

Musculoskeletal Symptoms during COVID-19 Pandemic in a Tertiary Care Hospital in South India

Vetrivel Chezian Sengodan¹, Marimuthu Sivagnanam², Surendhar Rathinasamy³, Ranjithkumar Selvaraj⁴

ABSTRACT

Background: The symptoms of COVID-19 include fever, myalgia, arthralgia, fatigue, headache, sore throat, dry cough, anosmia, ageusia/dysgeusia, and progression to viral pneumonia. Musculoskeletal symptoms such as fatigue, myalgia, and arthralgia are common COVID-19 symptoms, but their prevalence has not yet been systematically investigated. Hence, our study aims to know the incidence of musculoskeletal symptoms in COVID-19 infection and their relationship between comorbidities like diabetes and hypertension.

Methods: In our study, 1053 COVID-19 infected patients confirmed by the RT-PCR method were included. For all the patients in our study, detailed history of musculoskeletal symptoms and comorbidities were collected. Basic investigations were done for all the patients and appropriate treatment was given. The patients were followed up for persistence of musculoskeletal symptoms after discharge from the hospital.

Results: During COVID-19 infection, knee joint pain was present among 251 patients (23.8%), generalized myalgia in 147 patients (14%) and 40 patients (3.8%) had both knee joint pain and generalized myalgia. In these patients, during the post-COVID follow-up, 198 patients had persistent knee joint pain, 100 patients had persistence of generalized myalgia and 38 patients had persistence of both knee pain and myalgia, whereas 19 patients developed knee joint pain and one patient developed generalized myalgia after COVID-19 infection. From our study, it is evident that the musculoskeletal symptoms are more during COVID-19 infection than during the pre-COVID period. Compared with pre-COVID status, generalized myalgia is more during the post-COVID follow-up period. This was analyzed with Cochran's Q test and was found to be statistically significant ($p < 0.05$).

Conclusion: Our study showed an increased incidence of musculoskeletal symptoms during and after COVID-19 infection, the most common being generalized myalgia followed by knee joint pain. In patients with comorbidities like diabetes and hypertension, it is evident that musculoskeletal symptoms like knee joint pain and generalized myalgia are increased during COVID-19 infection.

Keywords: COVID-19, Knee pain, Musculoskeletal symptoms, Myalgia.

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INTRODUCTION

In December 2019, there was a rapid outbreak of a pneumonia disease which was named Coronavirus disease (COVID-19) caused by the novel Severe Acute Respiratory Syndrome Corona Virus 2 (SARS-CoV-2), which originated from Wuhan city in China, causing acute respiratory distress syndrome and death.¹

The disease was declared a pandemic by the World Health Organization (WHO) on 11th March 2020.¹ Being highly contagious, human-to-human transmission of the disease occurs rapidly through coughing, sneezing, and the spread of respiratory droplets or aerosols.²

Primarily a respiratory disease, the symptoms of COVID-19 vary widely ranging from absence of symptoms to fever, myalgia, arthralgia, fatigue, headache, sore throat, dry cough, anosmia, ageusia/dysgeusia, and progression to viral pneumonia, manifested by difficulty in breathing and fall in oxygen saturation.³⁻⁵ Musculoskeletal symptoms such as fatigue, myalgia, and arthralgia are common COVID-19 symptoms, but their prevalence has not yet been systematically investigated.³ Myalgia, defined as muscle aches and pain, has been frequently reported in 11–50% of the COVID-19 infected patients. Myalgia and arthralgia were disabling for the patients during and after the COVID-19 infection. The pathology is linked to a cascade of inflammation in the body against the virus and musculoskeletal symptoms also constitute a significant proportion of the symptoms experienced by the patients infected with COVID-19.³

Patients were suffering from arthralgia and myalgia even after becoming negative for COVID infection. Hence, our study

¹⁻⁴Institute of Orthopaedics and Traumatology, Coimbatore Medical College and Hospital, Coimbatore, Tamil Nadu, India; The Tamil Nadu Dr. MGR Medical University, Chennai, Tamil Nadu, India

Corresponding Author: Vetrivel Chezian Sengodan, Institute of Orthopaedics and Traumatology, Coimbatore Medical College and Hospital, Coimbatore, Tamil Nadu, India; The Tamil Nadu Dr. MGR Medical University, Chennai, Tamil Nadu, India, Phone: +91 9843028096, e-mail: svcortho@gmail.com

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aims to know the incidence of musculoskeletal symptoms among COVID-19 infected adults during and after COVID-19 infection and the relationship between comorbidities like diabetes and hypertension with these musculoskeletal symptoms.

