
POST COVID PAIN: A COMPREHENSIVE REVIEW OF CURRENT UNDERSTANDING

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Received: 3rd Feb.2025

Revised: 22nd Feb.25

Accepted: 24th Feb.25

ABSTRACT

Background: The COVID-19 pandemic, caused by SARS-CoV-2, has led to widespread health concerns. While primarily affecting the respiratory system, research suggests it impacts multiple bodily systems, leading to long-term complications, including persistent post-COVID pain. This condition is linked to inflammatory processes, extended hospitalization, and neurological involvement (Kemp et al., 2020).

Objective: This review explores factors contributing to post-COVID pain and highlights strategies for early intervention to prevent chronic pain development in affected individuals.

Methods: A systematic review was conducted in September 2021 utilizing databases such as PubMed and Google Scholar. The search employed Medical Subject Headings (MeSH) terms and Boolean operators to filter systematic reviews, observational studies, and randomized controlled trials (RCTs). Case reports, expert opinions, and editorial pieces were excluded. Among 124 identified studies, eight met the inclusion criteria (Iqbal et al., 2021).

Results: Findings indicate that post-COVID pain results from various factors, including inflammation, prolonged ICU stays, immobility, and pre-existing conditions. Common symptoms include myalgia, arthralgia, and neuropathic pain. Extended ICU admissions, mechanical ventilation, and corticosteroid use contribute to symptom severity, with mental health issues exacerbating pain (Fernández-de-lasPeñas et al., 2021).

Conclusion: Post-COVID pain is a frequently overlooked issue that requires a multidisciplinary approach. Identifying risk factors and implementing timely rehabilitation strategies are essential for mitigating long-term disability and enhancing the quality of life. Future research should focus on understanding pain mechanisms, physical activity's role, and rehabilitation efficacy (Dmytriiev et al., 2021).

Keywords: Post-COVID Pain, Chronic Pain after COVID, Long COVID Pain, Post-Viral Pain, Pain Management, COVID-19 Sequelae

INTRODUCTION

COVID-19, an infectious disease caused by SARS-CoV-2, emerged in December 2019, leading to a global health crisis. By October 2020, the World Health Organization (WHO) reported over 37 million confirmed cases and one million deaths. India was among the hardest-hit nations, with Karnataka showing a prevalence rate of 46.7%, indicating over 31.5 million infections (Mohan et al., 2021).

Although initially identified as a respiratory illness, research indicates it affects multiple organ systems. Post-COVID complications often include fatigue, dyspnea, persistent cough, joint pain, headaches, sleep disturbances, chest pain, and fever. Severity varies among individuals, with anxiety, depression, brain fog, stroke, and pre-existing conditions like diabetes, hypertension, and cardiovascular disease influencing recovery (Naik et al., 2021).

Post-COVID pain is a common but underreported condition linked to increased pro-inflammatory cytokines and prolonged hospitalization, particularly in ICU settings. Studies indicate delays in rehabilitation may heighten the risk of chronic pain development, with approximately 30% of recovered patients reporting persistent discomfort (Bittencourt et al., 2021). A comprehensive understanding of post-COVID pain is necessary to enhance rehabilitation and prevent long-term disability.

OBJECTIVE

To assess the factors influencing post-COVID pain and their role in shaping recovery outcomes.

