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Prevalence of Chronic Fatigue Syndrome in Individuals with Long COVID

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ABSTRACT

Introduction: The COVID-19 is highly infectious respiratory tract disease. Long COVID is determined as the presence of symptoms up to 3 months after Severe Acute Respiratory Syndrome Corona Virus2 infection. Fatigue is the chief communal symptoms of acute and long COVID-19. Many survey studies have been done on fatigue severity of COVID-19 patients but very few studies have been done on chronic fatigue syndrome (CFS) in Individuals with Long COVID. Hence, the need of this study is to find the prevalence of CFS after 1 year of COVID.
Objectives: Total 750 data were taken from Ahmedabad, who were age group between 44 to 64 years of male-female, confirmed diagnosis of COVID-19 and those who were infected with COVID-19 in India during second wave from March 2021 to June 2021 were selected for this study.
Material and methodology: This is a cross-sectional prevalence study in which who fulfilled the eligible criteria, those individuals filled Fatigue Assessment Scale by themselves. Statistical software SPSS 26 was used.
Results: The result of this study shows that the females were significantly more affected by fatigue and the age, smoking score and hospitalized as well as home quarantined individuals were significantly positive moderate correlation with fatigue score also shows that there was no statistically significant association between fatigue score and BMI.
Conclusion: It is concluded that there was a prevalence of mild to moderate level of chronic fatigue syndrome present even after 1 year of COVID 19 in both the home quarantine and hospitalized individuals.

Keywords: Chronic Fatigue Syndrome; Long COVID; prevalence

INTRODUCTION

On December 31, 2019, a cluster of cases of "pneumonia of unknown origin" in people associated with the Huanan Seafood Wholesale Market has been reported in Wuhan, China. Only a few days later, Chinese health authorities confirmed that this cluster was associated with a Novel Coronavirus and was named Coronavirus Disease 2019(COVID-19) by WHO. The COVID-19 is highly infectious respiratory tract disease. It is radiate overseas and global health threat as pandemic which is declared by WHO. The virus has been named specifically as Severe Acute Respiratory Syndrome Corona Virus2(SARS-CoV2).[1] The most common symptoms include fever, cough and shortness of breath.

Long COVID is determined as the presence of symptoms up to 3 months after Severe Acute Respiratory Syndrome Corona Virus2 infection.[2] Long COVID may be lacking, the most common symptoms reported in many studies are fatigue and dyspnoea that last for months after acute COVID-19. Other persistent symptoms may include cognitive and mental impairments, chest and joint pains, palpitations, myalgia, smell and taste dysfunctions, cough, headache, and gastrointestinal and cardiac issues. the most common symptoms reported in many studies are fatigue and dyspnea that last for months after acute COVID-19.

Fatigue defined as physical and/or mental weariness resulting from exertion, that is, an inability to continue exercise at the same intensity with a resultant deterioration in performance. The concept of deconditioning in patients is discussed as well as the implications for their rehabilitation and exercise. Fatigue tests are performed by repeated tension–tension, compression–compression, tension-compression or other combinations of cyclic loading. Fatigue is the chief communal symptoms of acute and long COVID-19, which is not associated with severity of initial infection, even though primary mechanism is unclear.[3]

Fatigue is a nonspecific symptom that is highly prevalent among patients in primary health care. Due to the fast-growing number of persons suffering from chronic fatigue syndrome in the nineties, interest in fatigue has expanded considerably. Fatigue Assessment Scale (FAS) is 10 items scale which evaluating symptoms of chronic fatigue. This scale would assess all aspects of fatigue, develop choose items which reacts both physical and mental symptoms. It will measure the components based on tiredness which affects daily living activities.[4]

Many survey studies have been done on fatigue severity of COVID-19 patients but very few studies have been done on chronic fatigue syndrome (CFS) in Individuals with Long COVID. Fatigue is severe enough to interfere with daily activities eventually it will lead to make the patients, physically dependent. Hence, the need of this study is to find the prevalence of CFS after 1 year of COVID.

The objectives are to find the prevalence of Fatigue by using Fatigue Assessment Scale (FAS) in Individuals with Long COVID. And to find the correlation of age, Body Mass Index (BMI), hospitalized and home-quarantined individuals, with level of fatigue using Fatigue Assessment Scale (FAS) in Individuals with Long COVID.

MATERIALS & METHODS

The ethical clearance was taken from institutional Ethical committee. This study was conducted on general population of Ahmedabad. Total study duration was 1 year. This is a Cross-sectional Prevalence study, which was conducted to find the prevalence of chronic fatigue syndrome (CFS) in individuals with Long COVID. Subjects were recruited through convenient sampling design.

