Section: Community Medicine

Original Research Article

THE COVID – 19 SEQUALAE: A CROSS-SECTIONAL EVALUATION OF POST-RECOVERY SYMPTOMS AND THE NEED FOR REHABILITATION OF COVID-19 SURVIVORS

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ABSTRACT

Background: Long-term consequences after SARS-CoV-2 infection are becoming an important burden to societies and healthcare systems. The past pandemics of severe acute respiratory syndrome (SARS) and the Middle East respiratory syndrome (MERS) hint toward a risk of occurrence of "Long-COVID" syndrome, i.e., the persistence of post-discharge symptoms among COVID-19 survivors. Current study aims to assess the prevalence and characteristics of post-COVID-19 manifestations and their effect on the quality of life (QoL) of COVID 19 recovered individuals.

Materials and Methods: Cross-sectional study was conducted among 344 adults from the general population with RTPCR -confirmed SARS-CoV-2 infection between May 2020 to November 2020 in the PHC Sokhda of Vadodara district. We identified anosmia, ageusia, fatigue or shortness of breath as most common, persisting symptoms and summarised presence of such long-term health consequences as post-COVID syndrome through questionnaire-based interviews. We evaluated the proportion of individuals reporting not to have fully recovered since SARS-CoV-2 infection, and the proportion reporting fatigue, dyspnoea or depression at six months after diagnosis.

Results: Majority experienced at least one post-COVID-19 symptom, with fatigue (91.66%) being the most prevalent post-discharge manifestation. We observed a significant correlation of post COVID-19 symptoms with gender, age, and severity of disease.

Conclusion: Our findings emphasize the need for the timely planning of resources and patient-centred services for post-COVID-19 care. Multidisciplinary care along with regular follow-up must be provided to such patients.

Keywords: COVID-19, Long-COVID, Polymerase chain reaction, Prevalence, SARS-CoV-2.

INTRODUCTION

Long-term effects of novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection place a significant burden on society and healthcare systems. As of March 2021, approximately 117 million people had been diagnosed with COVID-19, and more than 2.6 million had died.[1] COVID-19 is caused by the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), a heterogeneous virus with symptoms ranging from asymptomatic to life-threatening disease.[2]

Interstitial pneumonia is a common symptom of SARS-CoV-2 and can be complicated by acute respiratory distress syndrome (ARDS), a disease with a high mortality rate, particularly in elderly

people with multiple comorbidities. Through questionnaire-based interviews, we identified anosmia, ageusia, fatigue, or shortness of breath as the most common, persisting symptoms and summarised the presence of such long-term health consequences as post-COVID syndrome.

COVID-19 symptoms ranges from fever, cough, sore throat, and dyspnoea in mild cases to severe acute respiratory syndrome (SARS) and respiratory failure in critically ill patients who required hospitalization.[3] Many studies have found that the disease can last for weeks or even months after the acute phase, manifesting as a variety of symptoms ranging from fatigue to cardiac and neurological manifestation. In the acute phase, these manifestations exist regardless of disease severity.[4]

Past pandemics of severe acute respiratory syndrome (SARS) and Middle East respiratory syndrome (MERS) suggest a risk of "Long-COVID" syndrome, or the persistence of symptoms for more than three months after the first onset. "Long-term COVID-19" refers to people who have had SARS-CoV-2 infection but do not recover completely within a few weeks (commonly two–three weeks)5.

National Institute for Health and Care Excellence (NICE) guideline proposes the following classification: acute COVID-19 (symptoms for up to four weeks), ongoing symptomatic COVID (symptoms from 4 to 12 weeks), and post COVID (symptoms developed during or after an infection and continuing for more than 12 weeks).[4]

After COVID-19, a large number of patients are being released from the hospital without a systematic evaluation of their state of health, the need for rehabilitation, or additional testing arises to identify complications.[6] Following a SARS -CoV-2 infection, some studies have described psychological complaints, fatigability, fitness restrictions, and decreased quality of life.[7]

Rehabilitation interventions must be based on each patient's specific needs. As a result, following COVID-19 recovery, patients should be assessed for possible or occurring deficiencies to determine the modalities of rehabilitation, and they should be managed by a multidisciplinary team that includes a physical medicine and rehabilitation doctor, psychologist, physiotherapist, occupational therapist, and respiratory therapist, with the use of pharmacological and non-pharmacological interventions8.Current study aims to assess the prevalence and characteristics of post-COVID-19 manifestations and to study the effect of post-COVID-19 manifestations on the quality of life (QoL) of COVID 19 recovered individuals.

