Original Article

Post-COVID-19 manifestations: A study of analyzing symptoms, complications following hospitalization

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Abstract

Background: Post-COVID-19 symptoms and diseases appeared on recovered from COVID-19. Hence, the study aims to investigate and characterize the manifestations which appear after recovery from the corona virus infection. **Objectives:** To investigate the post-COVID-19 Manifestation, to demonstrate different symptoms or signs that appeared during COVID and after recovery from the disease and to see association of independent factors (like age, sex, BMI, Comorbidities) with Post-COVID complication. **Methods:** The study was conducted using cross-sectional study among COVID positive patients admitted and then recovered in Bangur Hospital, Pali, Rajasthan, including ICU and Isolation wards from March to December 2020. Sample size calculated was 423 with simple random sampling. **Findings:** In our study of these 421 COVID-19 cases, median age was 36 year (Interquartile Range: 26-55 years). Post-COVID manifestation (at least one symptom) significantly associated with age of subjects (p = 0.001), subjects who were in ICU during COVID-19 positive (p = 0.003), symptomatic subjects (p = 0.009) during COVID positive and SPO_2 level at the time of admission during COVID positive (p = 0.01). **Conclusion:** The recovered subjects should be highly vigilant in maintaining and monitoring their health status as there is a risk of future complications after recovery.

Keywords: Comorbidities, COVID-19, post-COVID, symptoms

Background

Post-COVID-19 symptoms appeared after recovery from COVID-19. Hence, the study aims to investigate and characterize the manifestations which appear after recovery from the corona virus infection.

Several Patients are getting discharged from hospital after COVID-19, there is necessity to promote well primary physicians communication and investigation to diagnose complications before time. COVID-19 is a viral infection, that is, due to SARS-CoV-2 that predominantly attacks the respiratory system, with earliest symptoms frequently having shortness of breath and fever.[1] Often notified symptom of coronavirus infection is fatigue.[2] It is equally crucial to assess lasting effects of COVID-19 patients after recovery. In spite of the rising number of recovered persons, there is growing importance concerning the consequences after diagnosis of COVID-19.[3] Evolving documentation recommends COVID-19 has lasting sequels on the immunological and respiratory systems. Common symptoms include cough, fever, dyspnoea, musculoskeletal symptoms (myalgia, joint pain, fatigue), gastrointestinal symptoms, and anosmia/dysgeusia.[4-6] However, information is lacking on symptoms that persist after recovery. We assessed persistent symptoms in patients

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Received: 27-01-2022 **Revised:** 04-04-2022
Accepted: 11-04-2022 **Published:** 31-10-2022

Access this article online

Quick Response Code:

Website: www.jfmpc.com

DOI: 10.4103/jfmpc.jfmpc_219_22

How to cite this article: Kaur D, Agrawal KC, Deep A, Choudhary H, Soni L, Saran R, *et al*. Post-COVID-19 manifestations: A study of analyzing symptoms, complications following hospitalization. J Family Med Prim Care 2022;11:6015-22.

who were discharged from the hospital after recovery from COVID-19. Long-term outcomes might not be comparable, as many patients admitted to hospital with COVID-19 have pre-existing disease and varying degrees of frailty. Risk factors for moderate or severe COVID-19 are similar to those of idiopathic pulmonary fibrosis: male gender and older age.[7] Guidelines published by the British Thoracic Society recommend chest radiography three months after discharge for all patients admitted to hospital with COVID-19. Those with a history of moderate or severe disease, with persisting symptoms or with radiological abnormalities, require clinical review and further investigation.[8]

Post-acute COVID-19 ("long covid") seems to be a multisystem disease, sometimes occurring after a relatively mild acute illness.[9] Clinical management requires a whole-patient perspective.[10] Post-acute COVID-19 symptoms vary widely. Even so-called mild COVID-19 may be associated with long term symptoms, most commonly cough, low grade fever, and fatigue, all of which may relapse and remit.[11,12] Other reported symptoms include shortness of breath, chest pain, headaches, neurocognitive difficulties, muscle pains and weakness, gastrointestinal upset, rashes, metabolic disruption (such as poor control of diabetes), thromboembolic conditions, and depression and other mental health conditions.[13]

Hence, the current study aims to investigate the post-COVID-19 manifestation to demonstrate the different symptoms or signs that appeared on subjects after recovery from the disease and we aimed to help primary care physician also to link these symptoms with several factors (age, weight, disease severity, or other co-morbidities).

