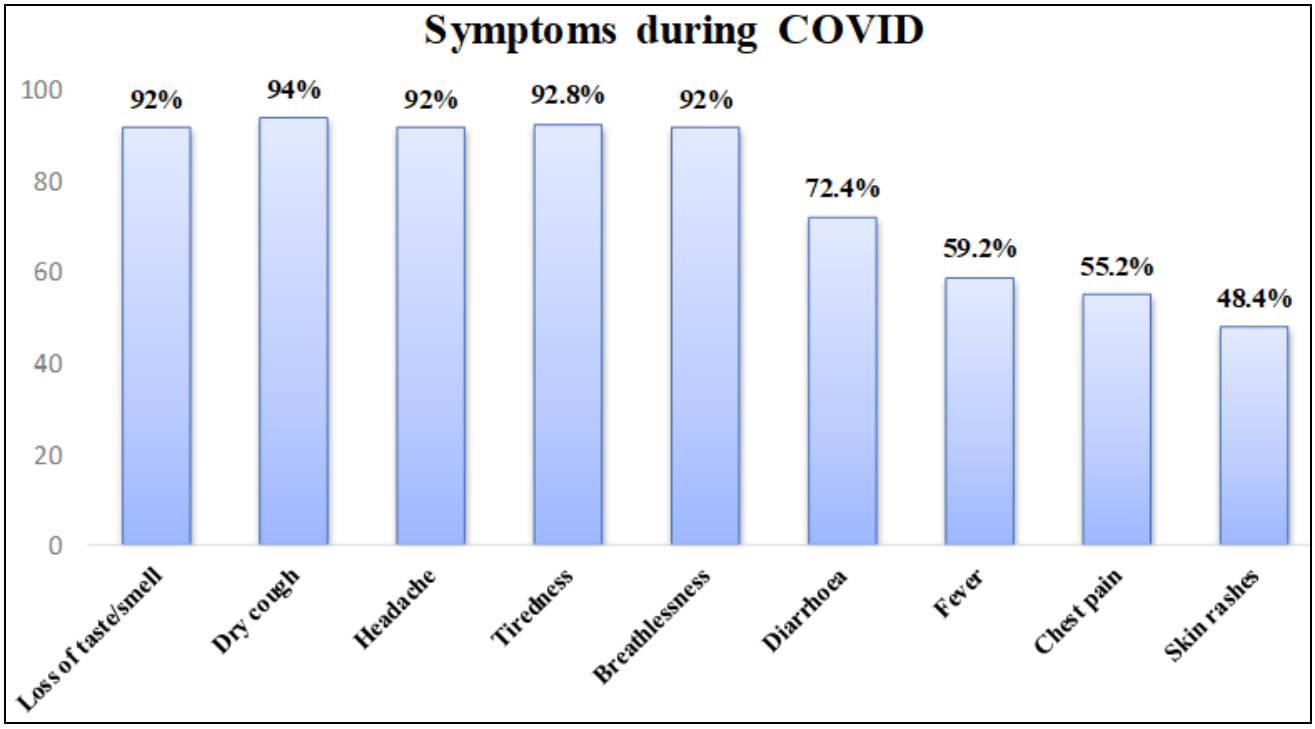

Fig 3: Assessment of symptoms during COVID -19 infection period

The most common post-COVID symptoms (Fig.4) among the subjects were joint paint (93.2%) followed by weakness (90%), shortness of breath (89.2%), sore throat (86.8%) and lack of appetite (86.4%). Palpitation (67.4%) and itchy skin (62.4%) were the other common symptoms. The occurrence of new allergies (36.8%) was the least prevalent symptom.