Total 750 data were taken for this study. The Inclusion criteria were individuals with age group between 44 to 64 years [5] both gender male and female were included. Individuals with confirmed diagnosis of COVID-19 and who were infected with COVID-19 in India during second wave from March 2021 to June 2021 were taken. Individuals are able to understand English language and who were willing to participate those were included in the study. The Exclusion criteria were Individuals having any visual defect and severe cognition deficit, any history of cardiovascular diseases like Myocardial Infarction, Heart Failure and respiratory diseases, any neuromuscular diseases were excluded. The Outcome measures was Fatigue Assessment Scale (FAS).

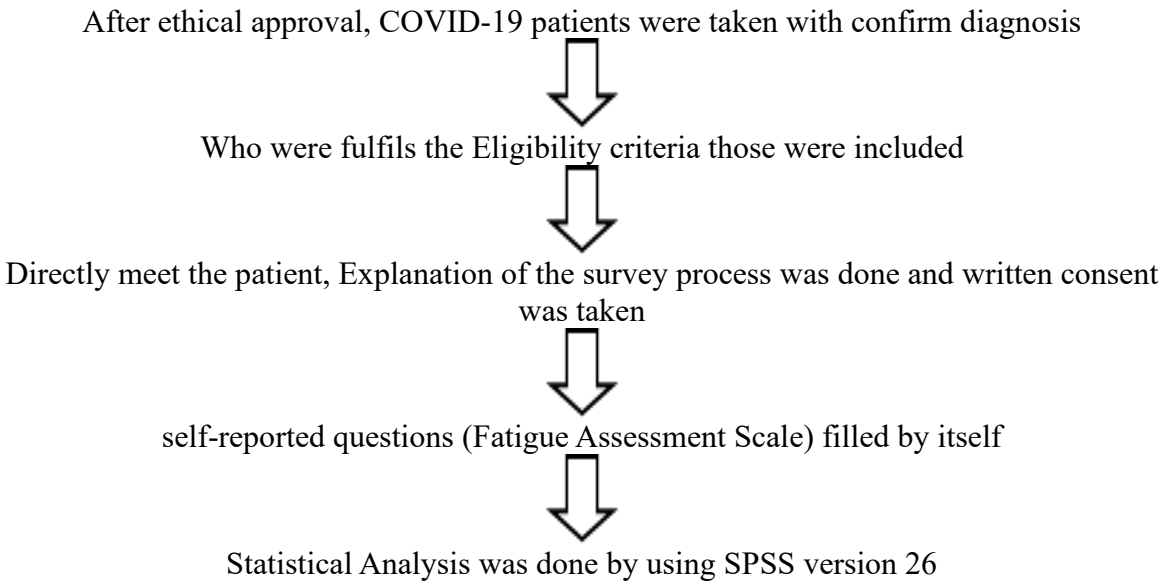


Figure 1: Flow chart of the study.

Statistical Analysis was done by using percentage and spearmen's correlation test with SPSS version 26. the data was not normally distributed; spearman's rank correlation was used to assess the correlation between the variables(r). The Spearman correlation coefficient ranges from -1 to +1, a positive value indicates a positive correlation and a negative value indicates a negative correlation. The level of significance (P-value) was kept as < 0.05

RESULT

Table 1: Demographic data

Characteristics	N	Mean ± SD
Age (years)	750	50.60 ± 6.46
Hight (cm)	750	158.62 ± 6.28
Weight (kg)	750	61.80 ± 9.32
BMI (Kg/m^2)	750	24.61 ± 3.77