Aim and Objectives

1. To investigate the post-COVID-19 Manifestation.
2. To demonstrate different symptoms or signs that appeared during COVID and after recovery from the disease.
3. To see association of independent factors (like age, sex, BMI, Comorbidities) with Post COVID complication.

Methods

The study was conducted using cross-sectional study among COVID positive patients admitted and then recovered in Bangur Hospital, Pali, Rajasthan, including Intensive care unit (ICU) and isolation wards. There were 2133 COVID-19 positive patients admitted in Bangur Hospital from March 20 to December 10, 2020. Out of 2133, 132 patients admitted in ICU. All 132 ICU patients included in sample and remaining from follow up OPD of Medicine and pulmonary Medicine Department. Patients selected out of 2001 patients non-ICU admitted patients by Simple Random Sampling.

The sample size determined by the following formula:

$$\textbf{Required sample size} = n = \frac{Z^2_{1-\frac{\alpha}{2}} p(100-p) * 1.1}{d^2}$$

Where

$Z_{1-\alpha/2}$ = 1.96 (Value of the normal deviate at 95% level of confidence)

P = 50% (Anticipated Prevalence)

d = 5% (Absolute Precision)

α = 0.05 (Level of significance)

1.1 = 10% Non-Response Rate

Therefore,

Estimated Sample Size = 423

The study tool used a pre-designed, pre-tested, semi-structured questionnaire for telephonic survey to recovered subjects through telephonic interview for post-COVID follow-up and indoor patient ticket for COVID illness during the period of hospitalization. Patients who were admitted in ICU and isolation wards in Bangur Hospital, Pali, from March to December 2020 and discharged after recovery included in the study. All Post COVID-19 patients in follow up of OPD of Medicine and Pulmonary Medicine Department included. Patients Non response to follow up and Died during COVID illness excluded.

The data analyzed by using the software Statistical Package for Social Sciences Version 22.0. Frequency distribution tables for all pertinent variables generated. Number (%) for categorical data and mean ± SD or median (inter-quartile range) for continuous data calculated as per requirement. Post-COVID complications divide into two categories, present and absent and binary logistic regression applied for identifying independent factors (like age, sex, BMI, comorbidities) associated with post-COVID complication.

Results

Demographic, clinical, and other characteristics

As per sample size calculation 423 cases included in our study out of which 2 cases not responded, so our database included 421 recovered COVID-19 cases. Of these 421 COVID-19 cases, median age was 36 years. 140 (33.3%) were female and 281 (66.7%) were male. Out of 421, 117 (27.8%) admitted in ICU during COVID-19 positive. Mean hospital stay days were 7 (7.05 ± 2.92). Mean BMI was 23.6 ± 40.19. Percent of smoker and physical activity were 9% and 42.9% respectively. Regarding comorbidities, 37 (8.8%) were hypertensive and 36 (8.6%) were diabetic. Of these 421 cases, 162 (38.5%) reported having at least one symptom during hospital stay. The common symptom