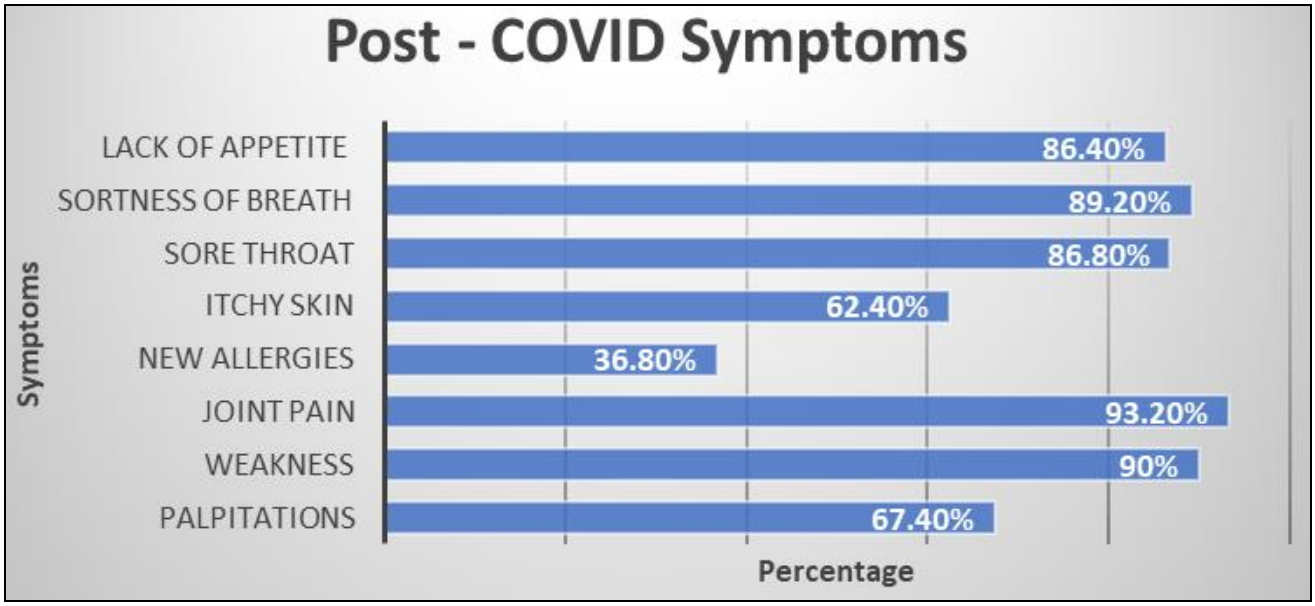

Fig 4: Assessment of symptoms during post COVID among study subjects

Fatigue is common in individuals with a variety of chronic health conditions and can have significant negative effects on quality of life including feelings of weariness, tiredness, a lack of energy, or decreased motivation to continue on a task. Only 24% of the research subjects experienced tiredness syndrome during the infection (Table 3), according to the findings. However, when the results of the post - COVID were analyzed, 55.2 percent reported severe fatigue.

Table 3: Assessment of fatigue using CFQ 11 Scale among study subjects (n=250)

Score	Interpretation	During COVID		Post COVID	
		Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
0-3	Not Severe	190	76	112	44.8
4-11	Severe	60	24	138	55.2

During the pandemic individuals infected with the virus often felt stressed about being unable to cope and upset the epidemic is out of their control. As evident in Figure 5, 48.6% had mild stress, and 47.8% experienced moderate stress throughout the infection period. Only 3.6 percent of the study subjects experienced severe stress during the period of infection. On analyzing the results in the post COVID period, 52.4 percent had moderate stress, 15.2 percent had severe stress and 32.4 percent of the study subjects had low-stress.

