ORIGINAL ARTICLE

Musculoskeletal Manifestations in COVID-19 Patients at Paramilitary Hospital: A Cross-sectional Study

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Abstract

Introduction: Musculoskeletal symptoms are frequently reported in patients with COVID-19; however, evidence from low-resource settings remains limited. This study aimed to assess the spectrum and severity of musculoskeletal manifestations in RT-PCR–confirmed COVID-19 patients in Nepal and examine their association with disease severity.

Methods: A hospital-based cross-sectional study was conducted at Nepal Armed Police Force Hospital, Kathmandu, from April 15 to July 15, 2022. After ethical approval from Nepal Health Research Council (Reference number: NHRC-3644). All adult patients (≥18 years) with confirmed COVID-19 were enrolled. Individuals with pre-existing chronic pain disorders, pregnancy, or altered sensorium were excluded. New-onset musculoskeletal symptoms myalgia, arthralgia, low back pain, fatigue, and paresthesia were recorded and graded using the Visual Analogue Scale for pain and the Numerical Rating Scale for fatigue. Demographic and clinical data, including comorbidities and COVID-19 severity, were collected. Associations were analyzed using ANOVA and chi-square tests ($p < 0.05$).

Results: Among 250 patients, there were 119(47.60%) male; mean age 49.80±18.1 years, most had mild 150(60%) or moderate 71(28.40%) COVID-19, while 29(11.60%) had severe illness. Myalgia 175(70%), arthralgia 158(63.20%), and fatigue 153(61.20%) were the most prevalent musculoskeletal symptoms. Low back pain was reported in 110(44%) and paresthesia in 11 (4.40%). Mean symptom severity scores increased significantly with disease severity ($p < 0.001$ for all). All of the moderate and severe cases had myalgia, arthralgia, and fatigue.

Conclusions: Musculoskeletal manifestations are common in COVID-19 and increase significantly with disease severity. These findings highlight the need for symptom monitoring in moderate and severe cases.

Keywords: *arthralgia; COVID-19; fatigue; musculoskeletal system; myalgia.*

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Introduction

Coronavirus disease 2019 (COVID-19), caused by SARS-CoV-2, emerged in late 2019 and has since spread globally.[1] While initially considered a respiratory illness, it is now recognized to affect multiple systems, including the musculoskeletal (MSK) system. Common musculoskeletal symptoms include fatigue, myalgia, and arthralgia.[2] Studies show variable prevalence of these symptoms, with myalgia affecting up to 86% and fatigue up to 76.60% in some hospitalized cohorts.[3] Additionally, post-COVID-19 syndromes often involve persistent musculoskeletal symptoms. Neurological and muscular complications, such as Guillain-Barre syndrome, critical illness myopathy, and steroid-induced myopathy, have also been reported.[4] Despite these findings, musculoskeletal symptoms in COVID-19 patients particularly in low-resource settings such as Nepal remain under-researched, with limited data available.

Methods

A Hospital-based cross-sectional study was conducted at Nepal Armed Police Force Hospital, Kathmandu, a designated COVID-19 referral center, from April 15 to July 15, 2022. Ethical approval was obtained from the Nepal Health Research Council (Reference number: NHRC-3644).

All adult patients (≥18 years) with RT-PCR confirmed COVID-19 were included and those who were pregnant, had pre-existing chronic pain conditions (such as fibromyalgia, rheumatoid arthritis, osteoarthritis, or diabetic neuropathy), or had altered sensorium were excluded. A total of 250 eligible patients were included in the study.

Data were collected from the hospital records. Recorded variables included demographic details , vaccination status, comorbidities, RT-PCR cycle threshold (Ct) values, and COVID-19 severity, which was classified as mild, moderate, or severe according to National Institute of Health (NIH) guidelines.[5]

New onset of MSK symptoms including myalgia, arthralgia, low back pain, fatigue, and paresthesia were documented only if they developed during the course of COVID-19 and had been absent in the preceding month. Symptom severity was assessed using a 10-point Visual Analogue Scale (VAS) for pain-related symptoms (myalgia, arthralgia) and an 11-point Numeric Rating Scale (NRS) for fatigue.

Data were entered in Microsoft Excel and analyzed using Statistical Package for the Social Sciences version 20. Continuous variables were summarized as mean±standard deviation Categorical variables were expressed as frequencies and percentages and analyzed using the chi-square test. A $p < 0.05$ was considered statistically significant. Confidentiality was maintained through the use of anonymized study identifiers.

Results

The study included 250 patients comprising male 119 (47.60%) and female 131 (52.40%). The mean age was 49.81±18.08 years, ranging from 18 to 79 years with the highest frequency (20%) falling into 40-49 years age distribution. Regarding COVID-19 severity, most patients (60%) had mild disease, 42% had low Ct values (<20), indicating high viral loads. A large proportion (82.40%) were vaccinated. Hypertension was the most prevalent comorbidity (30%), followed by diabetes mellitus (27.20%), hypothyroidism (9.20%), and COPD (8.80%).