SD- Standard Deviation, BMI- Body Mass Index, Kg- kilograms, cm- centimeter

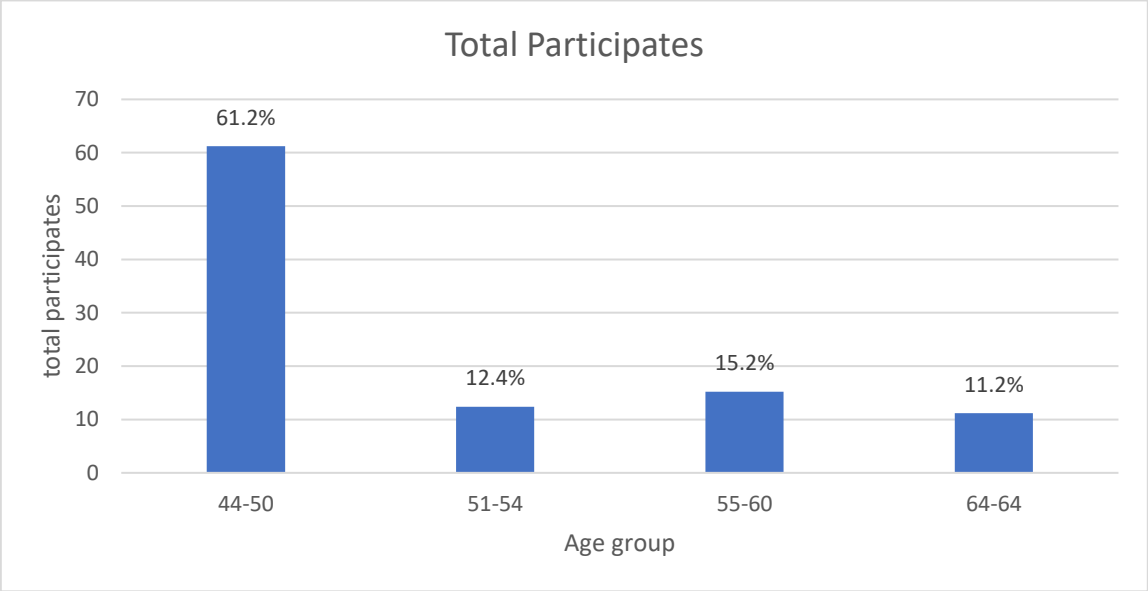
Table 1 shows descriptive characteristics of participants with the value of the mean and standard deviation of the Age in years, height in meters, weight in kilograms and Body Mass Index (BMI) in kilogram per meter square of all the participants. The mean age and Standard Deviation (SD) of the participants were 50.60 and 6.461 respectively, ranging from 44 to 64 years. The mean height and Standard Deviation (SD) of participants were 158.62 and 6.28 respectively the mean weight and Standard Deviation (SD) of participants were 61.80 and 9.32 respectively the mean BMI and Standard Deviation (SD) of participants were 24.61 and 3.77 respectively.

Table 2: Gender Distribution of Participants

Gender	N (%)
Male	378(50.53)
Female	372(49.46)

Table 2 shows the gender distribution of participants group. From a total of 750 participants,
378 (50.53%) of the were male and 372 (49.46%) of them were female consisted in our study.

Graph 1 – Age wise Distribution of Participants



Graph 1 shows the Age group wise distribution of participants. From total 750 participants, 44 to 50 years of age group includes 459(61.2%) participates, 51 to 54 years of age group includes 93(12.4%) participates, 55 to 60 years of age group includes 114(15.2%) participates and 61 to 64 years of age group includes 84(11.2%) participates.

Table 3: Group wise Distribution of Participants

Group of Participants	N (%)
Home Quarantined	700(93.33%)
Hospitalized	50(6.66%)

Table 3 shows Group wise Distribution of Participants. Home-Quarantined participants who were 700 (93.33%). Hospitalised participants who were 50 (6.66%).

Table 4: Home-Quarantined participants with and without Oxygen Support

Group of Participants	Oxygen Support	N (%)
Home Quarantined	With Oxygen Support	160 (21.33%)
	Without Oxygen Support	540 (77.14%)

Table 4 shows Home-Quarantined participants who were on oxygen support. From a total of 700 Home-Quarantine participants, 160 (21.33%) participates were on oxygen supported while 540 (77.14%) participates were without oxygen support.

Table 5: Hospitalized participants with and without Oxygen Support

Group of Participants	Oxygen Support	N (%)
Hospitalized	With Oxygen Support	32 (36%)
	Without Oxygen Support	18 (64%)

Table 5 shows hospitalised participants who were on oxygen support from a total of 50 participants of hospitalised participants, 32 (36%) were on oxygen supported while 18 (64%) were without oxygen support.

Table 6: Fatigue Assessment Score based on Severity

Severity of Fatigue	Fatigue Score
Normal level of fatigue	Less than 22
Mild-Moderate level of fatigue	22 to 34
Severe fatigue.	35 or more

Table 7: Fatigue score of Home-Quarantine and Hospitalized participates.

Group	N	Fatigue Score (Mean ± SD)
Home-Quarantine	700	12.34 ± 4.58
Hospitalized	50	10.50 ± 5.24

Table 7 shows the Fatigue score of Home-Quarantine and Hospitalised participates. From a total of 700 participants of Home-Quarantine group, fatigue score mean was 12.34 and Standard Deviation was 4.58 and from a total of 50 participants of Hospitalised group, fatigue score mean was 10.50 and Standard Deviation (SD) was 5.24.