Table 1: Demographic and clinical characteristics

Variables	Total (n=421)	Post-COVID Manifestation (At least one)	
		Yes (n_1=151)	No (n_2=270)
Gender (Male)	281 (66.7%)	95 (62.9%)	186 (68.9%)
Age (Years) (#)	36 (26-55)	50 (33-66)	32 (32-48)
Admitted in ICU (Yes)	117 (27.8%)	64 (42.4%)	53 (19.6%)
Hospital Stay (*)	7.05±2.92	7.46±3.237	6.83±2.709
BMI (*)	23.60±4.19	25.097±4.22	22.77±3.95
Smoking Status (Yes)	38 (9%)	20 (13.2%)	18 (6.7%)
Physical Activity (Yes)	181 (42.9%)	55 (36.4%)	126 (46.7%)
During COVID Positive			
Comorbidities (Yes)	68 (16.2%)	39 (25.8%)	29 (10.7%)
Hypertension (Yes)	37 (8.8%)	19 (12.6%)	18 (6.7%)
Diabetes (Yes)	36 (8.6%)	22 (14.6%)	14 (5.2%)
Ischemic Heart Disease (Yes)	8 (1.9%)	4 (2.6%)	4 (1.5%)
Liver Disease (Yes)	0 (0%)	0 (0%)	0 (0%)
Asthma (Yes)	3 (0.7%)	2 (1.3%)	1 (0.4%)
Chronic Obstructive Pulmonary Disease (Yes)	4 (1%)	3 (2%)	1 (0.4%)
Chronic Kidney Disease (Yes)	2 (0.5%)	0 (0%)	2 (0.7%)
Mental Illness (Yes)	0 (0%)	0 (0%)	0 (0%)
Malignancy (Yes)	0 (0%)	0 (0%)	0 (0%)
Postpartum <6 weeks (Yes)	0 (0%)	0 (0%)	0 (0%)
Immune compromised condition HIV &TB (Yes)	0 (0%)	0 (0%)	0 (0%)
Symptoms (Yes)	162 (38.5%)	99 (65.6%)	63 (23.3%)
Fever (Yes)	87 (20.7%)	54 (35.8%)	33 (12.2%)
Cough (Yes)	82 (19.5%)	52 (34.4%)	30 (11.1%)
Sore Throat (Yes)	9 (2.1%)	5 (3.3%)	4 (1.5%)
Nausea (Yes)	5 (1.2%)	3 (2%)	2 (0.7%)
Headache (Yes)	6 (1.4%)	5 (3.3%)	1 (0.4%)
Body ache (Yes)	3 (0.7%)	2 (1.3%)	1 (0.4%)
Runny Nose (Yes)	4 (1%)	1 (0.7%)	3 (1.1%)
General Weakness (Yes)	21 (5%)	19 (12.6%)	2 (0.7%)
Loss of Smell (Yes)	0 (0%)	0 (0%)	0 (0%)
Loss of Taste (Yes)	1 (0.2%)	1 (0.7%)	0 (0%)
Loss of Appetite (Yes)	2 (0.5%)	2 (1.3%)	0 (0%)
Shortness of Breath (Yes)	74 (17.6%)	46 (30.5%)	28 (10.4%)
Vomiting (Yes)	1 (0.2%)	0 (0%)	1 (0.4%)
Lose Motion (Yes)	0 (0%)	0 (0%)	0 (0%)
Symptoms of Psychiatric Disorder (Yes)	0 (0%)	0 (0%)	0 (0%)
SPO_2 (#)	98 (95-98)	96 (94-97)	98 (97-98)
Hemoglobin (g/dl) (*)	12.51±1.849	12.57±1.889	12.40±1.796
WBC ($10^3/mm^3$) (*)	7.61±3.068	7.67±3.235	7.52±2.799
Lymphocyte ($10^3/mm^3$) (*)	1.71±0.8	1.61±0.774	1.87±0.83
Platelet ($10^3/mm^3$) (*)	248.02±86.92	237±84.87	265.45±88.388
Blood Sugar (mg%) (#)	123 (101-169)	131 (102-177)	118 (89-148)
LFT S BILIRUBINT (mg%) (#)	0.8 (0.6-0.9)	0.8 (0.6-0.9)	0.7 (0.6-0.85)
LFTS BILIRUBIN D (mg%) (#)	0.2 (0.2-0.3)	0.2 (0.2-0.3)	0.2 (0.2-0.3)

(*) Mean±S.D., (#) Median (Interquartile Range)

during COVID-19 Positive was fever (20.7%), followed by cough (19.5%) [Table 1].