REVIEW OF LITERATURE

1. Iqbal et al. (2021) conducted a cross-sectional study assessing post-COVID symptoms and rehabilitation needs. They found that post-COVID pain was prevalent among recovered patients, with significant associations between pain severity and factors such as age, gender, and pre-existing health conditions. Their study underscores the necessity for personalized rehabilitation strategies.
2. Fernández-de-las-Peñas et al. (2021) conducted a systematic review and meta-analysis to determine the prevalence of post-COVID symptoms among hospitalized and non-hospitalized survivors. Their results indicated that a substantial proportion of patients experience lingering pain symptoms beyond 90 days post-recovery, necessitating further investigation into long-term management approaches.
3. Bittencourt et al. (2021) highlighted the overlooked nature of post-COVID pain in physical therapy settings. They advocated for increased awareness and proactive pain management strategies, particularly for individuals with pre-existing musculoskeletal conditions.
4. Dmytriiev et al. (2021) proposed a framework for understanding post-COVID pain, categorizing it into acute, para-infectious, and chronic phases. Their study suggests that some patients may develop long-term neuropathic pain due to virus-induced changes in the nervous system, emphasizing the need for further neurophysiological research.
5. Cascella et al. (2021) examined molecular mechanisms underlying post-COVID pain, identifying inflammatory pathways and immune responses as key contributors. Their findings highlight potential therapeutic targets for managing chronic pain in COVID-19 survivors.
6. Alonso-Matielo et al. (2021) explored the impact of COVID-19 on chronic pain, discussing how viral infections can exacerbate pre-existing conditions or contribute to new pain disorders. They highlighted that musculoskeletal pain, myalgia, and neuropathic pain are common among survivors, and that the virus may interfere with pain modulation pathways.
7. Naik et al. (2021) conducted a prospective observational study in India, identifying clinical details and risk factors for post-COVID sequelae. Their findings suggest that individuals with severe COVID-19 cases requiring hospitalization are at higher risk of long-term pain symptoms. The study emphasized the need for multidisciplinary rehabilitation approaches.
8. Willi et al. (2021) performed a systematic review focusing on individuals under 50 years old, identifying persistent pain as a significant concern in post-COVID patients. They found that factors such as cytokine storms and immune response dysregulation play a key role in the development of chronic pain.
9. Kemp et al. (2020) analysed the role of acute pain in ICU settings, highlighting that individuals with higher distress and pain levels during hospitalization are at increased risk of developing chronic pain. Their findings emphasize the necessity of effective pain management strategies during ICU stays to prevent long-term complications.

METHODOLOGY

Study Design: Literature Review

Study Setting: St. John's Medical College Hospital, Bangalore

Search Strategy: A systematic literature review conducted in September 2021 using PubMed and Google Scholar. The search strategy targeted systematic reviews, literature reviews, non-randomized controlled trials, randomized controlled trials, and observational studies (Cascella et al., 2021).

Studies Included:

- Research involving systematic reviews
- Meta-analysis studies
- Review-based publications
- Trials conducted using randomization
- Non-randomized controlled research

Studies Excluded:

- Individual case studies
- Conference abstracts
- Editorial opinion pieces
- Preliminary or pilot research

RESULTS

The review identifies post-COVID pain as a multifactorial condition linked to inflammation, prolonged hospitalization, immobility, and pre-existing comorbidities. Common symptoms include myalgia, arthralgia, and neuropathic pain, affecting up to 30% of survivors. Studies indicate a higher prevalence among hospitalized and ICU-admitted patients, with factors such as mechanical ventilation and corticosteroid use exacerbating symptoms (Iqbal et al., 2021; Naik et al., 2021). Iqbal et al. (2021) found a significant correlation between prolonged hospitalization and chronic pain, highlighting the role of pre-existing conditions in exacerbating symptoms. Their study also identified older adults and those with prior musculoskeletal disorders as being at a higher risk of experiencing persistent pain. Fernández-de-las-Peñas et al. (2021) reported that over 40% of post-COVID patients experienced musculoskeletal pain, with symptoms persisting beyond 90 days. They