Table 8: Prevalence of Fatigue severity in Home-Quarantine participates.

Group of data	Gender	Level of fatigue	Prevalence (%)
Home-Quarantine	Male	Normal healthy	64.52%
		Mild to moderate	39.94%
		Severe	1.%
	Female	Normal healthy	58.47%
		Mild to moderate	47.36%
		Severe	1.20%

Table 8 shows the Prevalence of Fatigue score Based on severity in group of Home-Quarantine participates. From a total of 700 participants of Home-Quarantine group in Prevalence level of fatigue score for male, Normal healthy was 64.52%, mild to moderate fatigue was 39.94% and severe fatigue was 1% and level of fatigue score for female, Normal healthy was 58.47%, mild to moderate fatigue was 47.36% and severe fatigue was 1.20%.

Table 9: Prevalence of Fatigue severity in Hospitalized participates.

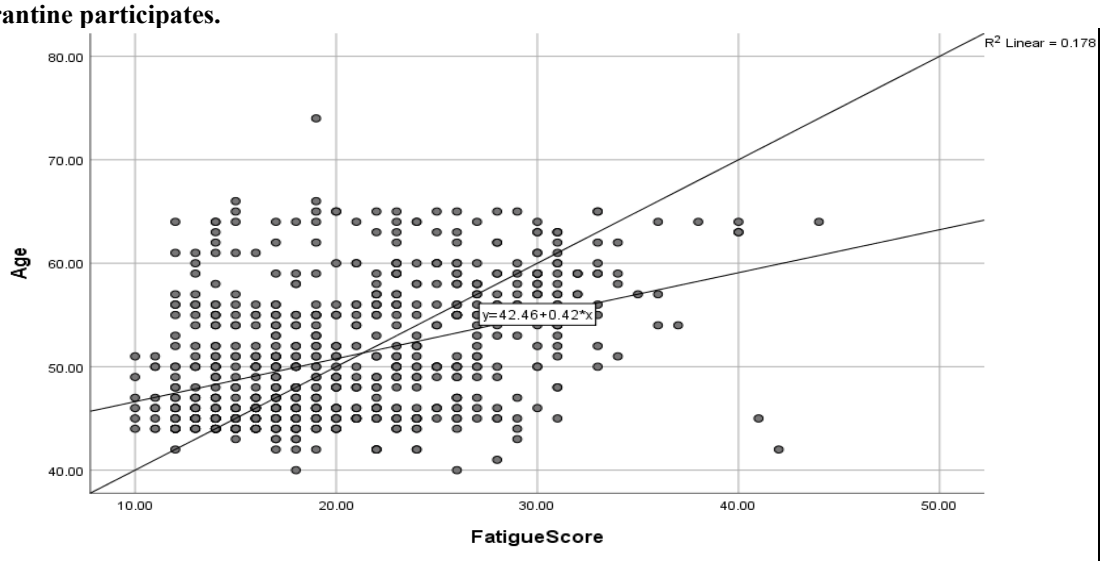
Group of data	Gender	Level of fatigue	Prevalence (%)
Hospitalized	Male	Normal healthy	35%
		Mild to moderate	65%
		Severe	1.11%
	Female	Normal healthy	12.90%
		Mild to moderate	87.09%
		Severe	2%

Table 9 shows the Prevalence of Fatigue score Based on severity in group of Hospitalised participates**.** From a total of 50 participants of Hospitalised group in Prevalence level of fatigue score for male, Normal healthy was 35%, mild to moderate fatigue was 65% and severe fatigue was 1.11% and level of fatigue score for female, Normal healthy was 12.90%, mild to moderate fatigue was 87.09% and severe fatigue was 2%.

