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Impact of Long COVID-19 on Patients and Their Families

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ABSTRACT

Objective: To determine the clinical effects of COVID-19 on patients and families after diagnosis at regular intervals of 30 days and 90 days respectively.

Study Design: Prospective longitudinal Study.

Place and Duration of Study: Combined Military Hospital, Hyderabad Pakistan, from Mar 2020 to Feb 2021.

Methodology: Two hundred patients and their families who were symptomatic and RT-PCR positive for COVID-19 with mild and moderate disease were included in the study. The patients listed in our COVID-19 registry were called on Day 30 and Day 90 after the appearance of the first symptoms and were assessed on various parameters.

Results: In our study, 200 patients were included and assessed on days 30 and 90. On day 90, the median number of symptoms per person was almost 3, reduced from a median of 7 on day 30. However, at the time of presentation, the median number of symptoms per person was 12. The patients had persistent symptoms that hindered their routine lives and reduced their working capacity.

Conclusion: The persistence of clinical symptoms post-COVID-19 requires assessment and longitudinal monitoring. Persistence of symptoms reflects a worse clinical progression and delay in attaining 100% fitness.

Keywords: Acute post COVID-19 syndrome, COVID-19, long COVID-19.

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INTRODUCTION

The novel coronavirus (COVID-19) causes an infectious disease affecting the lungs primarily, leading to acute respiratory disease. However, a multi-organ involvement has been reported, which leads to irreversible damage and death.[1,2] The presentation of the disease is very variable, with completely asymptomatic patients on one side of the spectrum and multi-organ failure on the other side.[3] Those lying in between the spectrum may present with varied symptoms and signs. Multiple symptoms, like fever, cough, fatigue, dyspnoea, headache, diarrhoea, nausea and vomiting, have been reported.[4,5] Various scientific reports suggest that residual effects of SARS-CoV-2 infection, such as fatigue, dyspnea, chest pain, cognitive disturbances, and arthralgia, are observed over time, leading to a decline in quality of life.[6,7] The disease may end up with resolution or persistence, of symptoms. Scientific and clinical evidence is emerging on the subacute and long-term effects of COVID-19.[8] This accumulation of symptoms has been labelled as post-COVID-19 syndrome, which may be acute or chronic.[9]

This study was planned to assess the frequency and clinical correlation of persistent symptoms post-COVID-19 in our study population and their dependents. Our study emphasizes whether or not multiple relevant symptoms appear in our fit population. The study intends to investigate and assess the full range of functional limitations to capture the heterogeneity of post-COVID-19 outcomes. Based on this study, we intend to determine the frequency of acute post-COVID-19 syndrome in our population and an ongoing transformation process to chronic post-COVID-19. This shall give an insight into the subject and a chance to prevent and give recommendations for preventing mortality and morbidity.

METHODOLOGY

The prospective longitudinal study was carried out at Combined Military Hospital, Hyderabad Pakistan, from March 2020 to February 2021 after obtaining approval from the Institutional Ethical Review Board (Trg/EC/1).

Inclusion Criteria: Patients and their families who were symptomatic and RT-PCR positive for COVID-19

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with mild and moderate disease were included in the study

Exclusion Criteria: Newly diagnosed cases of PCR-positive, symptomatic patients with negative PCR and PCR-positive neonates and children under 16 years were excluded from the study.

Consecutively treated patients of mild COVID-19 disease were recruited after the informed consent. Mild COVID-19 included patients having any of the various signs and symptoms of COVID-19 (e.g., fever, cough, sore throat, malaise, headache, muscle pain, nausea, vomiting, diarrhoea, loss of taste and smell) but who do not have shortness of breath, dyspnea, or abnormal chest imaging. Moderate COVID-19 included patients showing evidence of lower respiratory disease during clinical assessment or imaging and with oxygen saturation (SpO2) ≥94% on room air at sea level.

All chosen patients had a detailed history taken, physical examination and basic diagnostic tests done. The treated patients were called in person on Day 30 and 90 post-diagnosis, respectively, and a predesigned questionnaire about the evaluation of symptoms and health-related quality of life was filled in from the information provided. A detailed general physical examination and psychosocial analysis were done. The basic tests for inflammatory marker determination were not done. The primary endpoint of the study was to describe 30 and 90-day post-discharge clinical, functional and mental health outcomes and the persistence of clinically significant symptoms in patients with COVID-19.

