A STUDY OF MUSCULOSKELETAL MANIFESTATIONS AMONG POST COVID PATIENTS AT A TERTIARY CARE CENTRE.

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ABSTRACT
Introduction - Besides other multisystemic symptoms, musculoskeletal symptoms are quite common in patients with COVID-19. Post covid, there has been a rapid rise in diffuse complaints of myalgia and joint pain. This study was designed to calculate the prevalence of musculoskeletal symptoms in post-COVID 19 cases.

Material & Methods - This was a cross-sectional single-centre study at Pt. B. D. Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana. Patients aged more than 18 years who were diagnosed with COVID 19 without any previous history of musculoskeletal manifestations and a minimum of 21 days of negative RT-PCR report were included in the study. Results - 249 patients with a history of Covid 19 participated in the study and presented with musculoskeletal manifestations. Lower back pain (37.3%) was the most common symptom in patients with post-covid musculoskeletal symptoms, followed by shortness of breath (34.1%), arthralgia (33.7%), myalgia (31.4%), upper back pain (26.5%) and only a few patients with post- covid reactive arthritis (1.2%). In addition, fatigue was reported by almost all the study subjects.

Conclusion - Generalised fatigue, diffuse muscle and joint pain are frequently seen in post-COVID patients, which amount to a huge patient load presenting to Orthopaedic clinics.

KEYWORDS Covid19, Myalgia, Musculoskeletal, Arthralgia

Introduction
In December 2019, the first case of novel coronavirus disease 2019 (COVID-19) was reported in China1. As a result, the World Health Organization classified coronavirus disease 2019 (covid-19) as a worldwide pandemic on March 11, 2020. Even though the bulk of people diagnosed with SARS-CoV-2 remain asymptomatic or have minor symptoms, few people develop serious symptoms which can negatively impact their standard of living for the rest of their lives2,3.

While COVID-19 is predominantly a respiratory illness, several researchers have described manifestations of COVID-19 to other systems like musculoskeletal. For example, musculoskeletal symptoms such as diffuse muscle ache, back pain, and joint pain are frequent clinical presentations of COVID-194.

According to the Global Burden of Diseases data, a study published in 2017, musculoskeletal disorders, specifically low back pain, were reported as the leading cause of disability worldwide5.

Muscle pain following a viral infection is commonly seen as a result of the inflammatory cascade6. Viral joint pain is another finding was commonly seen after HIV, alphavirus, hepatitis B, and parvovirus B19 infection. However, it is a rare symptom of COVID-19. Considering immune dysfunction and activation of the complement system in various viral infections, this might contribute to immune complex accumulation inside joints or transient synovitis7,8. In addition, systemic inflammation has been shown to function in bone and joint disease in earlier investigations9. All these factors can lead to musculoskeletal...
disorders in patients with a history of COVID-19 infestation.

Very few studies have assessed the musculoskeletal symptoms in post-COVID 19 cases. Therefore, the current study aimed to calculate the prevalence of musculoskeletal symptoms in post-COVID 19 patients. The research findings will help frame preventive and therapeutic measures to minimize the suffering and improve the prognosis among patients with post-COVID 19 infections.

Materials & Methods

This cross-sectional study was carried out at Pt. B. D. Sharma Post Graduate Institute of Medical Sciences, Rohtak, Haryana, from 3 months from November 2020 to January 2021.

The study was conducted among the patients diagnosed previously and recovered from COVID 19 (minimum 21 days before data collection) after obtaining written informed consent and explaining the study’s objectives. Data collection was done using a pre-structured pre-validated questionnaire which included demographic details of the patient, history of COVID 19 infection and musculoskeletal manifestations post-COVID 19 infections.

Consent was obtained from the patient after briefing them about the study objectives and procedure and before the start of the data collection.

Sample population and size

Assuming a prevalence rate of and maximum allowable error of 5% sample size thus calculated using the formula:

\[ N = (1.96)^2 pq / L^2 \]

\[ P = \text{total patient suffering from post covid musculoskeletal symptoms (92\%)} \]

\[ Q = 100 - p (82\%) \]

\[ L = \text{Allowable error (0.05, taken 5\%)} \]

The minimum sample size from the above calculation came out to be 246.

Inclusion criterion

Patients aged more than 18 years who were diagnosed with COVID 19 without any previous history of musculoskeletal manifestations.

Patients with a minimum of 21 days of negative RT-PCR report. Patients who gave consent to study.