MATERIAL AND METHODS

We conducted a cross-sectional study in primary health centre (PHC) Sokhda of Vadodara district. Reverse transcriptase polymerase chain reaction (RT-PCR) confirmed SARS-CoV-2 patient's data were recovered from the register which was maintained by data operator of the PHC. Total 344 Patients were found RTPCR -confirmed SARS-CoV-2 infection in register between June 2020 to November 2020. Participants >18 years of age and population with RTPCR confirmed SARS-CoV-2 infection were included. After excluding incomplete interviews, those who did not give consent for interview, deaths of COVID patient and patients who had a history of psychiatric illness, total 203 responses were included in the study. So, the response rate was 59.01%.

Informed consent was taken from participants after explaining the detailed purpose of study. Data was collected by using pretested (pilot tested), semi-structured questionnaire in local language. We evaluated the proportion of individuals reporting not to have fully recovered since SARS-CoV-2 infection, and the proportion reporting fatigue, dyspnoea or depression and other post covid manifestation at six months after diagnosis of SARS-CoV-2 infection.

Post COVID discharge criteria were based on Indian council of medical research (ICMR) national Guideline policy: asymptomatic patients discharged after 10 days of positive RT-PCR test reports and symptomatic patients within ten days of onset of symptom and no fever for three days with oxygen saturation (SpO2) of 94% at room air with positive RT-PCR test reports. The patient was further recommended a period of home isolation of seven days as per the national guidelines.[7]

Data Collection was done by recovered COVID-19 patients were contacted with the help of the information obtained from the covid data of PHC Sokhda. In month of June only three patients became positive, so these patient's interview was done after six months of SARS-Covid-2 infection. So, the interview was conducted in December. Similarly in July 17 patients, august 48 patients, September 139 patients, October 114 patients and November 23 patients found positive, so interview was taken after six months of infection on January, February, march respectively. Questionnaire-based interviews were conducted. Questionnaire consist of demographic details of patients, their comorbidities, the clinical presentation at the time of diagnosis, severity of disease, post covid manifestations and based on quality-of-life (QOL) e.g., walking difficulty, washing or dressing problem, any effect on daily routine activities, pain or discomfort and anxiety or depression. Only those patients who had a symptom after six months of covid infection for more than three month was considered as post covid manifestation.

Disease severity was classified based on those who managed at home were classified as mild disease, those who required oxygen therapy were classified as moderate disease and those who required Intensive care unit (ICU) admission classified as severe disease.

The data was entered in Microsoft Excel 2019 and analysed using Epi Info. Categorical variables were expressed in percentages. Results were expressed in appropriate graphs and tables.

RESULTS

Total 344 patients were recorded during the study; after excluding the incomplete interviews, 203 responses were included in the study. The response rate was, therefore, 59.01%(Fig.1). Our study shows that the Prevalence of post covid manifestation was 47%. [Table 1]

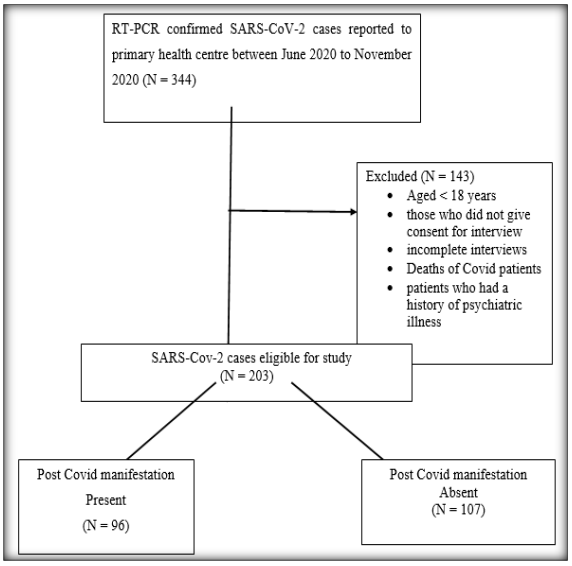

Figure 1: Flow chart for the inclusion of SARS-CoV-2 infected individuals from the primary health centre, Sokhda diagnosed between June 2020 and November 2020

