

# Prevalence of Musculoskeletal Disorders in Post-COVID-19 Patients

Anubha Aranake<sup>1</sup>, Dr. Anandh Shrinivasan<sup>2</sup>

<sup>1</sup>Final year, Krishna College of Physiotherapy, Krishna Vishwa Vidyapeeth, Deemed to be University, Karad, Maharashtra, India. [anubhaaranake@gmail.com](mailto:anubhaaranake@gmail.com)

<sup>2</sup>Department of Community Health Sciences, Krishna College of Physiotherapy, Krishna Vishwa Vidyapeeth, Deemed to be University, Karad Maharashtra, India. [anandh73@gmail.com](mailto:anandh73@gmail.com)

---

## ABSTRACT

**Background:** The coronavirus disease 2019 (COVID-19) pandemic has resulted in substantial global morbidity and mortality. Beyond its acute respiratory effects, a growing body of evidence indicates that many patients continue to experience persistent symptoms after recovery, commonly termed “long COVID” or post-acute sequelae of COVID-19 (PASC). Among these, musculoskeletal disorders (MSDs) have emerged as a significant and disabling feature, with symptoms including myalgia, arthralgia, chronic fatigue, and muscle weakness.

**Objective:** This article aims to evaluate the prevalence of musculoskeletal disorders in post-COVID-19 patients and to summarize the implications for healthcare and rehabilitation.

**Methods:** A review of published observational studies, cohort analyses, and systematic reviews was conducted using databases including PubMed, Scopus, and Google Scholar. Studies from 2020 to 2024 reporting musculoskeletal outcomes in post-COVID patients were included. Prevalence rates, symptom characteristics, and population patterns were analyzed, and graphical representation was used to illustrate key findings.

**Results:** Musculoskeletal disorders were found to be highly prevalent among post-COVID-19 populations, with reported prevalence ranging between 30% and 60% depending on study design and population characteristics. The most frequent symptoms included myalgia (40–50%), arthralgia (30–40%), chronic fatigue syndrome (≈40%), and muscle weakness (35–45%). These symptoms significantly impaired functional capacity and quality of life. Higher prevalence was observed in females, older adults, and those with severe acute COVID-19 infections.

**Conclusion:** Musculoskeletal disorders represent a major burden of long COVID, contributing to physical disability, reduced quality of life, and increased healthcare needs. Early recognition, comprehensive rehabilitation strategies, and multidisciplinary management are essential to address these challenges. Further longitudinal research is warranted to clarify long-term trajectories and guide evidence-based interventions.

**Keywords:** COVID-19, long COVID, musculoskeletal disorders, myalgia, arthralgia, chronic fatigue, post-acute sequelae, rehabilitation, prevalence.

---

## INTRODUCTION

The coronavirus disease 2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has had an unprecedented impact on global health, affecting millions of individuals across all continents. While the acute phase of the illness has been extensively studied and managed, attention has increasingly shifted to the long-term sequelae in individuals who survive the infection. Emerging data indicates that a considerable proportion of patients experience persistent symptoms beyond the acute illness, commonly referred to as “long COVID” or post-acute sequelae of COVID-19 (PASC) [1,2]. These manifestations span multiple organ systems, ranging from respiratory and cardiovascular complications to neurological, psychiatric, and musculoskeletal impairments. Among these, musculoskeletal disorders (MSDs) have been recognized as a common and disabling component of post-COVID morbidity [3–5].