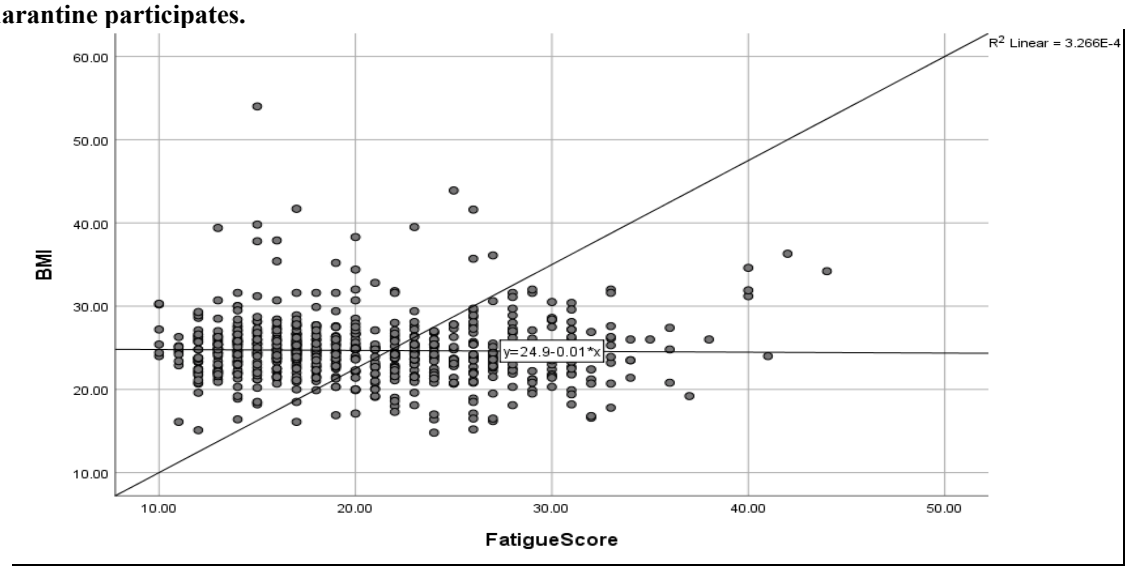
Table 10: The Correlation of fatigue score with Outcomes measures in Home-Quarantine participates

Outcomes measures	Correlation coefficient with fatigue score	P value
Age(year)	r = 0.40	P=0.00
BMI (Kg/m^2)	r = 0.08	P=0.30
Home Quarantine Days	r = 0.24	P=0.00
Smoking	r = 0.37	P=0.00
O_2 supplied (lit/min)	r = 0.38	P=0.00
Correlation is significant at the 0.05 level.		

Graph 2: The Correlation of fatigue score with Based on Outcomes measure of age in group of Home-Quarantine participates.



Graph 3: The Correlation of fatigue score with Based on Outcomes measure of BMI in group of Home-Quarantine participates.



Graph 4: The Correlation of fatigue score with Based on Outcomes measure of Home-Quarantine Days in group of Home-Quarantine participates.

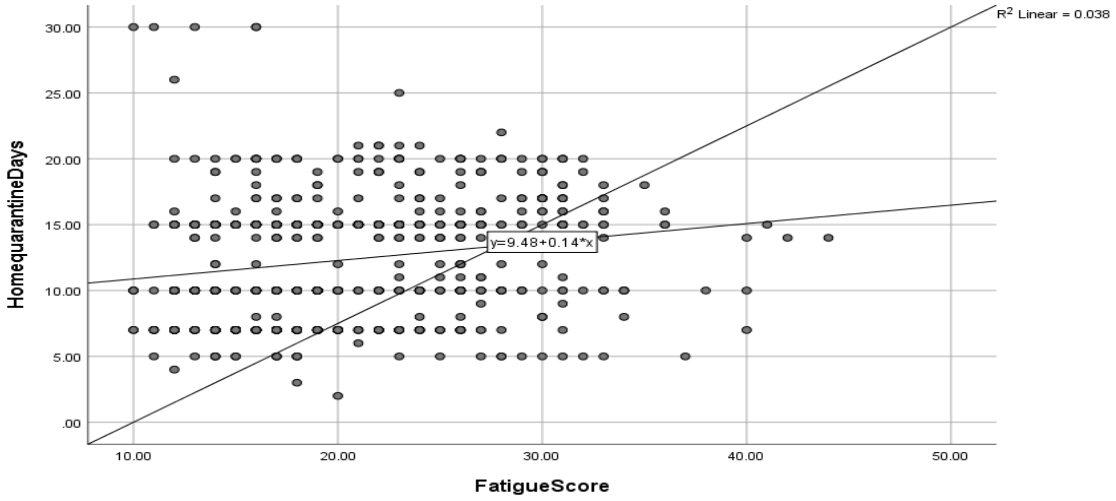
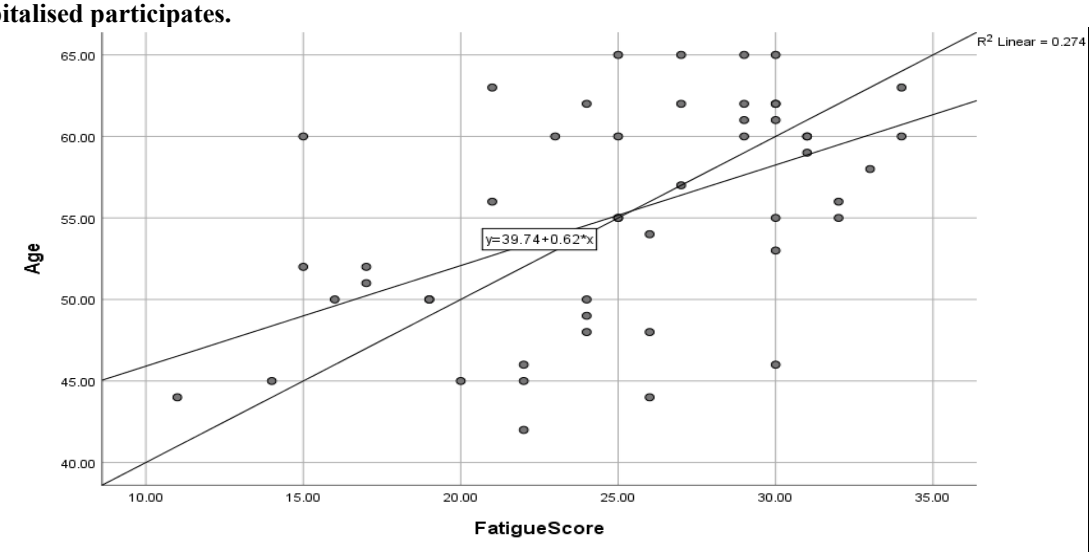