Table 1 shows that Mostly 21-to-60-year age group had the post covid manifestation. Males were more commonly shows post covid manifestation than females. Around 60% male and 40% female had post covid manifestation. Based on severity of disease clinical classification of covid 19 was done into three group mild, moderate, and severe. Out of total 96 cases of post covid manifestation 55.20% patients were managed at home (Mild disease), 36.46% patients were managed with oxygen therapy (Moderate disease) and only 8.33% patients were required (Intensive care unit) ICU admission (Severe disease).

Pre-existing comorbidity were reported in around 60% population. Hypertension was 40.62%. followed by Diabetes mellitus (DM) in 20.83%, hypothyroidism 2.08%, Cardio vascular disease and asthma in 1.04%. (Table 1) Majority were belonged to lower middle-class family and worked as a housewife and done a job.

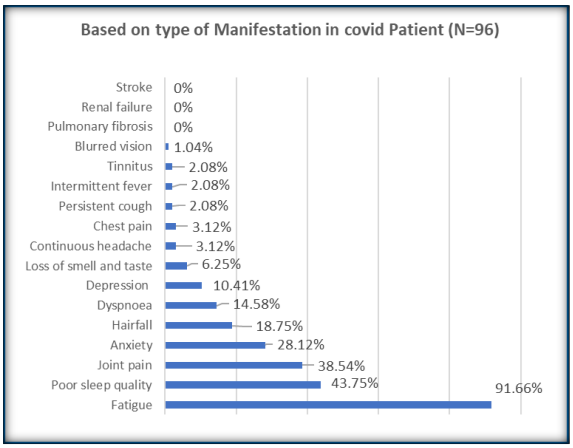

Figure 2: post recovery COVD-19 long-term symptoms in RHTC Sokhda of Vadodara District

Figure 2 shows that fatigue was most common manifestation present in post covid recovered patients (91.66%) followed by poor sleep quality (43.75%), joint pain (38.54%), anxiety (28.12%), hair fall (18.75%), dyspnoea (14.58%), depression (10.41%) and loss of smell and taste (6.25%). Only around 1 to 2% patients manifest blurred vision, chest pain, persistent cough, and intermittent fever.
Table 2 shows that half participants (51.04%) were able to walk without any problem. 43.75% patients complain slight problem, only 5.20% patients complain moderate walking difficulty and no one had a severe walking difficulty (unable to walk). Based on ability of washing and dressing majority (59.37%) were do their activity without any problem, 39.58% had a slight washing and dressing difficulty. No one had a severe washing and dressing difficulty. Approximately 48% patients carried out their usual activity without any problem, around 48% had a slight difficulty. No one had a severe problem. Based on anxiety and depression 42.70% patients become slight anxious and depressed. Based on pain and discomfort, around 53.12% patients feel slight pain and discomfort after recovery. No one had a severe pain or discomfort. [Table 2]

Table 1: Sociodemographic and clinical characteristics of the Post covid manifestation in study sample (N = 96)

Characteristics	Frequency (%)
Post Covid manifestation	
Present	96 (47.29%)
Absent	107 (52.70%)
Age	
1-20 Years	3(3.12%)
21-40 Years	36(37.5%)
41-60 Years	46(47.91%)
61-80 Years	10(10.41%)
81-100 Years	1(1.04%)

Gender	
Male	58 (60.41%)
Female	38 (39.58%)
Education	
Primary	15 (15.62%)
Secondary	29 (30.20%)
Higher secondary	38 (39.58%)
Graduate	14 (14.58%)
Post graduate	0 (0%)
Occupation	
Housewife	34 (35.41%)
Job	36 (37.5%)
Student	1 (1.04%)
Business	8 (8.33%)
Unemployed or retired	17 (17.70%)
Socio economic class	
Upper	0
Upper middle	4 (4.16%)
Middle	25 (26.04%)
Lower middle	51 (53.12%)
Lower	16 (16.66%)
Do you smoke?	
Yes	8 (8.33%)
No	88 (91.66%)
Co morbidities	
HTN	39 (40.62%)
DM	20 (20.83%)
Hypothyroidism	2 (2.08%)
Cardiovascular Disease	1 (1.04%)
Asthma	1 (1.04%)
None	40 (41.66%)
Severity of disease	
Mild (manage at home by remedies)	53 (55.20%)
Moderate (oxygen therapy used only)	35 (36.46%)
Severe (ICU)	8 (8.34%)