Data was analyzed by using SPSS 26.00. Frequency and percentage were calculated for qualitative variables, and Mean±SD was calculated for normal data. For non-normal data, the Kruskal-Wallis test and Mann-Whitney test were used. The *p*-value of ≤0.05 was considered significant.

RESULTS

In our study, 200 patients were included and assessed on days 30 and 90. Our targeted population of patients and their families included 100(50%) females and 100(50%) males. The mean age of presentation was 38.3±8.0 years (ranging from 18-69 years). In our study population, the patients suffering from mild and moderate COVID-19 were included; 11% of them remained hospitalized initially but had no significant lung injury on HRCT and did not require high-flow oxygenation or intensive unit stay. We observed that Patients reported a median number of 12(11–15) symptoms at the time of presentation, and 97% of the respondents had >5 symptoms initially. Breathlessness and fatigue/ weakness were the top symptoms presented initially at the time of diagnosis.

The median of symptoms free in patients was at 0 days 79(131–35), 30 Days 53(102–25), and after 90 days, it was 12(32–2). A statistically significant diffe-rence was found between patient symptoms and time, as shown in Table-I. There was also a significant difference at 30 days vs. 90 Days, p <0.01 shown in Table-II.

Table-I: Comparison of Symptoms free and time (Zero-day, 30 days and 90 Days) (n=200)

Time	0 Day	30-Days	90-Days	*p*-value
	Median (IQR)			
Symptoms free	79(131–35)	53(102–25)	12(32–2)	<0.01

Table-II: Inter-Group comparison of Symptoms free and Time (n=200)

Group Comparison	0 day Vs. 30 Days	30 day Vs. 90 Days	0 day Vs. 90 Days
p-value	0.175	0.01	0.175

Following a mean period of 30±1 day (the time between the onset of the first symptoms and completing the questionnaire), the patients were assessed. They showed improvement in symptoms, which reduced to a median of 7(6-9). Weight loss, fatigue/ weakness, breathlessness on walking/ running, and exercise intolerance were the top symptoms.

In our study population, 82(41% out of the total population, with females 48 and males (34%) had persistent symptoms even after 30 days (acute post-COVID-19 syndrome), and 6(3%) out of the total population, with females 4(8%) and males 2(4%) showed persistent symptoms beyond 90 days (chronic post-COVID-19 syndrome). It was seen that only 4% of the patients were completely symptom-free 30 days after the infection, and 1% of the population reportedly had an increase in severity and number of symptoms compared to the number of symptoms previously. Percentages of the population having a particular symptom at Diagnosis, 30 and 90 days after infection are shown in the Figure.

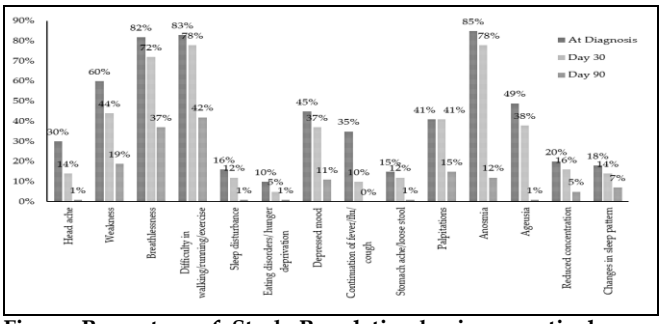

Figure: Percentage of Study Population having a particular symptom at Diagnosis, 30 & 90 days after Infection (n=200)

DISCUSSION

The seemingly healthy population with access to better healthcare facilities after COVID-19 would recover fast and early, with very few suffering from persistent symptoms.[10,11] Our study the median number of symptoms in most participants at the time of presentation was twelve. However, on day 30, the median symptoms presented were recorded to be 7. It reduced to a median number of three persistent symptoms on day 90, which was still high.

One study reported fatigue and breathlessness as being the most frequent symptoms about 60 days after the onset of COVID-19-related symptoms in previously hospitalized patients with COVID-19.[12] These findings are in line with findings in other post-viral/infectious syndromes,[13-15] and are in parallel with our findings as well.