Table 10, Graph 2, Graph 3 and graph 4 shows the Correlation coefficient with fatigue score Based on outcomes consisted in group of Home-Quarantine. A statistically significant moderate positive correlation found between age and fatigue score which was r=0.40 (p=0.00). A statistically significant negligible positive correlation found between BMI and fatigue score which was r= 0.08 (p=0.30). A statistically significant weak positive correlation found between Home-Quarantine Days and fatigue score which was r= 0.24 (p=0.00). A statistically significant weak positive correlation found between Smoking and fatigue score which was r= 0.37 (p=0.00). A statistically significant weak positive correlation found between o2 supplied and fatigue score which was r= 0.38 (p=0.00).

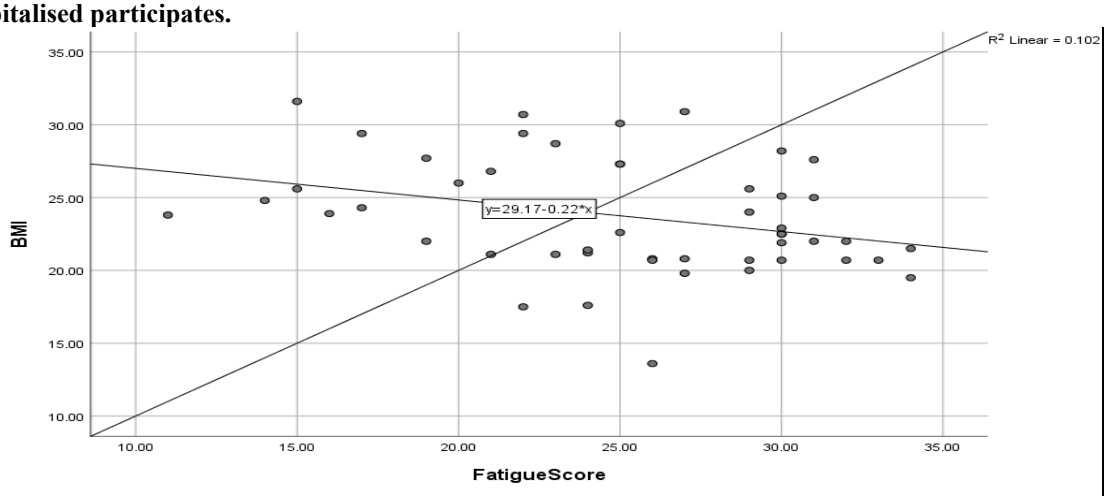
Table 11: The Correlation of fatigue score with Outcomes measures in Hospitalized participates

Outcomes measures	Correlation coefficient with fatigue score	P value
Age (year)	r = 0.49	P=0.00
BMI ($Kg/m^{2)}$	r = 0.33	P=0.16
Hospitalized days	r = 0.12	P=0.37
Smoking	r = 0.27	P=0.05
O_2 supplied (lit/min)	r = 0.58	P=0.00
Correlation is significant at the 0.05 level.		