Table 2: Characteristics of post-COVID-19 manifestations and quality of life of participants (N = 96)

Quality of Life	Frequency (%)
1) After recovery, were you able to walk about?	
Yes, without any problems	49 (51.04%)
Yes, with slight problems	42(43.75%)
Yes, with moderate problems	5(5.20%)
Yes, with severe problems	0(0%)
No, I was unable to walk	0(0%)
2) After recovery, were you able to wash or dress yourself?	
Yes, without any problem	57(59.37%)
Yes, with slight problems	38 (39.58%)
Yes, with moderate problems	1(1.04%)
Yes, with severe problems	0(0%)
No, I was unable to wash or dress myself	0(0%)
3) After recovery, were you able to carry out your usual activities?	
Yes, without any problem	46 (47.91%)
Yes, with slight problems	46 (47.91%)
Yes, with moderate problems	4(4.16%)
Yes, with severe problems	0(0%)
No, I was unable to carry out my usual activities	0(0%)
4) After recovery, did you feel pain or discomfort?	
No pain or discomfort	42 (43.75%)
Slight pain or discomfort	51 (53.12%)
Moderate pain or discomfort	3(3.12%)
Severe pain or discomfort	0(0%)
Extreme pain or discomfort	0(0%)
5) After recovery, were you anxious or depressed?	
Not anxious or depressed	51(53.12%)
Slightly anxious or depressed	41(42.70%)
Moderately anxious or depressed	4(4.16%)
Severely anxious or depressed	0(0%)
Extremely anxious or depressed	0(0%)

DISCUSSION

Our study shows that the Prevalence of post covid manifestation was 47%. Similar type of studies carried out in Germany, USA, Italy, and China reported prevalence of 28%, 35%, 51%, and 76%, respectively, to highlight the geographic heterogeneity seen in post-COVID-19 condition prevalence estimates.[9,10] Chen et al. (2021) conducted a meta-analysis of 29 studies published in peer-reviewed journals (preprint article), reporting a 43% (95% CI 35-63%) prevalence of post COVID condition.[11]

In our study it was seen that Males were more commonly affected than females. Our results were not consistent with the Study conducted by Montenegro et al.(2022) in Barcelona, space shows that males and females were equally affected but in rural India where males commonly go out for work and female were do their household work could be a reason for males being more commonly affected than females3. Alkundi et al (2020) conducted a retrospective study in patients with diabetes in the United Kingdome found that majority of admitted patients were men (61.2%), this agrees with emerging studies showing that men with COVID-19 are at higher risk for developing severe outcomes including death than women.[12]

Post covid manifestation was commonly seen in 40-to-60-year age group. Similar findings were found in a study by Khodeir MM et al. (2021) which found that more than 80% of participants were between the ages of 20 and 50 and in good health prior to contracting COVID-19. This finding suggests that weakness and fatigue are important post-recovery symptoms of COVID-19.[13]

In our study mostly middle and lower middle-class people were affected with post covid manifestation than upper class. Our results were not consistent with the study done by Iqbal et al. (2021) which shows that upper class was most commonly affected with post covid manifestation and stigma associated with it than middle and lower class.[14]

In our study Fatigue, poor sleep quality, anxiety, joint pain, dyspnoea and loss of taste and smell were most common post covid manifestations. Follow up study conducted in Italy and United Kingdom by Halpin et al.(2021), a cross- sectional evaluation in survivors of COVID -19 infection and shows that fatigue was most common post covid manifestation in 72% participants of the ICU group and 60.3% participants in the ward group which is also relevant with our study.[15]