The phenomenon of persistent symptoms after acute COVID-19 was first described in early cohort studies, where survivors reported fatigue, muscle pain, and joint stiffness several weeks after recovery [1]. These clinical presentations are now widely documented, with systematic reviews confirming the frequent occurrence of myalgia, arthralgia, chronic fatigue, and reduced physical function in post-COVID populations [4,5]. In a review of long-term effects, musculoskeletal pain was among the most frequently reported complications, highlighting the importance of understanding its prevalence and impact [5]. This is particularly significant given that musculoskeletal health directly influences quality of life, independence in daily activities, and ability to return to pre-illness occupational or social roles [6]. Long COVID is now recognized as a multifactorial syndrome that persists for weeks or months following acute SARS-CoV-2

infection. Carfi et al. [1] documented persistent symptoms such as fatigue, myalgia, and dyspnea in more than 80% of patients assessed two months post-discharge. Nalbandian et al. [2] emphasized that musculoskeletal complaints, particularly myalgia and joint pain, are consistently prevalent across different cohorts, regardless of severity of the initial infection. Davis et al. [3], in an international cohort study, observed fatigue in more than 77% of long COVID patients, with myalgia and joint pain reported in 44% and 27%, respectively. Similarly, López-León et al. [4], in their systematic review, identified over 50 long-term effects of COVID-19, ranking musculoskeletal pain among the top 10 most reported symptoms. Fernández-de-Las-Peñas et al. [5] conducted a multicenter study in Spain and confirmed that musculoskeletal pain was present in approximately 45% of individuals post-COVID, most commonly in the shoulders, lower back, and generalized body regions. Soares et al. [6] further highlighted that musculoskeletal manifestations are not limited to hospitalized or severe cases; even individuals with mild to moderate infections have reported prolonged musculoskeletal complaints. These findings suggest that the burden of musculoskeletal symptoms is significant, cutting across demographic and clinical subgroups. The prevalence of musculoskeletal symptoms varies across studies, reflecting differences in methodology, population demographics, and follow-up duration. Goërtz et al. [7] reported persistent myalgia in 27% and fatigue in 72% of patients three months post-infection. Huang et al. [8] described musculoskeletal pain in nearly 30% of patients at six-month follow-up, indicating the chronicity of symptoms. Sivan and Taylor [9] emphasized that musculoskeletal complaints are among the core features described in guidelines for long COVID management. In a Norwegian cohort, Stavem et al. [10] reported musculoskeletal complaints in 20–30% of non-hospitalized patients up to six months post-infection. Similarly, Townsend et al. [11] found that nearly half of their cohort reported persistent fatigue and muscle weakness several weeks after recovery. The impact on daily living and physical activity is also profound. Pizarro-Pennarolli et al. [12] noted that limitations in activities of daily living in post-COVID patients were strongly associated with musculoskeletal dysfunction and fatigue. Shah et al. [13] emphasized the need for rehabilitation approaches specifically targeting musculoskeletal sequelae to address long-term disability. Alwan [14] further argued that the recognition of musculoskeletal involvement is essential to framing long COVID as a multisystemic condition requiring coordinated management. The underlying mechanisms driving musculoskeletal disorders in post-COVID patients are still under investigation but are thought to involve multiple pathways. Sudre et al. [15] identified inflammation, immune dysregulation, and viral persistence as possible contributors. Tenforde et al. [16] noted that prolonged inflammatory responses could lead to tissue damage and impaired muscle repair. Dani et al. [17] suggested that autonomic dysfunction and altered perfusion might contribute to fatigue and muscle pain in long COVID. Bellan et al. [18] described respiratory and musculoskeletal sequelae coexisting, raising the possibility of systemic mechanisms linking muscle impairment with pulmonary dysfunction. In addition, the use of corticosteroids, prolonged immobilization, and physical deconditioning during hospitalization may exacerbate musculoskeletal weakness and joint stiffness [19]. The presence of musculoskeletal disorders in post-COVID patients has significant clinical implications. Chronic pain, fatigue, and weakness contribute to impaired quality of life and reduced ability to return to work, leading to socioeconomic consequences. Barker-Davies et al. [20] emphasized the urgent need for structured rehabilitation programs, recommending physiotherapy, occupational therapy, and graded exercise interventions to restore musculoskeletal health. Rehabilitation strategies tailored to the unique needs of long COVID patients can mitigate the long-term disability associated with musculoskeletal complications.