emphasized the importance of early rehabilitation interventions in mitigating long-term pain-related complications. Alonso-Matielo et al. (2021) identified neuropathic pain as a major concern, often linked to immune system dysregulation. Their study highlighted that patients who reported severe initial COVID-19 symptoms were more likely to develop neuropathic pain. Dmytriiev et al. (2021) categorized post-COVID pain into acute, para-infectious, and chronic phases, emphasizing that long-term neuropathic pain could result from virus-induced neurophysiological changes. Willi et al. (2021) suggested that cytokine storms and immune dysregulation contribute to persistent pain, particularly in younger individuals. Their research indicated that immune response irregularities might lead to prolonged pain symptoms, even in individuals without prior health conditions. Bittencourt et al. (2021) noted a gap in pain management strategies, stressing the need for more comprehensive rehabilitation programs. Their findings suggested that current pain management approaches are insufficient, with many patients requiring prolonged physiotherapy interventions. Naik et al. (2021) conducted a prospective observational study in India, revealing that individuals with severe COVID-19 cases requiring hospitalization were at a significantly higher risk of long-term pain symptoms. Their study underscored the necessity of incorporating multidisciplinary rehabilitation approaches to improve recovery outcomes. Cascella et al. (2021) examined the molecular mechanisms underlying post-COVID pain, identifying inflammatory pathways and immune responses as key contributors. Their findings suggest potential therapeutic targets for managing chronic pain in COVID-19 survivors. These findings underscore the necessity for targeted interventions, long-term monitoring, and further research into the pathophysiology of post-COVID pain.

DISCUSSION

Post-COVID pain extends beyond residual symptoms and requires a structured multidisciplinary approach. Chronic pain post-infection may result from immune

dysregulation, hospitalization factors, or exacerbation of pre-existing conditions. Studies indicate that cytokine storms and prolonged ICU stays contribute significantly to pain development, necessitating early intervention (Willi et al., 2021).

A comprehensive review of the literature indicates that post-COVID pain management remains an evolving challenge, with discrepancies in reported prevalence and severity. While some studies highlight musculoskeletal pain as the predominant symptom (Fernández-de-las-Peñas et al., 2021), others emphasize neuropathic mechanisms due to nervous system involvement (Dmytriiev et al., 2021). These inconsistencies suggest that individual patient factors such as pre-existing conditions, genetic predispositions, and severity of initial infection may influence long-term pain outcomes.

Bittencourt et al. (2021) highlight the lack of adequate pain management strategies, emphasizing the need for increased awareness in clinical and rehabilitation settings. Alonso-Matielo et al. (2021) report that post-COVID pain frequently manifests as musculoskeletal pain, myalgia, and neuropathic pain, with hypothyroidism being a potential risk factor for prolonged symptoms. Dmytriiev et al. (2021) suggest that SARS-CoV-2 may induce long-term neuropathic pain, warranting further research into neurophysiological mechanisms.

Psychological factors such as anxiety, depression, and post-traumatic stress disorder have also been implicated in pain perception and chronicity (Naik et al., 2021). The interplay between mental health and pain remains an underexplored area, despite evidence suggesting that psychological distress can amplify pain experiences and delay recovery. This reinforces the need for integrating mental health support into postCOVID pain rehabilitation programs.

Current rehabilitation strategies lack standardization, leading to variable treatment outcomes. Fernández-de-las-Peñas et al. (2021) advocate for systematic pain assessments to optimize treatment, while Naik et al. (2021) stress the necessity of multidisciplinary rehabilitation programs. The role of physical activity in alleviating long-term pain complications is particularly crucial, yet further studies are needed to determine

optimal exercise protocols.

Given the gaps in understanding post-COVID pain, future research should focus on identifying precise pathophysiological mechanisms, effective rehabilitation interventions, and long-term patient monitoring strategies. Standardized clinical guidelines will be critical in ensuring that affected individuals receive timely and effective care, ultimately improving patient recovery and quality of life.

CONCLUSION

Post-COVID pain is an emerging health challenge requiring urgent attention. Factors such as prolonged ICU stays, mechanical ventilation, inflammation, and psychological distress highlight the need for early identification and rehabilitation. Addressing these risk factors can help mitigate long-term complications and improve recovery. Future research should explore pain mechanisms and effective rehabilitation interventions (Casella et al., 2021).

CONFLICT OF INTEREST

The authors declare no conflict of interest regarding this study.

ACKNOWLEDGMENT

The authors extend their gratitude to St. John's Medical College for supporting this review. Special thanks to colleagues and researchers whose work contributed to this study.

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