Presence of post COVID manifestation and clinical characteristic

Analysis of post-COVID manifestation revealed that 35.5% of all subjects suffered with at least one symptom [Figure 1]. Subjects suffered from fatigue (17.81%), cough (9.26%), intermittent fever (7.36%), shortness of breath (5.22%), headache (7.99%), and body ache (4.28%) [Table 2 and Figure 2].

Association of post-COVID manifestation with demographic and clinical characteristics

Post-COVID manifestation (at least one symptom) significantly associated with age of subjects (p = 0.001), [Figure 3] subjects who were in ICU during COVID-19 positive (p = 0.003), symptomatic subjects (p = 0.009) during COVID positive and SPO_2 level

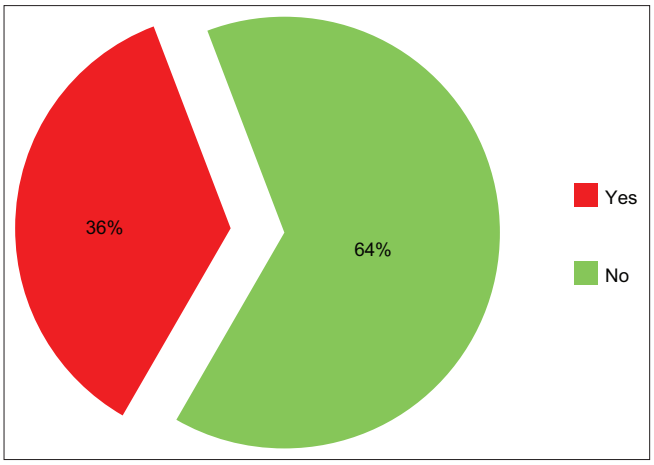

Figure 1: Post-COVID Manifestation

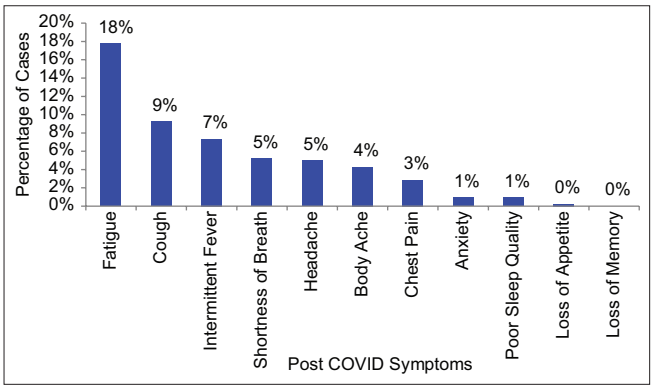

Figure 2: Post COVID Symptoms

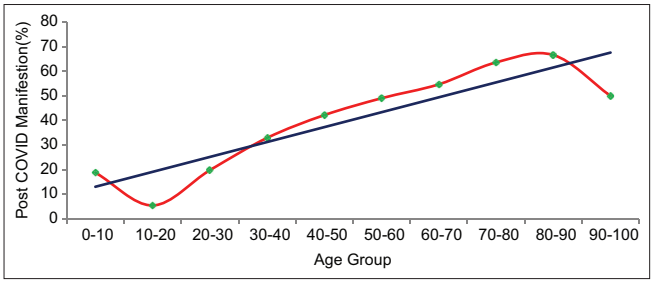

Figure 3: Post COVID Manifestation in Different Age Group

at the time of admission during COVID positive (p = 0.01). Post-COVID manifestation is not significantly associated with gender (p = 0.119), hospital stay (p = 0.255), BMI (p = 0.103), smoking status (p = 0.144), physical activity (p = 0.174), comorbidities (p = 0.267), hemoglobin (p = 0.856), WBC (p = 0.314), lymphocyte (p = 0.206), platelet (p = 0.129), blood sugar (p = 0.151), LFT Bilirubin T (p = 0.523), and LFT Bilirubin D (0.459) [Table 3].

Association of post-COVID manifestation with other clinical characteristics

Fatigue: Fatigue is positively associated with age (p = 0.000) and during COVID symptom general weakness (p = 0.001).