A study carried out on COVID-19 patients included both hospitalized and non-hospitalized patients.[16] Their median age was 47 years, which was higher compared to our mean age of 38 years. However, the initial health status of their study population was parallel to ours in terms of fitness. However, in our population, the recovery was better than that of the counterparts in this study and other parts of the world.[17] Another study reported the median number of symptoms being four, even three months after the onset of symptoms in hospitalized & nonhospitalized patients. However, in our study population, the median number of symptoms dropped to 3 at the same duration.[18]

In our study, females were found to be more symptomatic when compared with males. The median number of presenting symptoms was higher in females, 14 compared to 10 in males at the time of presentation. The same trend was observed on day 30 and day 90. The common co-morbidities observed at the time of presentation were being overweight or obese (20%), type 2 diabetes (27.9%) and gastrointestinal disease (15.4%). This may complicate the perception of presenting symptoms as the one reporting symptoms may become biased with previous complaints.[19]

This study principally aims to create awareness among healthcare professionals and the general public about the fact that there are most probably thousands of patients with so-called "mild" COVID-19-19 who do not all recover fully in months following the onset of symptoms. They are the patients who are not well and have persistent symptoms. This is an important first step as patients with "mild" COVID-19 get little guidance. The individuals who are having symptoms and are not guided properly are usually ignored in comparison to hospitalized patients.[20]

This disease has new variants coming up with variable infectivity, transmissibility, and virulence; nothing can be said with surety about the course of the disease. Time will decide upon the exact size of the group of patients with persistent symptoms and how their disease unfolds. Considering this novel virus, nothing could be said for sure. Therefore, with this study, we aim to see the current trend of persistent symptoms in our population.

This provides a clear rationale for additional assessment of the underlying physical, emotional, cognitive and social factors by a multidisciplinary team.[21] This is required for a better understanding of the persistence of these symptoms and their impact on the general well-being of a patient. This gives us an insight into the disease and its better management. With a better insight into the disease and identification of pharmacological and non-pharmacological treatment, better control of the disease can be obtained.

CONCLUSIONS

Initial assessment and longitudinal monitoring of the persistence of symptoms are advisable in patients with the SARS-CoV-2 infection, whereby persistence or worsening of symptoms may reflect a worse clinical progression. Weakness for approximately 30-60 days requiring reduced/light duty and increased protein intake to compensate for weakness. Major scientific research advancements with extensive multi-centre studies having a high number of study populations with equal gender representation and more comprehensive disease management are expected shortly.

Conflict of Interest: None.

Author's Contribution:

Following authors have made substantial contributions to the manuscript as under:

SF & IK: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

AK & AL: Data acquisition, data analysis, drafting the manuscript, critical review, approval of the final version to be published.

GHI & SZ & MAF: Concept, data acquisition, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

REFERENCES

1. Zaim S, Chong JH, Sankaranarayanan V, Harky A. COVID-19 and multiorgan response. Curr Probl Cardiol 2020; 45(8): 100618. https://doi.org/10.1016%2Fj.cpcardiol.2020.100618