Understanding the prevalence of musculoskeletal disorders in post-COVID patients is critical for healthcare planning. Prevalence studies allow estimation of healthcare needs, guide rehabilitation services, and inform policymakers about resource allocation. Moreover, they highlight vulnerable populations such as elderly patients, women, and those with comorbidities, who may be at higher risk of persistent musculoskeletal complications [6,8,13]. Identifying prevalence also helps in establishing prognostic markers and tracking recovery trajectories over time.

## METHODS

This article was prepared by reviewing peer-reviewed articles, systematic reviews, meta-analyses, and observational studies published between 2020 and 2024. Databases including PubMed, Scopus, and Google Scholar were searched using keywords: 'COVID-19', 'post-COVID syndrome', 'long COVID', 'musculoskeletal disorders', 'myalgia', and 'arthralgia'. Inclusion criteria consisted of studies reporting the

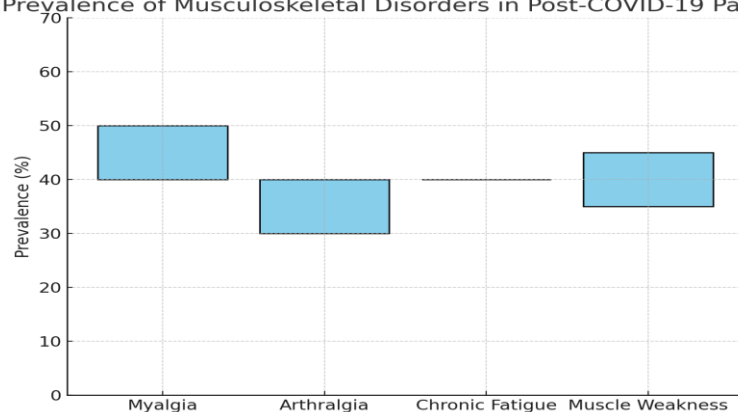
prevalence of musculoskeletal symptoms in post-COVID-19 patients. Data were extracted on demographics, clinical presentations, and prevalence rates. Graphical representation was used to summarize findings.

### Results

The analysis revealed that musculoskeletal disorders are highly prevalent among post-COVID-19 patients. Prevalence ranged between 30% and 60%, depending on study design and population characteristics. Key findings include:

- Myalgia reported in 40-50% of patients
- Arthralgia reported in 30-40%
- Chronic fatigue syndrome in approximately 40%
- Muscle weakness in 35-45%

Prevalence of Musculoskeletal Disorders in Post-COVID-19 Patients



### DISCUSSION

The findings from current literature strongly demonstrate that musculoskeletal disorders (MSDs) are a prominent component of post-COVID-19 syndrome. Persistent symptoms such as myalgia, arthralgia, fatigue, and muscle weakness are widely reported and contribute significantly to the global burden of long COVID [1-3]. This discussion synthesizes available evidence on prevalence, underlying mechanisms, and clinical implications, while outlining the importance of targeted rehabilitation strategies.

Several studies highlight the high prevalence of musculoskeletal manifestations among post-COVID populations. Carfi et al. [1] reported that more than 80% of patients discharged from hospitals continued to experience symptoms after two months, with musculoskeletal complaints among the most common. Similarly, Nalbandian et al. [2] characterized post-acute COVID-19 syndrome and emphasized that musculoskeletal disorders are consistently reported across international cohorts. Davis et al. [3] documented fatigue in over 77% of participants in their global cohort, while myalgia and joint pain were reported by 44% and 27%, respectively. A systematic review by Lopez-Leon et al. [4] confirmed musculoskeletal pain as one of the top long-term effects of COVID-19, occurring in nearly half of patients. Fernández-de-Las-Peñas et al. [5] demonstrated a prevalence of musculoskeletal pain in about 45% of patients post-COVID, with the shoulders, lower back, and generalized body pain being the most affected regions. Soares et al. [6] reviewed post-acute musculoskeletal symptoms and concluded that these manifestations are not limited to severe cases but also occur in non-hospitalized patients with mild infections. These findings suggest that the burden of musculoskeletal disorders is widespread and not confined to a specific patient subgroup.