Table 2: Post-COVID Manifestation

Post COVID Manifestation	Yes (*n*=151)	No (*n*=270
Cough	39 (9.26%)	382 (90.74%)
Shortness of Breath	22 (5.22%)	399 (94.78%)
Fatigue	75 (17.81%)	346 (82.19%)
Anxiety	4 (0.95%)	417 (99.05%)
Body Ache	18 (4.28%)	403 (95.72%)
Loss of Appetite	1 (0.24%)	420 (99.76%)
Headache	21 (4.99%)	400 (95.01%)
Chest Pain	12 (2.85%)	409 (97.15%)
Loss of Memory	0 (0%)	421 (100%)
Intermittent Fever	31 (7.36%)	390 (92.64%)
Poor Sleep Quality	4 (0.95%)	417 (99.05%)

Cough: Cough is positively associated with age (p = 0.021) and during COVID symptom cough and negatively associated with hypertension (p = 0.029).

Intermittent Fever: Intermittent fever is positively associated with during COVID symptom fever (p = 0.022).

Shortness of Breath: Shortness of breath is positively associated with age (p = 0.036) and during COVID symptom shortness of breath (p = 0.005) [Table 4]. 21.61% with 1 symptom and 14.25% with 2 or more than 2 symptoms [Table 5].

Discussion

In our study of these 421 COVID-19 cases, median age was 36 years. Post-COVID manifestation (at least one symptom) significantly associated with age of subjects (p = 0.001), subjects who were in ICU during COVID-19 positive (p = 0.003), symptomatic subjects (p = 0.009) during COVID positive and SPO_2 level at the time of admission during COVID positive (p = 0.01).

The relation between age, comorbidities, and severity of COVID-19 showed a strong link between the presence of other comorbidities and the severity of COVID-19. Also increasing age was related to increased severity of the disease course.[14]

In our study out of 421, 117 (27.8%) admitted in ICU during COVID-19 positive. Mean hospital stay days were 7 (7.05 ± 2.92). In a recent study of 1775 veterans in the United States admitted to hospital with COVID-19, 20% were readmitted and 9% died within 60 days of discharge.[15]

In our study common symptom during COVID-19 positive was fever (20.7%), followed by cough (19.5%). Subjects suffered from fatigue (17.81%), cough (9.26%), intermittent fever (7.36%), shortness of breath (5.22%), headache (7.99%), and body ache (4.28%) after recovery from COVID.

In another study patients with COVID-19 are known to have fever, cough, headache, loss of smell, and deterioration of GI system in general.[16] The findings in this study are similar to the Italian COVID-19 Post-Acute Care Study observed in that prospective study

Table 3: Association of Post-COVID Manifestation with Demographic and Clinical Characteristics