MATERIALS AND METHODS

The study was conducted in Government Coimbatore Medical College Hospital, Coimbatore after ethical committee clearance. One thousand and fifty-three COVID-19 infected patients confirmed by the RT-PCR method were in our study group. The study period was from April to September 2021.

Adults from 21 years of age were included in our study. The pediatric age group, patients suffering from rheumatoid arthritis, seronegative arthritis, malignancy, and RT-PCR negative patients were excluded from our study.

For all the patients in our study, detailed history of musculoskeletal symptoms and comorbidities were collected. Basic investigations were done for all the patients and appropriate treatment was given. The patients were followed up for persistence of musculoskeletal symptoms after discharge from the hospital. The collected data were compared and analyzed with Cochran's Q test.

RESULTS

Among the 1,053 patients in our study group, 599 (56.9%) were male and 454 (43.1%) were female. The mean age was 45 years. The mean duration of stay in the hospital was 7 days.

In our study, 738 patients (70.1%) of the study group did not have any comorbidities before COVID infection [Vk4]. Diabetes was the only comorbidity among 121 patients (11.5%) before COVID infection. Hypertension was the only comorbidity among 76 patients (7.2%) before COVID infection. Diabetes and hypertension were the comorbidities for 89 patients (8.5%) before COVID infection. Heart disease was one of the comorbidities among ten patients (0.9%) before COVID infection.

Regarding the musculoskeletal symptoms from the history, 777 patients (73.8%) did not have any musculoskeletal symptoms before the COVID-19 infection. Knee joint pain was present in 238 patients (22.6%) and generalized myalgia in 29 patients (2.8%) before COVID-19 infection.

During COVID-19 infection, knee joint pain was present as a complaint among 251 patients (23.8%), generalized myalgia was present in 147 patients (14%) and 40 patients (3.8%) had both knee joint pain and generalized myalgia.

In these patients, during the post-COVID follow-up, 198 patients had persistent knee joint pain, 100 patients had persistence of generalized myalgia and 38 patients had persistence of both knee pain and myalgia, whereas 19 patients developed knee joint pain and one patient developed generalized myalgia after COVID-19 infection during the follow-up period (Table 1) (Fig. 1).

From our study, it is evident that the musculoskeletal symptoms are more during COVID infection than during the pre-COVID period. Compared with pre-COVID status, generalized myalgia is more during the post-COVID follow-up period (Fig. 2). This was analyzed with Cochran's Q test and was found to be statistically significant ($p < 0.05$).

Regarding the musculoskeletal symptoms, among the patients infected with COVID-19, generalized myalgia was observed to be more common than knee joint pain.

Regarding patients with comorbidities, before COVID infection, 67 patients (55.4%) had knee pain and six patients (5%) had generalized myalgia with diabetes as comorbidity, 34 patients

(44.7%) had knee pain and 12 patients (15.8%) had generalized myalgia with hypertension as comorbidity.

During COVID infection, with diabetes as comorbidity, 75 patients (62%) had knee pain, 12 patients (9.9%) had generalized myalgia and 14 patients (11.6%) had both knee pain and generalized myalgia.

Among hypertensive patients, during the hospital stay, 36 patients (47.4%) had knee pain, 17 patients (22.4%) had generalized myalgia and two patients (2.6%) had both knee pain and generalized myalgia.

In our study, with both diabetes and hypertension as comorbidities, 43 patients (41.6%) had knee pain and six patients (6.7%) had generalized myalgia during COVID infection.

During the post-COVID follow-up period, 61 patients (50.4%) had knee pain and seven patients (5.8%) had generalized myalgia and 14 patients (11.6%) had both knee pain and generalized myalgia with diabetes as a comorbidity.

With hypertension as comorbidity, during post-COVID follow-up, 36 patients (47.4%) had knee pain, 12 patients (15.8%) had generalized myalgia and two (2.6%) patients had both knee pain and generalized myalgia.

In the post-COVID follow-up study, among patients with both diabetes and hypertension as comorbidities, 34 patients (38.2%) had knee pain, five patients (5.6%) had generalized myalgia and 17 patients (19.1%) had both knee pain and generalized myalgia (Table 2).

As per our study, it is evident that musculoskeletal symptoms like knee joint pain, and generalized myalgia are increased during COVID infection in patients with comorbidities like diabetes and hypertension. This was analyzed with Cochran's Q test and was found to be statistically significant ($p < 0.05$).

With diabetes as a comorbidity, the number of patients with knee pain after COVID infection is less than the number of patients with knee pain before COVID infection. It appears that there is an immune-mediated response that may be the cause of the absence of knee pain in the above-said category.