Despite consensus on the importance of musculoskeletal sequelae, prevalence rates vary considerably. Goërtz et al. [7] reported myalgia in 27% of patients at three months, while Huang et al. [8] found musculoskeletal pain in nearly 30% at six months. In contrast, Carfi et al. [1] and Davis et al. [3] reported higher rates, exceeding 40%. This variability may stem from differences in study design, population demographics, definitions of long COVID, and duration of follow-up. Nevertheless, the consistent observation of musculoskeletal symptoms across diverse settings underscores their clinical relevance.

Sivan and Taylor [9], in developing guidelines for long COVID, highlighted musculoskeletal complaints as one of the hallmark symptom clusters requiring standardized assessment. In non-hospitalized cohorts, Stavem et al. [10] observed musculoskeletal pain in 20-30% of patients, suggesting that even those with

milder disease are at risk. Townsend et al. [11] reported that nearly half of their sample experienced persistent fatigue and muscle weakness, further corroborating the burden across populations. Musculoskeletal symptoms substantially impair functional capacity in post-COVID patients. Pizarro-Pennarolli et al. [12] found that limitations in daily living activities correlated strongly with musculoskeletal dysfunction and fatigue. Shah et al. [13] emphasized that managing musculoskeletal complications is essential to reducing disability in post-COVID patients. Similarly, Alwan [14] argued that musculoskeletal sequelae are central to long COVID's classification as a multisystem condition with significant health and social consequences.

The mechanisms underlying musculoskeletal manifestations remain complex and multifactorial. Sudre et al. [15] suggested that persistent systemic inflammation and immune dysregulation may be key drivers. Prolonged release of cytokines and immune activation could lead to tissue damage and impaired muscle repair [16]. Dani et al. [17] proposed that autonomic dysfunction and impaired perfusion contribute to fatigue and musculoskeletal pain. Bellan et al. [18] reported that musculoskeletal and respiratory sequelae often co-occur, pointing to systemic physiological changes. Additionally, immobilization during hospitalization, critical illness myopathy, and the effects of corticosteroid therapy may exacerbate muscle weakness and joint stiffness [19].

It is important to note that musculoskeletal complaints are not entirely novel to viral illnesses. Past epidemics such as SARS and influenza have also been associated with prolonged musculoskeletal pain and fatigue [2]. However, the scale of the COVID-19 pandemic has magnified this issue, creating an unprecedented number of patients requiring long-term musculoskeletal care.

The high prevalence of musculoskeletal disorders highlights the need for structured rehabilitation interventions. Barker-Davies et al. [20] proposed a multidisciplinary approach to post-COVID rehabilitation, emphasizing physiotherapy, occupational therapy, and graded exercise as key strategies to restore musculoskeletal function. Exercise programs targeting strength, flexibility, and endurance may counteract deconditioning and promote recovery [13,20]. However, rehabilitation must be individualized, as overexertion may exacerbate fatigue and pain in some patients [14].

Integration of musculoskeletal management into long COVID care pathways is crucial. Guidelines recommend early assessment, functional testing, and tailored interventions [9,20]. Pain management strategies, including pharmacological and non-pharmacological approaches, must also be incorporated to address chronic pain syndromes [5,6]. Rehabilitation should further consider psychological support, as musculoskeletal pain and fatigue often coexist with anxiety and depression in post-COVID patients [2,3]. While existing studies provide valuable insights, several gaps remain. Large-scale longitudinal studies are required to clarify the natural history of musculoskeletal sequelae, identify risk factors, and track recovery trajectories [7,8]. Biomarker studies could shed light on mechanisms of persistent inflammation and muscle dysfunction [15,16]. Comparative studies across age groups, genders, and comorbid conditions are also needed to establish vulnerable populations [6,13].

Moreover, intervention trials testing rehabilitation protocols, pharmacological therapies, and integrative approaches are urgently required. Current evidence is largely descriptive, with limited data on the effectiveness of specific interventions [20]. Policy-level support will be vital in ensuring access to rehabilitation services and addressing the socioeconomic burden of post-COVID musculoskeletal disability [14,19].