Table 1: Baseline characteristics of study participants (n = 250).

Variable	Category	Frequency (n)	Percentage (%)
Age Group	18–29	47	18.80
	30–39	35	14
	40–49	50	20
	50–59	35	14
	60–69	41	16.40
	≥70	42	16.80
Sex	Male	119	47.60
	Female	131	52.40
CT Value Category	High (>30)	47	18.80
	Moderate (20–30)	98	39.20
	Low (<20)	105	42
Vaccination Status	Not Vaccinated	44	17.60
	Vaccinated	206	82.40

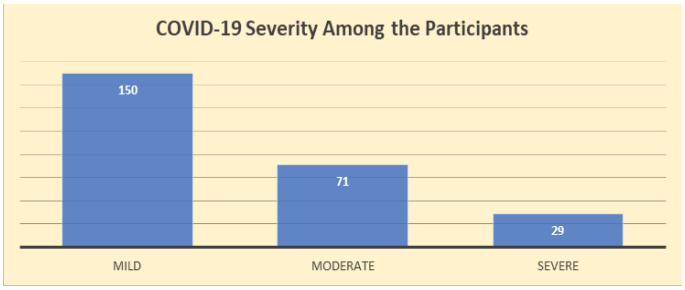

Figure 1: Bar chart showing the distribution of COVID-19 severity among study participants

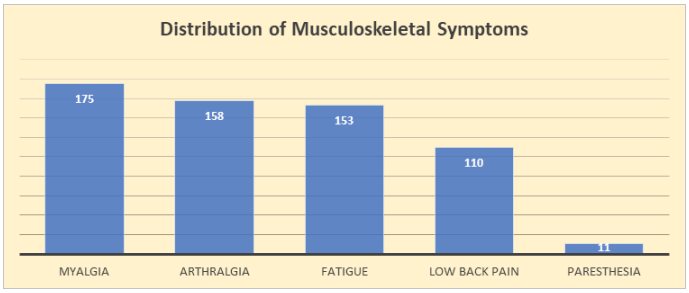

Figure 2: Clustered Bar Chart Showing the Distribution of Musculoskeletal Symptoms Among COVID-19 Patients.

Table 2 presents the severity of musculoskeletal symptoms. A clear and progressive increase in symptom severity is observed as the severity of COVID-19 increases. The mean myalgia score rose from 1.57 ± 1.16 in mild cases to 5.38 ± 1.11 in moderate cases, and further to 8.31 ± 1.23 in severe cases. Similarly, the mean arthralgia score increased from 1.61 ± 1.09 in mild COVID-19 to 5.54 ± 1.11 in moderate cases and 8.76 ± 1.15 in severe cases. The mean fatigue score followed a comparable pattern, with values of 1.38 ± 1.10, 5.54 ± 1.13, and 8.52 ± 1.15 in mild, moderate, and severe groups respectively.

Table 2: Mean severity scores of musculoskeletal symptoms by COVID-19 severity (VAS for myalgia and arthralgia, NRS for fatigue).

Symptom	COVID-19 Severity	Mean ± SD
Myalgia (VAS)	Mild	1.57 ± 1.16
	Moderate	5.38 ± 1.11
	Severe	8.31 ± 1.23
Arthralgia (VAS)	Mild	1.61 ± 1.09
	Moderate	5.54 ± 1.11
	Severe	8.76 ± 1.15
Fatigue (NRS)	Mild	1.38 ± 1.10
	Moderate	5.54 ± 1.13
	Severe	8.52 ± 1.15

In our study, there was a significant association between COVID-19 severity and the presence of musculoskeletal symptoms (Table 3). Patients with moderate or severe COVID-19 had a markedly higher prevalence of myalgia, fatigue, and arthralgia compared to those with mild disease ($p < 0.001$ for all).

Table 3: Association between COVID-19 severity and presence of musculoskeletal symptoms (n = 250).

COVID-19 Severity	Myalgia Present n(%)	Fatigue Present n(%)	Arthralgia Present n(%)
Mild (n = 150)	75(50)	53(35.30)	58(38.70)
Moderate (n = 71)	71(100)	71(100)	71(100)
Severe (n = 29)	29(100)	29(100)	29(100)
Total (n = 250)	175(70)	153(61.20)	158(63.20)

Chi-square (χ^2) value:
Myalgia: $\chi^2 = 71.429$, df = 2
Fatigue: $\chi^2 = 105.664$, df = 2
Arthralgia: $\chi^2 = 97.046$, df = 2

p-value: All comparisons: $p<0.001$

Discussion

Our cross-sectional study at Nepal Armed Police Force Hospital found a high prevalence of acute MSK symptoms in COVID-19 patients: myalgia in 70%, arthralgia in 63.2%, and fatigue in 61.2%. Symptom severity also rose with COVID-19 severity in that group. Some international studies mirror the high frequency of these symptoms, whereas others report lower rates. A European multi-center study of mild COVID-19 cases reported myalgia in 59% and arthralgia in 31% of patients, comparable to our findings for myalgia (70%).[6] By contrast, global meta-analysis has shown more modest figures, myalgia 19% and fatigue 32% of COVID-19 patients at presentation.[7] Our finding appear elevated relative to global averages, which may reflect its specific patient population or data collection methods (active symptom screening). Notably, all these figures refer to acute COVID-19 symptoms, not the prolonged issues of long COVID.