Regarding the age-wise split-up of musculoskeletal symptoms, 70 patients had knee joint pain before COVID in the age group of 51–60 years, maybe because of degenerative arthrosis.

During COVID infection, patients in all the age groups had musculoskeletal symptoms, with symptoms being the least among 21–30 years age group and maximum among 41–60 years (Fig. 3).

DISCUSSION

The symptoms of COVID-19 vary widely ranging from absence of symptoms to fever, headache, sore throat, dry cough, anosmia, ageusia/dysgeusia, and progression to viral pneumonia, manifested by difficulty in breathing and fall in oxygen saturation.³⁻⁵

SARS-CoV-2 is an RNA virus with a viral structural spike (S) protein.⁶ The virus enters the body through the airway and binds

Table 1: Musculoskeletal symptoms in patients with COVID-19 infection

	Musculoskeletal symptoms before covid infection	Musculoskeletal symptoms during hospital stay	Persistence of symptoms in post-covid follow-up	New symptoms during post-covid follow-up
No symptoms	777	581	678	–
Knee joint pain	238	251	198	19
Generalized myalgia	29	147	100	1
Knee joint pain and generalized myalgia	–	40	38	–

with the Angiotensin-Converting Enzyme 2 (ACE2) receptors which are highly expressed in the lung epithelial cells, heart, kidneys, gastrointestinal system, cornea, blood vessels, and skeletal muscle.⁶

The virus enters these cells and starts replicating within these cells with subsequent activation of the innate immune system. This leads to the release of large amounts of proinflammatory cytokines such as Interleukin-6 (IL6), Interleukin-10 (IL10), and Tumor Necrosis Factor α (TNF α), producing a phenomenon known as "Cytokine storm".^{7,8} The musculoskeletal symptoms experienced by the COVID-19 affected patients could be attributed to the inflammatory response.

Studies from other countries regarding the symptoms of COVID-19 infection showed that myalgia, arthralgia, and fatigue were the most common musculoskeletal symptoms experienced by COVID-19 infected patients.³

Guan et al. in China conducted a study among 1,099 COVID-19 infected patients and reported that 38% of the patients experienced fatigue and 15% experienced arthralgia/ myalgia.⁹

Lechien et al. in Europe conducted a study involving 417 COVID-19 infected patients and reported myalgia in 31% and arthralgia in 59% of the study group.¹⁰

Liang et al. in a study involving 1,590 COVID-19 infected patients in China reported that 43% of the patients experienced fatigue and 17% of the patients experienced myalgia/arthralgia.¹¹

Lian et al. in a study involving 788 COVID-19 infected patients in China reported that 17.6% of the patients experienced fatigue and 11% of the patients experienced myalgia.¹

Goyal et al. in a study involving 393 COVID-19 infected patients in the USA reported myalgia in 23.8% of the study group.¹²

Li et al. in a study involving 548 COVID-19 infected patients in China reported fatigue among 47% of the patients and myalgia/arthralgia in 20% of the patients in the study group.⁴

In our study, knee joint pain was present in 22.6% of our study group before COVID-19 infection, whereas it was 23.8% during COVID-19 infection. Generalized myalgia was present in 2.8% of the patients before COVID-19 infection, whereas it was 14% during COVID-19 infection. Hence generalized myalgia was the chief complaint in COVID-19 infected patients followed by knee joint pain.

As per our study, during the follow-up period, knee joint pain was present in 20.8% of patients, whereas generalized myalgia was present in 9.6% of patients. When compared to the musculoskeletal symptoms before COVID-19 infection (knee joint pain- 22.6%, generalized myalgia- 2.8%), it can be seen that generalized myalgia was the chief complaint even during the follow-up period in our study patients.

As per our study, musculoskeletal symptoms like generalized myalgia and knee joint pain are increased in COVID-19 infected patients with comorbidities like diabetes and hypertension. Among the diabetic patients in our study, knee joint pain was present in 55.4% of our study group before COVID-19 infection, whereas it was 62% during COVID-19 infection. Generalized myalgia was present in 5% of the diabetic patients before COVID-19 infection, whereas it was 9.9% during COVID-19 infection.