Variables	Total (n=421)	Post COVID Manifestation (At least one)		P (Logistic Regression)
		Yes (n_1=151)	No (n_2=270)	
Gender (Male)	281 (66.7%)	95 (62.9%)	186 (68.9%)	0.119
Age (Years) (#)	36 (26-55)	50 (33-66)	32 (32-48)	0.001
Admitted in ICU (Yes)	117 (27.8%)	64 (42.4%)	53 (19.6%)	0.003
Hospital Stay (*)	7.05±2.92	7.46±3.237	6.83±2.709	0.255
BMI (*)	23.60±4.19	25.097±4.22	22.77±3.95	0.103
Smoking Status (Yes)	38 (9%)	20 (13.2%)	18 (6.7%)	0.144
Physical Activity (Yes)	181 (42.9%)	55 (36.4%)	126 (46.7%)	0.174
During COVID Positive				
Comorbidities (Yes)	68 (16.2%)	39 (25.8%)	29 (10.7%)	0.267
Hypertension (Yes)	37 (8.8%)	19 (12.6%)	18 (6.7%)	0.600
Diabetes (Yes)	36 (8.6%)	22 (14.6%)	14 (5.2%)	0.896
Ischemic Heart Disease (Yes)	8 (1.9%)	4 (2.6%)	4 (1.5%)	0.448
Liver Disease (Yes)	0 (0%)	0 (0%)	0 (0%)	
Asthma (Yes)	3 (0.7%)	2 (1.3%)	1 (0.4%)	0.475
Chronic Obstructive Pulmonary Disease (Yes)	4 (1%)	3 (2%)	1 (0.4%)	0.926
Chronic Kidney Disease (Yes)	2 (0.5%)	0 (0%)	2 (0.7%)	0.999
Symptoms (Yes)	162 (38.5%)	99 (65.6%)	63 (23.3%)	0.009
Fever (Yes)	87 (20.7%)	54 (35.8%)	33 (12.2%)	0.257
Cough (Yes)	82 (19.5%)	52 (34.4%)	30 (11.1%)	0.728
Sore Throat (Yes)	9 (2.1%)	5 (3.3%)	4 (1.5%)	0.490
Nausea (Yes)	5 (1.2%)	3 (2%)	2 (0.7%)	0.461
Headache (Yes)	6 (1.4%)	5 (3.3%)	1 (0.4%)	0.961
Body ache (Yes)	3 (0.7%)	2 (1.3%)	1 (0.4%)	0.561
Runny Nose (Yes)	4 (1%)	1 (0.7%)	3 (1.1%)	0.460
General Weakness (Yes)	21 (5%)	19 (12.6%)	2 (0.7%)	0.005
Loss of Taste (Yes)	1 (0.2%)	1 (0.7%)	0 (0%)	1.000
Loss of Appetite (Yes)	2 (0.5%)	2 (1.3%)	0 (0%)	0.999
Shortness of Breath (Yes)	74 (17.6%)	46 (30.5%)	28 (10.4%)	0.123
Vomiting (Yes)	1 (0.2%)	0 (0%)	1 (0.4%)	1.000
SPO_2 (#)	98 (95-98)	96 (94-97)	98 (97-98)	0.010
Hemoglobin (g/dl) (*)	12.51±1.849	12.57±1.889	12.40±1.796	0.856
WBC (10^3/mm^3) (*)	7.61±3.068	7.67±3.235	7.52±2.799	0.314
Lymphocyte (10^3/mm^3) (*)	1.71±0.8	1.61±0.774	1.87±0.83	0.206
Platelet (10^3/mm^3) (*)	248.02±86.92	237±84.87	265.45±88.388	0.129
Blood Sugar (mg%) (#)	123 (101-169)	131 (102-177)	118 (89-148)	0.151
LFT S BILIRUBINT (mg%) (#)	0.8 (0.6-0.9)	0.8 (0.6-0.9)	0.7 (0.6-0.85)	0.523
LFTS BILIRUBIN D (mg%) (#)	0.2 (0.2-0.3)	0.2 (0.2-0.3)	0.2 (0.2-0.3)	0.459

(*) Mean±S.D., (#) Median (Interquartile Range), Association considered significant at $P \leq 0.05$

involving 143 individuals.[17] In another study conducted in United States, they found that 92% had symptoms at the time of the test, and 35% of these still had symptoms at a telephone interview (median, 16 days after the time of the test)—primarily driven by fatigue, cough, headache, and shortness of breath.[18] Lara *et al.* [19] found that symptoms of those subjects were worsened significantly during 5 weeks from the infection. These data are compatible with studies reporting longer term abnormalities in SARS survivors, and initial data emerging from smaller COVID-19 cohorts.[20]

A systematic review and meta-analysis conducted of recovered SARS and MERS patients; fatigue was reported in at least one-third of the patients in two studies with a follow-up period of 18 and 40 months, respectively.[21]

In our study regarding comorbidities, 37 (8.8%) were hypertensive and 36 (8.6%) were diabetic. Our findings have echoed the recently published studies in terms of the commonness of comorbidities in patients with COVID-19.[22-25]

A network-based analysis indicated that SARS-CoV infections led to immune dysregulation that could help explain the escalated risk of cardiac diseases, bone diseases, and malignancy.[26]

It has been well accepted that some comorbidities frequently coexist. For instance, diabetes,[27] and COPD[28] frequently coexist with hypertension or coronary heart diseases.