2. Bikdeli B, Madhavan MV, Jimenez D, Chuich T, Dreyfus I, Driggin E, et al. COVID-19 and thrombotic or thromboembolic disease: implications for prevention, antithrombotic therapy, and follow-up. J Am Coll Cardiol 2020; 75(23): 2950-2973. https://doi.org/10.1016/j.jacc.2020.04.031.
3. Varga Z, Flammer AJ, Steiger P, Haberecker M, Andermatt R, Zinkernagel AS, et al. Endothelial cell infection and endotheliitis in COVID-19. Lancet 2020; 395(10234): 1417-1418. https://doi.org/10.1016/s0140-6736(20)30937-5
4. Tenforde MW, Kim SS, Lindsell CJ, Rose EB, Shapiro NI, Files DC, et al. Symptom duration and risk factors for delayed return to usual health among outpatients with COVID-19 in a multistate health care systems network—United States, March–June 2020. Morb Mortal Wkly Rep 2020; 69(30): 993. https://doi.org/10.15585%2Fmmwr.mm6930e1
5. Li R, Pei S, Chen B, Song Y, Zhang T, Yang W, et al. Substantial undocumented infection facilitates the rapid dissemination of novel coronavirus (SARS-CoV-2). Science 2020; 368(6490): 489-493. https://doi.org/10.1126/science.abb3221
6. Li LQ, Huang T, Wang YQ, Wang ZP, Liang Y, Huang TB, et al. COVID-19 patients' clinical characteristics, discharge rate, and fatality rate of meta-analysis. J Med Virol 2020; 92(6): 577-583. https://doi.org/10.1002/jmv.25757
7. Guan WJ, Ni ZY, Hu Y, Liang WH. Clinical characteristics of coronavirus disease 2019 in China. N Engl J Med 2020; 382(18): 1708-1720. https://doi.org/10.1056/nejmoa 2002032
8. Dong E, Du H, Gardner L. An interactive web-based dashboard to track COVID-19 in real time. Lancet Infect Dis 2020; 20(5): 533-534. https://doi.org/10.1016/S1473-3099(20)30120-1
9. Carfì A, Bernabei R, Landi F. Persistent symptoms in patients after acute COVID-19. JAMA2020;324(6):603-605. https://doi.org/10.1001/jama.2020.12603
10. Nalbandian A, Sehgal K, Gupta A, Madhavan MV, McGroder C, Stevens JS, et al . Post-acute COVID-19 syndrome. Nat Med 2021; 27(4): 601-615. https://doi.org/10.1038/s41591-021-01283-z
11. McElvaney OJ, McEvoy NL, McElvaney OF, Carroll TP, Murphy MP, Dunlea DM, et al. Characterization of the inflammatory response to severe COVID-19 illness.Am. J. Respir. Crit. Care Med 2020; 202(6): 812-821. https://doi.org/10.1164/rccm.202005-1583oc65454654
12. Stringhini S, Wisniak A, Piumatti G, Azman AS, Lauer SA, Baysson H, et al. Seroprevalence of anti-SARS-CoV-2 IgG antibodies in Geneva, Switzerland (SEROCoV-POP): a population-based study. Lancet. 2020; 396(10247): 313-319. https://doi.org/10.1016/s0140-6736(20)31304-0
13. Centers for Disease Control and Prevention. Interim guidance for implementing home care of people not requiring hospitalization for coronavirus disease 2019. (COVID-19). [Internet] available at: https://www.cdc.gov/coronavirus/2019-ncov/hcp/guidance-home-care.html [Accessed on November 27, 2020].
14. Gandhi RT, Lynch JB, Del Rio C. Mild or moderate COVID-19. N Eng J Med 2020; 383(18): 1757-1766. https://doi.org/10.1056/nejmcp2009249
15. Fan BE. Hematologic parameters in patients with COVID-19 infection: a reply. Am J Hematol 2020; 95(6): E131-E134. https://doi.org/10.1002/ajh.25774
16. Gupta A, Madhavan MV, Sehgal K, Nair N, Mahajan S. Extrapulmonary manifestations of COVID-19. Nat Med 2020; 26(7): 1017-1032. https://doi.org/10.1038/s41591-020-0968-3
17. Greenhalgh T, Knight M, Buxton M, Husain L. Management of post-acute COVID-19 in primary care. BMJ 2020; 370: m3026. https://doi.org/10.1136/bmj.m3026
18. Lechien JR, Chiesa-Estomba CM, Place S, Van Laethem Y, Cabaraux P, Mat Q, et al. Clinical and epidemiological characteristics of 1420 European patients with mild-to-moderate coronavirus disease 2019.J Intern Med 2020; 288(3): 335-344. https://doi.org/10.1111/joim.13089
19. Goërtz YM, Van Herck M, Delbressine JM, Vaes AW, Meys R, Machado FV, et al. Persistent symptoms 3 months after a SARS-CoV-2 infection: the post-COVID-19 syndrome?.ERJ Open Res 2020; 6(4): 10-14. https://doi.org/10.1183/23120541.00542-2020
20. Lam MH, Wing YK, Yu MW, Leung CM, Ma RC, Kong AP, et al . Mental morbidities and chronic fatigue in severe acute respiratory syndrome survivors: long-term follow-up. Arch Intern Med 2009; 169(22): 2142-2147. https://doi.org/10.1001/archinternmed.2009.384
21. Moldofsky H, Patcai J. Chronic widespread musculoskeletal pain, fatigue, depression and disordered sleep in chronic post-SARS syndrome; a case-controlled study. BMC Neurol 2011; 11(1): 1-7. https://doi.org/10.1186/1471-2377-11-37