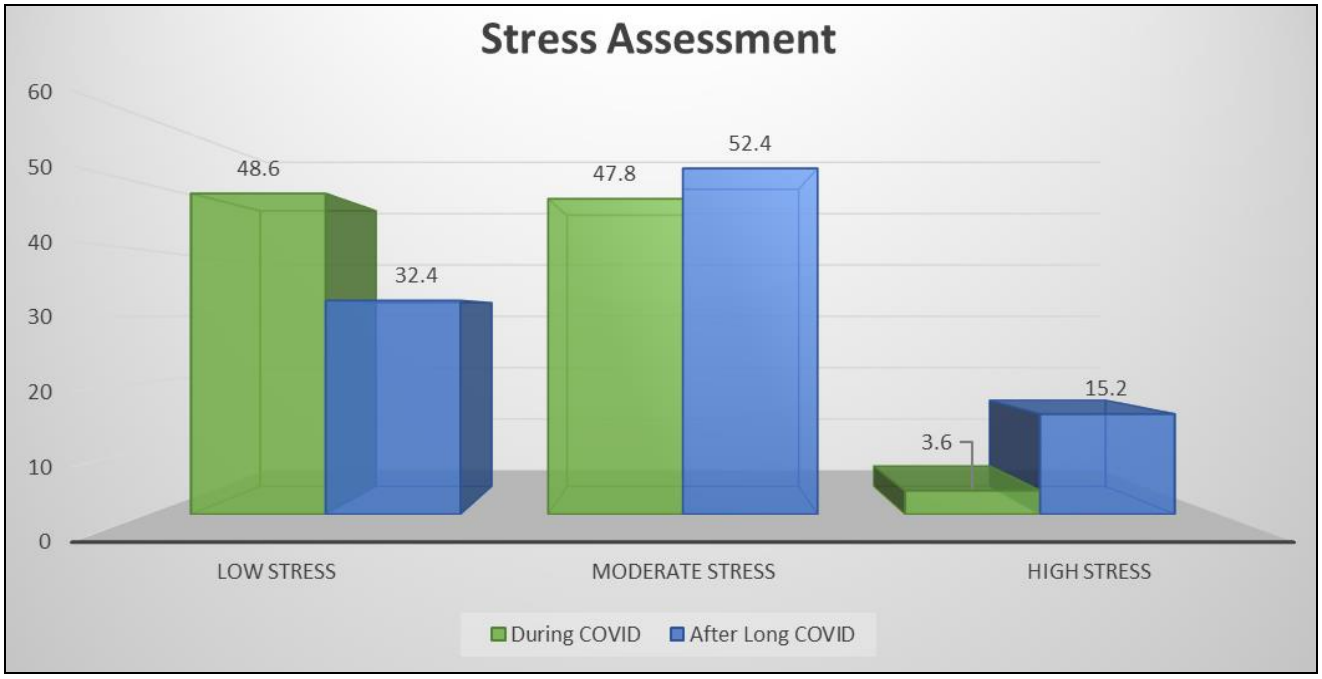

Fig 5: PSS-10-C Scale to Assess Perceived Stress among Study Subjects

On assessing sleep quality among the study subjects (Table 4), 74.4 percent had no sleep disturbances during the period of infection. Only 1.6 percent reported significant insomnia, while 24 percent had subthreshold insomnia. In the post COVID period, 49.6% reported moderate insomnia and 12% had subthreshold insomnia and 8% suffered from severe insomnia.

Table 4: ISI Scale to Assess Sleep among Study Subjects (n=250)

Score	Interpretation	During COVID		Post COVID	
		Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
0-7	Absence of Insomnia	186	74.4	76	30.4
8-14	Subthreshold Insomnia	4	1.6	124	49.6
15-21	Moderate Insomnia	60	24	30	12
22-28	Severe Insomnia	0	0	20	8

The ANOVA was significant during COVID (Table 5), the null hypothesis was rejected at 5% level of significance for the variables fatigue (0.627>0.05) and stress (0.268>0.05) indicating that the groups were not equal. Hence at 95% level of confidence, there was a significant effect of exercise on stress and fatigue. For the variable sleep (0.010>0.01), there was a rejection of the null hypothesis at 1% level of significance. Hence at 99% of confidence, there was a significant effect of exercise on sleep. This means exercise will affect the stress level, fatigue level and sleep pattern. For the variable diet (0.005>0.05), the null hypothesis was accepted at 5% level of significance indicating that at 95 % of confidence, there was no significant effect of exercise on diet.

In post COVID, the null hypothesis was rejected at 5% level of significance for the variables fatigue (0.253>0.05), stress (0.598>0.05) and diet (0.851>0.05) indicating that the groups were not equal. Hence at 95% level of confidence, there was a significant effect of exercise on stress and fatigue. The null hypothesis was rejected at 1% level of significance for the variable sleep (0.010>0.01). Exercise will affect stress level, diet and sleep pattern as well as fatigue. With 99% confidence, there was a significant effect of exercise on sleep.

Table 5: ANOVA of exercise with different parameters during COVID and post COVID (n=250)

Parameter	p-value	
	During COVID	Post COVID
Sleep	.010	.010
Diet	.005	0.253
Fatigue	.627	0.598
Stress	.268	0.851

According to the findings of Pearson's Correlation analysis (Table 6), during the period of infection, the negatively correlated variables were sleep and diet (-0.002<0.5), fatigue and diet (-0.174<0.5). The positively correlated variables were, sleep and fatigue (0.528>0.5), sleep and stress (0.593>0.5), stress and fatigue (0.619>0.5), stress and diet (0.012<0.5). In post-COVID, the negatively correlated variables were, sleep and diet (-0.001<0.5), fatigue and diet (-0.110<0.5) and the positively correlated variables were, sleep and fatigue (0.821>0.5), sleep and stress (0.679>0.5), stress and fatigue (0.782>0.5), stress and diet (0.029<0.5) respectively.