Exclusion criteria

Psychiatric patients who were unable to cooperate with the study.

Mentally challenged patients who were unable to provide consent for the study.

Patients have a history of any musculoskeletal manifestations before covid.

A convenient sampling of patients was done. Study subjects were selected from the waiting area of the Medicine outpatient department, where patients selected were not having musculoskeletal ailments at the time of administering study questionnaires. History of COVID 19 infection was confirmed, and data collection was done after ensuring inclusion and exclusion criteria.

Data was collected by a one-to-one technique using the study tool. Collected data were entered in a Microsoft Excel sheet and analyzed using Statistical Package for Social Sciences (SPSS) Statistics for Windows, version 24 (IBM Corp., Armonk, N.Y., USA), and relevant significance tests were applied.

The study was commenced after ethical clearance from the institutional Biomedical Research Ethics Committee (BREC), Pt. B. D. Sharma PGIMS, UHS, Rohtak

Results

A total of 249 patients were involved in the study. The mean age of the patients was 35.7 ± 4.6 years. Out of the total, 159 (64\%) were males, while the rest 90 (36\%) were females.

Figure 1 shows the musculoskeletal manifestations among the study subjects. The responses in the figure were not mutually exclusive as each subject could choose more than one manifestation.

As evident in figure 1, lower back pain (37.3\%) was the most common reported symptom by the patients, followed by arthralgia (33.7\%), myalgia (31.4\%) and upper back pain (26.5\%), and only a few patients with post-covid reactive arthritis (1.2\%).

Though fatigue is not truly a musculoskeletal manifestation, it was a commonly reported complaint by study subjects (93.4\%).

Patients with widespread myalgia (57, 72.2\%) accounted for the majority, while only 22 (27.8\%) patients developed local myalgia.

Only 84 (33.7 percent) of the total 249 patients developed arthralgia, with 60 (71.4 percent) suffering from widespread arthralgia and 24 (28.6 percent) suffering from local arthralgia.

Only 18 of the 249 patients (7.2\%) had paresthesia or numbness, whereas 231 patients (92.7\%) reported no such symptom.

On a scale of 1 to 10, with 1 being mild and 10 being severe, most patients rated their symptoms as 5, with an average scale of 4.7 (± 0.2). Only a few individuals, change in weather, stress at night, and postural shift reported worsening symptoms after activity. Some patients (2.4\%) also claimed that their symptoms worsened spontaneously for no apparent cause. Rest (60.1\%), medicine (28.9\%), physiotherapy (9.4\%), and massage (2.4\%) were the most common relieving factors reported by the study subjects.

Between infection with COVID-19 and the onset of musculoskeletal symptoms varied from few days to 4 months, with an average of 30.30 (± 6.5) days. Musculoskeletal symptoms lasted from 2 days to 8 months, with an average of 22.92 (± 4.2) days.
Widespread Myalgia (72.2%) and Arthralgia (71.4%)

<table>
<thead>
<tr>
<th>Myalgia</th>
<th>Widespread Myalgia (72.2%)</th>
<th>Myalgia (27.8%)</th>
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<tbody>
<tr>
<td>Arthralgia</td>
<td>Widespread arthralgia (71.4%)</td>
<td>Arthralgia (28.6%)</td>
</tr>
</tbody>
</table>

Only 43.37 percent of patients with these musculoskeletal symptoms took drugs, usually recommended by their covid treating physicians (55.6%). Some patients self-administered the drug (33.3%), while others provided it by an orthopaedic doctor (11.1%).

Out of the total, 54 (21.7%) had comorbidity, such as asthma (22.2%), diabetes (22.2%), heart disease (angina) (11.1%), and hypothyroidism (44.4%), with durations ranging from 1.5 to 10 years and an average of 5.5 (± 1.3) years.

### Discussion

Nearly two-fifths of individuals in the research said they had one or more musculoskeletal problems. Fatigue was the most prevalent musculoskeletal symptom (nearly every patient), followed by lower back pain (two out of five), arthralgia (three out of ten), myalgia (three out of ten), upper back pain (one out of five) and post-covid reactive arthritis; the most common other COVID-19 symptom was shortness of breath (three out of ten).