In a large prospective cohort study from New York including 5279 patients admitted with COVID-19, older age, high BMI, and multi-morbidity were associated with not returning to a usual state of health 14–21 days after detection of SARS-CoV-2.[29]

Table 4: Association of Post-COVID Symptoms with Clinical Characteristics

Variables	Post-COVID Manifestation			Odds Ratio (95%CI)	*P* (Logistic Regression)
	Fatigue				
	Total (*n*=421)	Yes (n_1=75)	No (n_2=346)		
Gender (Male)	281 (66.7%)	46 (61.3%)	235 (67.9)	0.681 (0.387-1.200	0.184
Age (years)	36 (26-55)	52 (41-63)	34 (25-51)	0.966 (0.950-0.982)	0.000
Hypertension	37 (8.8%)	11 (14.7%)	26 (7.5%)	0.888 (0.366-2.153)	0.792
Diabetes	36 (8.6%)	13 (17.3%)	23 (6.6%)	1.177 (0.492-2.812)	0.714
During COVID Symptoms					
Fever	87 (20.7%)	28 (37.3%)	59 (17.1%)	1.791 (0.927-3.460)	0.083
Cough	82 (19.5%)	26 (34.7%)	56 (16.2%)	1.231 (0.608-2.493)	0.564
General Weakness	21 (5%)	11 (14.7%)	10 (2.9%)	4.927 (1.909-12.949)	0.001
Shortness of Breath	74 (17.6%)	25 (33.3%)	49 (14.2%)	1.331 (0.686-2.582)	0.398
	Cough				
	Total (*n*=421)	Yes (n_1=39)	No (n_2=382)		
Gender (Male)	281 (66.7%)	25 (64.1%)	256 (67%)	0.744 (0.351-1.622)	0.457
Age (years)	36 (26-55)	54 (34-62)	35 (26-53)	0.975 (0.955-0.996)	0.021
Hypertension	37 (8.8%)	3 (7.7%)	34 (8.9%)	0.208 (0.051-0.850)	0.029
Diabetes	36 (8.6%)	8 (20.5%)	28 (7.3%)	1.838 (0.621-5.438)	0.271
During COVID Symptoms					
Fever	87 (20.7%)	19 (48.7%)	68 (17.8%)	1.477 (0.635-3.436)	0.365
Cough	82 (19.5%)	25 (64.1%)	57 (14.9%)	10.639 (4.363-25.944)	0.000
General Weakness	21 (5%)	1 (2.6%)	20 (5.2%)	0.165 (0.020-1.390)	0.097
Shortness of Breath	74 (17.6%)	11 (28.2%)	63 (16.5%)	1.889 (0.731-4.884)	0.189
	Intermittent Fever				
	Total (*n*=421)	Yes (n_1=31)	No (n_2=390)		
Gender (Male)	281 (66.7%)	17 (54.8%)	264 (67.7%)	0.595 (0.278-1.273)	0.181
Age (years)	36 (26-55)	38 (28-64)	36 (26-54)	0.996 (0.975-1.018)	0.703
Hypertension	37 (8.8%)	2 (6.5%)	35 (9%)	0.377 (0.073-1.949)	0.245
Diabetes	36 (8.6%)	5 (16.1%)	31 (7.9%)	2.317 (0.674-7.961)	0.182
During COVID Symptoms					
Fever	87 (20.7%)	12 (38.7%)	75 (19.2%)	2.937 (1.169-7.383)	0.022
Cough	82 (19.5%)	7 (22.6%)	75 (19.2%)	1.426 (0.487-4.174)	0.517
General Weakness	21 (5%)	0 (0%)	21 (5.4%)	0	0.998
Shortness of Breath	74 (17.6%)	7 (22.6%)	67 (17.2%)	1.120 (0.404-3.106)	0.828
	Shortness of Breath				
	Total (*n*=421)	Yes (n_1=22)	No (n_2=399)		
Gender (Male)	281 (66.7%)	13 (59.1%)	268 (67.2%)	0.590 (0.230-1.514)	0.273
Age (years)	36 (26-55)	57 (47-64)	35 (26-53)	0.970 (0.943-0.998)	0.036
Hypertension	37 (8.8%)	3 (13.6%)	34 (8.5%)	1.400 (0.334-5.870)	0.645
Diabetes	36 (8.6%)	3 (13.6%)	33 (8.3%)	1.711 (0.409-7.158)	0.462
During COVID Symptoms					
Fever	87 (20.7%)	8 (36.4%)	79 (19.8%)	1.053 (0.367-3.023)	0.924
Cough	82 (19.5%)	10 (45.5%)	72 (18%)	1.985 (0.674-5.845)	0.214
General Weakness	21 (5%)	2 (9.1%)	19 (4.8%)	1.271 (0.52-6.412)	0.771
Shortness of Breath	74 (17.6%)	13 (59.1%)	61 (15.3%)	4.330 (1.546-12.124)	0.005