Graph 5: The Correlation of fatigue score with Based on Outcomes measure of age in group of Hospitalised participates.



Graph 6: The Correlation of fatigue score with Based on Outcomes measure of BMI in group of Hospitalised participates.



Graph 7: The Correlation of fatigue score with Based on Outcomes measure of Hospitalised Days in group of Hospitalised participates.

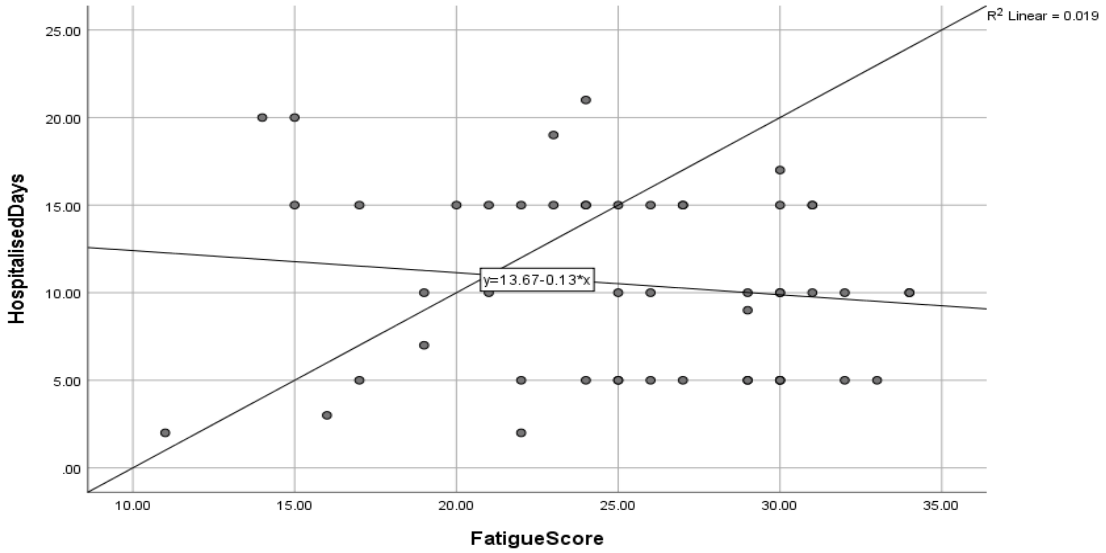


Table 11, Graph 5, Graph 6 and graph 7 shows the Correlation coefficient with fatigue score Based on outcomes consisted in group of Hospitalised. A statistically significant moderate positive correlation found between age and fatigue score which was r=0.49 (p=0.00). A statistically significant negligible positive correlation found between BMI and fatigue score which was r= 0.33 (p=0.16). A statistically significant weak positive correlation found between Hospitalised Days and fatigue score which was r= 0.12 (p=0.37). A statistically significant negligible positive correlation found between Smoking and fatigue score which was r= 0.27 (p=0.05). A statistically significant moderate positive correlation found between o2 supplied and fatigue score which was r= 0.58 (p=0.00).

DISCUSSION

COVID-19 is a respiratory disease, one that especially reaches into respiratory tract which includes lungs too. It can cause breathing problems mild to critical. The result of this study show that the females were significantly more affected by fatigue than the male was similar with other studies [6] which shows that the prevalence of post-COVID fatigue is higher among women than men. Similarly, a study conducted in the United States and the United Kingdom shows that the prevalence of fatigue among women is three times higher than men. This may be because of cause the acute inflammatory phase to continue even after the infection has treated. Moreover, it was argued in a study that this higher prevalence may be due to women paying more attention to their own well-being and bodies, who are more aware of changes and distresses.[7]

The result of this study shows that the age and fatigue score was significantly moderate positive correlated which is similar to the other study which says that chronic post-COVID fatigue was reported to be the predominant symptom experienced in all age groups with post-COVID-19 syndrome.[8]

Our study shows that the fatigue score of Hospitalized as well as home quarantined individuals were significantly positive moderate correlation. In a study by Bungenberg et al., the prevalence and severity of COVID-19 fatigue were higher among non-hospitalized patients which can be due to a number of post-COVID-19 symptoms, including fatigue are caused due to ICU treatments and hospitalization.[9]

Our study shows that there was no statistically significant association between fatigue and BMI which is related to the study done by Kamal et al., which reported that Obesity had no effect on the severity grade or form of symptoms following COVID- 19.[10]

Our study shows that there was statistically significant moderate correlation between smoking and fatigue score. Smokers had also higher presence of asymptomatic infections and lower seroprevalence. A certain under detection of cases among smokers could not be ruled out, since they may develop lower antibody levels.[11] However, a recent review concluded that smokers have lower risk of infection [12], although the mechanisms are not well understood.