Carfi et al. studied 143 patients who had been discharged for an average of 36 days. They found that 87% of people had one or more continuing symptoms, with tiredness, dyspnea, and arthralgia being the most common. Garrigues et al. conducted a telephone poll of one hundred twenty patients, including ward and ICU patients. They found that fatigue and dyspnea were the most common chronic symptoms within ward patients. Halpin et al. examined post-discharge symptoms in a hundred people in another telephone poll which included ward and ICU patients. In the ward group, tiredness was the most frequent complaint, followed by breathlessness. Nearly 3/4th of patients had one or even more symptoms, with a little more than 1/2 reporting any musculoskeletal problem at one month. Difficulty breathing was the most frequent complaint of other covid-19 patients reporting any musculoskeletal problem at one month. Difficulty breathing was the most frequent complaint of other covid-19 patients reporting any musculoskeletal problem at one month. Difficulty breathing was the most frequent complaint of other covid-19 patients reporting any musculoskeletal problem at one month.

Respiratory complaints were less prevalent than musculoskeletal complaints, with breathlessness being the most common respiratory symptom. Other investigations have shown that breathlessness was observed in 1/4 of post-acute COVID-19 patients. Musculoskeletal problems are quite prevalent in infections due to viruses, with the frequency being 30%. Although fewer cases of arthralgia are noted in COVID-19 than myalgia, it has been reported in various covid infections. The data on the persistence of musculoskeletal and rheumatic complaints following COVID-19 treatment is limited. Nearly 3/4 of patients with one or more symptoms, with a little more than 1/2 reporting any musculoskeletal problem at one month. Difficulty breathing was the most frequent complaint of other covid-19 symptoms (1/4th of patients), following the absence of taste, absence of smell, cough, decreased appetite, headache, diarrhea, sore throat, dizziness, and fever after one month.

Systemic immune reactions involving inflammation, immediate viral cytotoxicity, clot formation, and vascular damage are likely pathophysiologic explanations of musculoskeletal complaints in COVID19. Higher dimer levels and lower lymphocytes in individuals whose musculoskeletal problems increased by COVID19 corroborate this pathophysiologic pathways. The decrease in lymphocytes is due to lymphocyte utilization in inflammatory areas during the battle with COVID19. This decrease has also been linked to negative results.

### Table 1 Showing prevalence of Myalgia (n = 79) and Arthralgia (n = 84)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Myalgia (%)</th>
<th>Arthralgia (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myalgia</td>
<td>72.2</td>
<td>27.8</td>
</tr>
<tr>
<td>Arthralgia</td>
<td>71.4</td>
<td>28.6</td>
</tr>
</tbody>
</table>
biggest flaw was that it lacked a control group of infected patients for reasons other than COVID-19. A control group could provide a more accurate assessment of the current findings. Furthermore, recall bias for the research may arise in certain circumstances.

**Conclusion**

The study concludes that as very few studies have been conducted to assess the prevalence of musculoskeletal symptoms in post-COVID19 patients in a populated country like India, the findings of this current study will prove to be vital for preventive as well as therapeutic purposes to reduce the suffering and improve the outcome following the COVID 19 infection among the patients. While generalised fatigue was reported by all the patients participating in the study, lower back pain was the most common musculoskeletal manifestation reported, followed by arthralgia (three out of ten), myalgia (three out of ten), upper back pain (one out of five) and post-covid reactive arthritis; the most common other COVID-19 symptom was shortness of breath (three out of ten). Presently with the threat of an upcoming new mutation of Covid, this study helps us gather the magnitude of Post COVID manifestations we will face in the future. It is recommended to conduct further research in other parts of the country with newer variants of COVID 19 patients.

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**Conflict of interest**

There are no conflicts of interest to declare by any of the authors of this study.

**References**


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**Table 2** Studies reported musculoskeletal manifestations in Post covid patients

<table>
<thead>
<tr>
<th>Study (Year)</th>
<th>Sample size</th>
<th>Musculoskeletal manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carfi et al. (2020)</td>
<td>143</td>
<td>Tiredness, Dyspnea, and Arthralgia</td>
</tr>
<tr>
<td>Garrigues et al (2020)</td>
<td>120</td>
<td>Fatigue and Dyspnea</td>
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<td>Halpin et al. (2021)</td>
<td>100</td>
<td>Tiredness</td>
</tr>
<tr>
<td>Arnold et al. (2020)</td>
<td>110</td>
<td>Tiredness, Shortness of breath</td>
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<tr>
<td>Current study</td>
<td>249</td>
<td>Fatigue, Myalgia, Arthralgia</td>
</tr>
</tbody>
</table>

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