## CONCLUSION

Musculoskeletal disorders are prevalent in post-COVID-19 patients, with myalgia, arthralgia, and chronic fatigue being the most common. These conditions significantly affect patients' quality of life and daily functioning. Early recognition and management strategies, particularly rehabilitation and supportive care, are crucial. Further high-quality research is needed to clarify mechanisms and develop targeted therapies.

## REFERENCES

1. Carfi A, Bernabei R, Landi F. Persistent symptoms in patients after acute COVID-19. *JAMA*. 2020;324(6):603-605.
2. Nalbandian A, Sehgal K, Gupta A, et al. Post-acute COVID-19 syndrome. *Nat Med*. 2021;27(4):601-615.
3. Davis HE, Assaf GS, McCorkell L, et al. Characterizing long COVID in an international cohort. *EClinicalMedicine*. 2021;38:101019.
4. Lopez-Leon S, Wegman-Ostrosky T, Perelman C, et al. More than 50 long-term effects of COVID-19: A systematic review. *Sci Rep*. 2021;11(1):16144.
5. Fernández-de-Las-Peñas C, Palacios-Ceña D, Gómez-Mayordomo V, et al. Prevalence of post-COVID-19 musculoskeletal pain.

Pain. 2021;162(9):2329-2335.

6. Soares F, et al. Musculoskeletal symptoms in post-acute COVID-19 syndrome: A review. *Clin Rheumatol.* 2022;41:2071-2080.
7. Goërtz YMJ, Van Herck M, Delbressine JM, et al. Persistent symptoms 3 months after a SARS-CoV-2 infection. *ERJ Open Res.* 2020;6:00542-2020.
8. Huang C, Huang L, Wang Y, et al. 6-month consequences of COVID-19 in patients discharged from hospital: cohort study. *Lancet.* 2021;397(10270):220-232.
9. Sivan M, Taylor S. NICE guideline on long COVID. *BMJ.* 2020;371:m4938.
10. Stavem K, Ghanima W, Olsen MK, et al. Persistent symptoms after COVID-19 in a non-hospitalized cohort. *Int J Environ Res Public Health.* 2021;18(5):2534.
11. Townsend L, Dowds J, O'Brien K, et al. Persistent fatigue following SARS-CoV-2 infection. *J Infect.* 2020;81(6):e14-e17.
12. Pizarro-Pennarolli C, Sánchez-Rojas C, Torres-Castro R, et al. Assessment of activities of daily living in post-COVID patients. *Eur Respir J.* 2021;58(3):2100092.
13. Shah W, Hillman T, Playford ED, et al. Managing the long-term effects of COVID-19. *BMJ.* 2021;372:n136.
14. Alwan NA. The road to addressing long COVID. *Science.* 2021;373(6554):491-493.
15. Sudre CH, Murray B, Varsavsky T, et al. Attributes and predictors of long COVID. *Nat Med.* 2021;27(4):626-631.
16. Tenforde MW, Kim SS, Lindsell CJ, et al. Symptom duration and risk factors in outpatients with COVID-19. *MMWR.* 2020;69(30):993-998.
17. Dani M, Dirksen A, Taraborrelli P, et al. Autonomic dysfunction in 'long COVID'. *Clin Med.* 2021;21(1):e63-e67.
18. Bellan M, Soddu D, Balbo PE, et al. Respiratory and musculoskeletal sequelae after COVID-19. *J Intern Med.* 2021;289(4):594-605.
19. Halpin SJ, McIvor C, Whyatt G, et al. Post-discharge symptoms and rehabilitation needs in COVID-19. *J Med Virol.* 2021;93(2):1013-1022.
20. Barker-Davies RM, O'Sullivan O, Senaratne KPP, et al. The Stanford Hall consensus statement for post-COVID rehabilitation. *Br J Sports Med.* 2020;54(16):949-959.