Table 6: Karl Pearson Correlation Coefficient of different parameters among study subjects

Variables	Karl Pearson Correlation Coefficient (r)	
	During COVID	Post COVID
Sleep and Diet	-0.002	-0.001
Fatigue and Diet	-0.174	-0.110
Sleep and Fatigue	0.528*	0.821*
Sleep and Stress	0.593*	0.679*
Stress and Fatigue	0.619*	0.782*
Stress and Diet	0.012	0.029

* Coefficient of correlation >0.5 considered significant

Conclusion

This research explored the symptoms of COVID and the persisting symptoms of post-COVID. Hypertension was reported as the highest pre-existing comorbidity (39.2%), followed by diabetes mellitus (36%). Dry cough was reported as the most prevalent symptom 94%, followed by tiredness 92.8%, loss of taste/smell 92%, headache 92%, breathlessness 92%, and diarrhea 72.4.4%. Fever 59.2%, chest pain 55.2%, and skin rashes 48.4% were the other significant symptoms. The most prevalent post- COVID symptoms among subjects were joint paint (93.2%) followed by weakness (90%), shortness of breath (89.2%), sore throat (86.8%) and lack of appetite (86.4%). During COVID, 24% of the patients were severely fatigued, 47.8% of the patients had a moderate level of perceived stress, and 1.6% of the patients had subthreshold insomnia. During post-COVID, 55.2% were severely fatigued; moderate stress was found in 52.4%, of the subjects; and 49.6% of the study subjects had subthreshold insomnia. ANOVA analysis of different parameters among the subjects during COVID and after post COVID and Karl Pearson Correlation Coefficient of different parameters among the subjects were analyzed. Post-COVID is associated with comorbidities and disease severity. The prevalence of fatigue, perceived stress, and insomnia was significant among COVID-19 survivors. Evidently, COVID-19 affects several systems and has an adverse effect on health and well-being, comprehending and addressing the long-term effects could be just as crucial as resolving its immediate symptoms.

References

1. Amin MT, Hasan M, Bhuiya NMMA. Prevalence of Covid-19 Associated Symptoms their Onset and Duration and Variations among Different Groups of Patients in Bangladesh. Frontiers in Public Health,2021:9(738352):1-13.
2. Anjana N, Annie TT, Siba S, Meenu MS, Chintha S, Anish T. Manifestations and risk factors of the post-COVID syndrome among COVID-19 patients presented with minimal symptoms - A study from Kerala India. Journal of family medicine and primary care,2021:10(11):4023-4029.
3. Callard F, Perego E. How and why patients made Long Covid. Social science & medicine,2021:(1982):268.
4. Campo-Arias A, Pedrozo-Cortés MJ, Pedrozo-Pupo JC. Pandemic-Related Perceived Stress Scale of COVID-19 An exploration of online psychometric performance. Rev Colomb Psiquiatr,2020:49(4):229-230.
5. El Sayed S, Gomaa S, Shokry D, Kabil A, Eissa A. Sleep in post-COVID-19 recovery period and its impact on different domains of quality of life The Egyptian journal of neurology psychiatry and neurosurgery,2021:57(1):172.
6. Food and Agriculture Organization of the United Nations Dietary Assessment: A Resource Guide to Method Selection and Application in Low Resource Settings. Rome: FAO, 2018.
7. Jackson C. The Chalder Fatigue Scale (CFQ 11) Occupational medicine (Oxford, England),2015:65(1):86.
8. Laxmi Suresh Babu, Dr. Janarthanan Pillai M, Dr. Janardhanan KA, Marco Tommasi (Reviewing editor). Prevalence of Perceived Stress Due To COVID-19 among Faculties of Government Dental Colleges in Kerala India. Cogent Psychology,2021:8:1.
9. Salari N, Hosseinian-Far A, Jalali R, Vaisi-Raygani A, Rasoulpoor S, Mohammadi M, *et al*. Prevalence of stress anxiety depression among the general population during the COVID-19 pandemic a systematic review and meta-analysis. Globalization and health,2020:16(1):57.
10. Stavem K, Ghanima W, Olsen MK, Gilboe HM, Einvik G. Prevalence and Determinants of Fatigue after COVID-19 in Non-Hospitalized Subjects A Population-Based Study. International journal of environmental research and public health,2021:18(4):20-30.