Association considered significant at $P \leq 0.05$

Suggestions

The authors emphasize repeating the present study in other target groups in other area as well.

Limitations

It includes the lack of information on symptom history before acute COVID-19 illness and the lack of details on symptom severity.

Conclusion

Symptoms of post-COVID syndrome are normally mild, patients with post-COVID syndrome should be take care of their symptoms and recognition of comorbidities. Larger part of comorbidities associated with poor clinical outcomes. Evaluation of comorbidities at the time of hospital admission can assist to demonstrate risk categorization of patients with COVID-19. The recovered subjects should be highly vigilant in maintaining

Table 5: Demographics and Clinical Characteristics of Patients with 1 or ≥2 Post-COVID Manifestations

Variables	1 Post-COVID Manifestation	≥2 Post-COVID Manifestations
	n_1=91 (21.61%)	n_2=60 (14.25%)
Gender (Male)	54 (59.3%)	41 (68.3%)
Age (Years) (#)	48.48±18.82	49.86±17.12
Admitted in ICU (Yes)	32 (35.2%)	32 (53.3%)
Hospital Stay (*)	7.26±3.24	7.41±3.17
BMI (*)	24.55±3.82	25.92±4.67
Smoking Status (Yes)	11 (12.1%)	9 (15%)
Physical Activity (Yes)	30 (33.0%)	25 (41.7%)
During COVID Positive		
Comorbidities (Yes)	23 (25.3%)	16 (26.7%)
Hypertension (Yes)	13 (14.3%)	6 (10%)
Diabetes (Yes)	11 (12.1%)	11 (18.3%)
Ischemic Heart Disease (Yes)	1 (1.1%)	3 (5.0%)
Symptoms (Yes)	53 (58.2%)	46 (76.7%)
Fever (Yes)	28 (30.8%)	26 (43.3%)
Cough (Yes)	23 (25.3%)	29 (48.3%)
Sore Throat (Yes)	3 (3.3%)	2 (3.3%)
Headache (Yes)	2 (2.2%)	3 (5.0%)
Body ache (Yes)	1 (1.1%)	1 (1.7%)
General Weakness (Yes)	12 (13.2%)	7 (11.7%)
Shortness of Breath (Yes)	26 (28.6%)	20 (33.3%)
SPO_2 (#)	95.15±4.17	95.49±1.17
Hemoglobin (g/dl) (*)	12.62±2.02	12.50±1.72
WBC (10^3/mm^3) (*)	7.82±3.11	7.46±3.42
Lymphocyte (10^3/mm^3) (*)	1.63±0.92	1.59±0.51
Platelet (10^3/mm^3) (*)	243.42±80.63	229.48±90.97
Blood Sugar (mg%) (#)	146.93±67.25	161.07±87.34
LFT S BILIRUBINT (mg%) (#)	0.724±0.19	0.90±0.732
LFTS BILIRUBIN D (mg%) (#)	0.24±0.08	0.34±0.47

and monitoring their health status as there is a risk of future complications after recovery.

Acknowledgments

We would like to thank all the people and participants who helped us in this research and authority of Government Medical College, Pali (Rajasthan).

Ethical considerations

Institutional Ethical Clearance (from GMC Pali) obtained and Telephonic consent taken from all participants, With No. GMC/IRB/2021/005.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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