Other studies in Nepal have reported substantially lower MSK symptoms during acute COVID-19, highlighting a contrast with our study. A descriptive study by Risal et al.[8] found arthralgia in only 11.4% of hospitalized COVID-19 patients, a rate in line with prior international reports of 10–15%.[9] Similarly, a Western Nepal study observed myalgia in 39% of patients with fever, far below our finding.[10] These

differences suggest that our patients' experienced unusually high symptoms. It may be due to the referral of severe patients in our center. Additionally, differences in demographics or timing of study conducted at different stages of the pandemic, amid a different variant circulation could have influenced symptom profiles.

Studies from India and other countries generally report moderate levels of acute COVID-19 MSK symptoms, lower than our findings, a cross-sectional study in South India noted generalized myalgia in only 14% and arthralgia in 24% of patients.[11] Cohort studies in China have similarly found relatively lower prevalence: Guan et al.[12] reported fatigue in 38% and myalgia/arthralgia in just 15% of 1,099 patients, and Liang et al.[13] observed fatigue in 43% with 17% experiencing myalgia/arthralgia in a sample of 1,590. Even in Western contexts, rates have been moderate, a New York City study noted myalgia in 23.8% of hospitalized cases.[14] Thus, across India and much of the world, acute COVID-19 musculoskeletal manifestations like myalgia and arthralgia are common but typically affect a smaller fraction of patients.[11] Our study's much higher proportions therefore stand out. One possible explanation is One possible explanation is that APF being the COVID dedicated hospital and the main referral center with its limited number of bed and resources could enroll only those with moderate to severe disease and thus could have more musculoskeletal symptoms. Nonetheless, when comparing across geographies, the overall pattern holds that fatigue is among the most common acute COVID symptoms globally often the most common, followed by myalgia, while true joint pain is reported less frequently than generalized muscle aches.[15]

Our study found positive association between COVID-19 severity and MSK symptom severity suggesting patients with severe illness experienced more intense myalgia/arthralgia and fatigue. This trend aligns with the idea that a stronger systemic inflammatory response in severe COVID can manifest as worse muscle and joint pain. However, findings on this severity link have been mixed globally. Some early analyses suggested no significant association between myalgia presence and disease severity, Lippi et al. (2020) reviewed data from nine studies and concluded that myalgia was not statistically linked to severe COVID-19 outcomes.[16] Likewise, an observational study in Nepal noted an inverse pattern, where fewer ICU patients reported myalgia (38%) compared to non-ICU patients (62%),[10] possibly because critically ill patients cannot communicate aches or because life-threatening symptoms overshadow minor complaints. In contrast, other authors have posited that inflammatory pain should increase with severe infection, which is consistent with our observations and biological plausibility (cytokine surges causing diffuse pain).[17,18] It's important to recognize that in acute COVID, patients with mild cases might actually notice muscle/joint pains more (since they are not debilitated by respiratory failure), whereas severe cases might be sedated or focused on breathing issues. Thus, geographic and clinical context matters: our study setting (attentive symptom monitoring even in severe cases) revealed a severity–symptom gradient, while broader datasets show a more complex or flat relationship. In summary, acute COVID-19-related MSK symptom prevalence and severity patterns can vary widely from Nepal to India to elsewhere influenced by patient population, illness severity, and reporting methods. Our study's high myalgia/arthralgia rates and severity linkage show the need to consider contextual differences when comparing symptomatology across studies, while consistently reinforcing that even in the acute phase (separate from "long COVID"), musculoskeletal symptoms are a significant component of COVID-19's clinical presentation worldwide.

Being a single-center cross-sectional study the findings may not be generalizable to the broader population or other healthcare settings.

Conclusions

This study highlights a high proportion of musculoskeletal symptoms particularly myalgia, arthralgia, and fatigue among COVID-19 patients in a tertiary care setting in Nepal, with symptom severity significantly increasing with disease severity. These findings emphasize the need for routine assessment and management of musculoskeletal symptoms, especially in moderate to severe COVID-19 cases, to improve patient comfort and overall care during the acute phase of the illness.

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Conflict of Interest

The authors declare no competing interest.
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