CONCLUSION

Fatigue is common among clinically stable middle aged and older patients even after the COVID-19 outbreak. Considering its negative impact on overall Quality of Life (QOL), regular assessment of fatigue and appropriate treatment warrant attention in this subpopulation.

Our findings illustrated the incidence of CFS in COVID-19 recovered participants. This is the first study to discover the 1 year after adverse effects in post COVID patients. Our results show that the overall prevalence of chronic fatigue syndrome as a long COVID symptom was statistically significant more in hospitalised group. Especially gender wise distribution, Females were statistically significant more affected by chronic fatigue syndrome as well as above 50-year patient were more affected by chronic fatigue syndrome in both Home-Quarantine and Hospitalised group. Our results show the fatigue level was statistically significant higher in smoker group rather than non-smoker group and also show higher level of fatigue in subjects who had oxygen supported while affected by COVID. Our findings were also showing the significant moderate correlation of Fatigue score with the smoking history, with and without oxygen support, age wise distribution and gender wise distribution. Chronic fatigue after infection with COVID-19 can negatively affect personal and social lives. Given such significant negative consequences caused by the syndrome, it is recommended that health policymakers allocate funds to reduce the adverse effects of this syndrome, by creating programs to support long COVID patients.

From the result of this study, it is concluded that there was a prevalence of mild to moderate level of chronic fatigue syndrome preset even after 1 year of COVID 19 in both the home quarantine and hospitalized individuals. The result also shows the Fatigue post COVID was associate with age, BMI, smoking status of the individual in both home quarantine and hospitalized individuals.

Declaration by Authors

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Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Morgul E, Bener A, Atak M, et al. COVID-19 pandemic and psychological fatigue in Turkey. International Journal of Social Psychiatry. 2021 Mar;67(2):128-35.
2. Yong SJ. Long COVID or post-COVID-19 syndrome: putative pathophysiology, risk factors, and treatments. Infectious diseases. 2021 Oct 3;53(10):737-54.
3. Komaroff AL, Lipkin WI. Insights from myalgic encephalomyelitis/chronic fatigue syndrome may help unravel the pathogenesis of post-acute COVID-19 syndrome. Trends in Molecular Medicine. 2021 Sep 1;27(9):895-906.
4. Michielsen HJ, De Vries J, Van Heck GL. Psychometric qualities of a brief self- rated fatigue measure: The Fatigue Assessment Scale. Journal of psychosomatic research. 2003 Apr 1;54(4):345-52
5. World Health Organization, International Classification of Functioning, Disability, and Health: Children & Youth Version: ICF-CY. World Health Organization; 2007;10665-43737
6. Seeßle J, Waterboer T, Hippchen T, et al. Persistent symptoms in adult patients 1 year after coronavirus disease 2019 (COVID-19): a prospective cohort study. Clinical infectious diseases. 2022 Apr 1;74(7):1191-8.
7. Bai F, Tomasoni D, Falcinella C, et al. Female gender is associated with long

COVID syndrome: a prospective cohort study. Clinical microbiology and infection: the official publication of the European Society of Clinical Microbiology and Infectious Diseases, 2021;28(4),611;9-611
8. Roge I, Smane L, Kivite-Urtane A, et al. Comparison of Persistent Symptoms After COVID-19 and Other Non-SARS-CoV-2 Infections in Children. Frontiers in pediatrics. 2021;9.
9. Bungenberg J, Humkamp K, Hohenfeld C, et al. Long COVID-19: Objectifying most self-reported neurological symptoms. Annals of clinical and translational neurology. 2022 Feb;9(2):141-54.
10. Kamal M, Abo Omirah M, Hussein A, Saeed H. Assessment and characterisation of post-COVID-19 manifestations. Int J Clin Pract. 2021 Mar;75(3): e13746. doi: 10.1111/ijcp.13746.
11. Watanabe M, Balena A, Tuccinardi D, et al. Central obesity, smoking habit, and hypertension are associated with lower antibody titers in response to COVID-19 mRNA vaccine. Diabetes/metabolism research and reviews. 2022 Jan;38(1): e3465.
12. Simons D, Shahab L, Brown J, et al. The association of smoking status with SARS-CoV-2 infection, hospitalization and mortality from COVID-19: living rapid evidence reviews with Bayesian meta-analyses (version 7). Addiction. 2021 Jun;116(6):1319-68.

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