Among the hypertensive patients in our study, knee joint pain was present in 44.7% of our study group before COVID-19 infection, whereas during COVID-19 infection it was 47.4%. Generalized myalgia was present in 15.8% of the patients before COVID-19 infection, whereas during COVID-19 infection it was 22.4%. Hence generalized

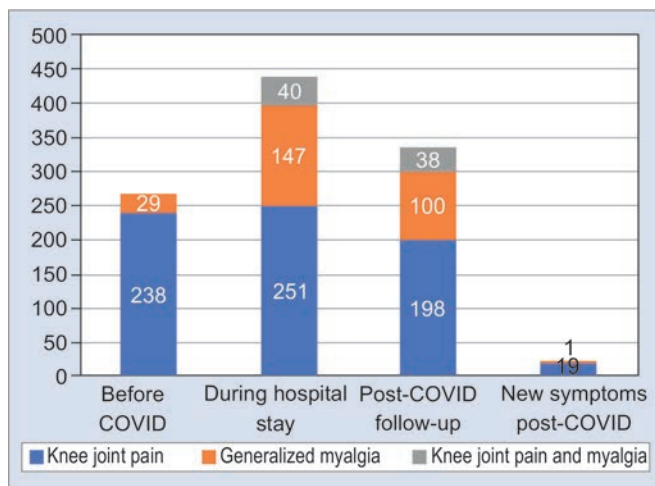


Fig. 1: Bar diagram showing the incidence of musculoskeletal symptoms before, during, and after COVID-19 infection

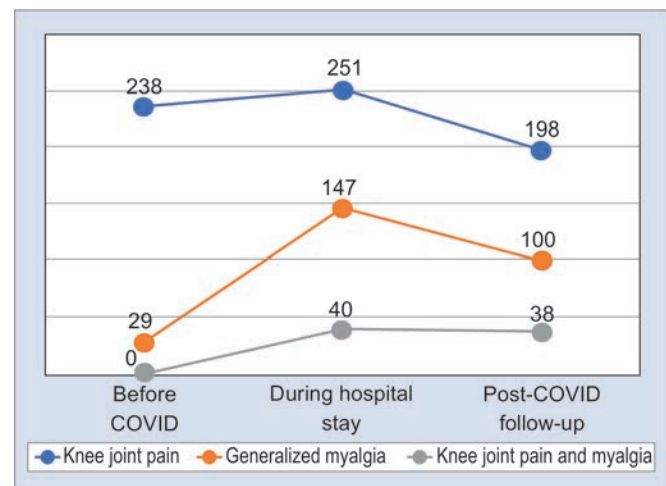


Fig. 2: Graph showing the course of musculoskeletal symptoms before, during, and after COVID-19 infection

Table 2: Musculoskeletal symptoms in COVID-19 patients with pre-existing diseases

	Diabetes			Hypertension			Diabetes & hypertension		
	Before covid	During covid	Post covid	Before covid	During covid	Post covid	Before covid	During covid	Post covid
Knee joint pain	67	75	61	34	36	36	37	43	34
Generalized myalgia	6	12	7	12	17	12	11	6	5
Knee joint pain & generalized myalgia	--	14	14	--	2	2	--	17	17

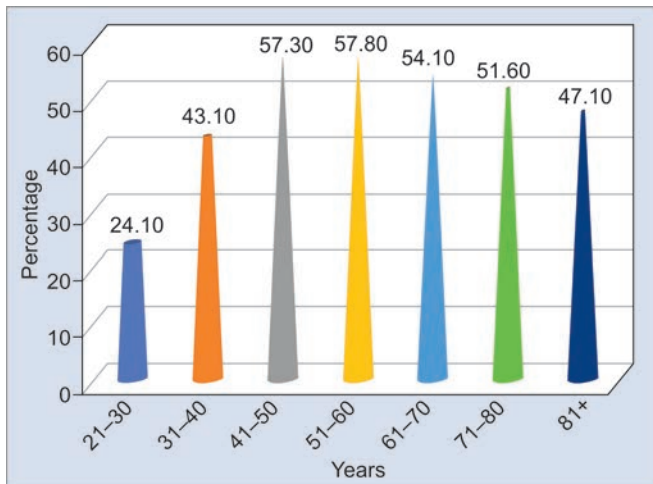


Fig. 3: Figure showing the age-wise distribution of musculoskeletal symptoms in COVID-19 infected patients during the hospital stay

myalgia was the chief complaint in COVID-19 infected patients with hypertension as comorbidity followed by knee joint pain.

During the follow-up period, knee joint pain was present in 50.4% of patients and generalized myalgia was present in 5.8% of patients in the diabetic group, whereas in the hypertensive group, knee joint pain was present in 47.4% of patients and generalized myalgia was present in 15.8% patients.

CONCLUSION

Our study showed an increased incidence of musculoskeletal symptoms in COVID-19 infection, the most common being generalized myalgia followed by knee joint pain. These symptoms are increased during the COVID-19 infection period and the post-COVID follow-up period. In our study, in patients with comorbidities like diabetes and hypertension, it is evident that musculoskeletal symptoms like knee joint pain and generalized myalgia are increased during COVID-19 infection. However, a large multi-centric study may be necessary to confirm our findings.

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