Poor sleep quality and dyspnoea were another most common manifestations present in our study. Similarly, as reported by Vitti-Ruela BV et al.(2021) conducted a study effects on sleep and general health condition in post-SARS-CoV-2 patients and it was shows that the prolonged effects of impaired respiratory regulation, due to neurological injury, can result in a worsening of the quality of sleep in patients recovering from COVID-19, since there is a close relationship between breathing disorders and sleep.[16] Dyspnoea could be due to respiratory compromise leading to abnormalities in diffusion lung capacity of carbon monoxide, forced vital capacity, and total lung capacity.[17]

In our study association between the severity of COVID-19 and post covid manifestations was also present. Our findings are consistent with the study done by Kamal et al (2020) - assessment and characterisation of post-COVID-19 manifestations in Egyptian subjects shows that severe COVID-19 had more severe post-recovery manifestations than those with milder disease.[18]

In our study Comorbidities were present in 60% post covid manifestation patients. hypertension to be the most prevalent comorbidity (40.62%). Other comorbidities included diabetes (20.83%), hypothyroidism (2.08%), and cardiovascular disease (1.04%), and our findings were consistent with trends in other countries in terms of high prevalence.[12,19]

Alkundi et al (2020) conducted a retrospective study in patients with diabetes in the United Kingdome found that older patients and individuals with pre-existing medical conditions such as diabetes found to be more vulnerable to severe outcomes. It also shows that COVID-19 patients with diabetes had a longer length of stay than patients without diabetes.[12] This is due to the people with weakened immune systems are more vulnerable to COVID-19. Comorbidities such as hypertension and diabetes significantly reduce immunity, allowing the virus to enter lung cells via the angiotensin-converting enzyme 2 receptor.[20]

Around 20% Post covid recovered patients experienced hair fall as a post covid manifestation. Similar finding was seen in Iqbal et al. (2021), telogen effluvium, a transient form of hair loss brought on by stress, a high fever, or an infection, is the cause of this. The majority of patients report this condition after they have recovered because there is a two- to three-month delay between the stressful event and the onset of telogen effluvium.[14]

In our study half of the patients were done their usual activity without any difficulty and around 45% had only slight or moderate problem for that or poor quality of life. Our results were not consistent with the study done by Iqbal et al. (2021) shows that nearly third quarter patients (around 77%) were had a severe problem in doing their routine activity.[14]

In another study done by Malik et al. (2021) showed that 41.5% had pain/discomfort, 37.5% had anxiety/depression, followed by 36% problems with mobility, 28% problems with usual activities, and only 8% having self- care problems. These results signify that the majority of COVID- 19 patients' post- recovery have a poor quality of life posing challenges to patients, healthcare providers, and public health practitioners.[21]

CONCLUSION

Prevalence of post covid manifestation was 47% and it was more common in males than females. Nearly half of the covid survivors experienced some post covid manifestations. Most common COVID-19 manifestation experienced was fatigue followed by poor sleep quality, Joint pain, and anxiety. Age, gender, severity of disease, SES, presence of comorbidity and occupation were all significantly associated with post covid manifestations. According to our study majority covid patients did not have a problem in carried out their usual activities, difficulty in washing or dressing oneself, difficulty in walking, pain, discomfort, anxiety, and depression.

Limitation

The study limitation is that responses are subjective based on the replies to the questionnaire and thereby depend on the interpretation of the responder and are not supported by any objective assessment of symptoms. We include only those patients who were tested positive for SARS-CoV-2. It was carried out in a single centre. so, limiting the generalisability of our findings. Majority were belonged to middle and lower middle class and sample size was small. So, more proper study would be carried out in future with bigger sample size. We carried out a questionnaire-based interview on telephone, due to this there may have been a recall bias in answering some questions in the survey. Those patients were required a prolonged ICU stay might be under noticed in this study.

Recommendation

Our findings emphasize the need for the timely planning of resources and patient-centred services for post-COVID-19 care. Anxiety and depression can be alleviated with counselling, yoga, and breathing exercises. Multidisciplinary rehabilitation teams, healthcare workers, and the public should recognise the importance of systematic evaluation of their recovery and further rehabilitation. Similar follow-up studies should be carried out in the future to investigate the long-term effects of COVID-19 and devise strategies for dealing with the aftermath.

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