Original Article

Musculoskeletal Symptoms in Patients with COVID-19 Infection

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Abstract

Background: *COVID-19 infection caused by the new coronavirus was reported in December by the World Health Organization 2019 in China. The main clinical manifestations of infected patients are fever, cough, and dyspnea. Musculoskeletal symptoms, including myalgia, arthralgia, and fatigue, are nearly constantly present.*

Objective: *To evaluate the musculoskeletal symptoms and its relationship with disease severity in patients with COVID-19 infection attending a tertiary level hospital in Bangladesh.*

Materials and Methods: *This cross-sectional study, conducted at Dhaka Medical College Hospital, Bangladesh, aimed to evaluate the prevalence of musculoskeletal symptoms and their relationship with disease severity in 113 patients with RT-PCR-confirmed COVID-19.*

Results: *The findings revealed that musculoskeletal manifestations were highly common, present in 82.3% of the patients. The most frequent symptoms were fatigue (77.4%) and myalgia (67.7%), followed by arthralgia (22.6%). The study further established a significant relationship between fatigue and the severity of the COVID-19 illness. Additionally, a notable gender disparity was observed, with female patients reporting significantly higher psychological fatigue scores compared to males.*

Conclusion: *The research concludes that musculoskeletal symptoms, particularly fatigue and myalgia, are predominant clinical features in COVID-19 patients. The association of fatigue with disease severity and its higher prevalence in females underscores the need for clinicians to recognize these symptoms.*

Key words: *COVID-19 infection, Musculoskeletal symptoms, Disease severity.*

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Introduction

In December 2019, a novel coronavirus labeled 2019- nCoV, which is believed to have originated in Wuhan, the capital city of Hubei province, began spreading rapidly across China. The virus is transmitted mainly via respiratory droplets and/or contact, and human-to-human transmission and family clustering have been reported.[1] In Bangladesh, the first case was identified on 8th March 2020. On November 21, 2020, a total of 443434 cases of the virus were confirmed. On 9th September 2021, the number of total cases was 231,630,420 while the total number of deaths was 4,745,175. In Bangladesh, the first case was identified on 8th March 2020. In Bangladesh, from 3 January 2020 to 11 October 2021, there have been 1,562,958 confirmed cases of COVID-19 with 27,699 deaths, reported to WHO.[2]

Reported illnesses have ranged from patients with little or no symptoms to patients being severely ill and dying.[3] Musculoskeletal symptoms are quite common in patients with COVID-19 aside from other symptoms like fever, sore throat, dry cough, and dyspnea. Myalgia, arthralgia, and fatigue are the most common musculoskeletal symptoms; those have been reported with a peak ratio of 40%, 15%, and 85% respectively,[4-6] Although they are totally different, myalgia and arthralgia were usually taken into account together in the majority of studies.[7]

It is noteworthy that COVID-19 infected patients tend to experience a prolonged hospitalization or intensive care unit (ICU) stay, with an average of three weeks in the ICU.[8] Commonly, bed rest is prescribed in infected patients to minimize the metabolic demand and orientate resources towards the recovery

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process. However, it has been evidenced that long periods of immobilization and rest in hospitals and ICU produce a negative impact on several body systems. As an example, a period of four to six weeks of bed rest has been shown to cause muscle wasting, loss of muscle force generation capacity (6% to 40% muscle strength), and changes in contractile proteins (muscle protein turnover) among others.[9]

There are many retrospective studies to present clinical aspects of the COVID-19 disease, still, the involvement of the musculoskeletal system has not been deeply investigated. As a new infectious disease, it is particularly important to underline the clinical features of COVID-19, especially in the early stage of the illness, to help clinicians to individuate and isolate patients earlier, and then minimize its spread. It will be beneficial for the patients if treatment for musculoskeletal symptoms can be started earlier and thereby reduce musculoskeletal complications. Therefore, the present study was designed to evaluate the musculoskeletal symptoms in patients with COVID-19 infection attending a tertiary level hospital in Bangladesh.

Material and Methods

This descriptive type of cross-sectional study was conducted in the COVID unit of Dhaka Medical College Hospital for a one-year duration (from 1st October 2020 – 30th September 2021) with approval from Ethical Review Committee (ERC), DMC. Patients diagnosed with COVID-19 infection detected by real-time reverse transcription-polymerase chain reaction (RT-PCR) were selected for the study. Severely ill COVID-19 patients in ICU were excluded from the study. A total of 113 patients fulfilled the selection criteria and were included in the study by convenience sampling technique.

Patients were offered a comprehensive medical assessment with detailed history and physical examination. Data on all clinical characteristics, including clinical history, were collected by using a pretested semi-structured questionnaire. Demographic data on age, sex, comorbidities like hypertension, diabetes, thyroid disease, cardiovascular and cerebrovascular disease, malignancy, chronic kidney disease, and musculoskeletal disease were collected. Typical symptoms from onset to hospital admission as fever, cough, dyspnea, loss of appetite, myalgia, fatigue, arthralgia, diarrhea, sore throat were evaluated.

The degree of severity of COVID-19 was categorized according to National Guidelines on Clinical Management of Coronavirus Disease 2019 (COVID-19), 2020.[10] Myalgia and arthralgia localizations were interrogated in detail and the severity of myalgia and arthralgia were calculated by the Numerical Rating Scale (NRS).[11] The severity of fatigue was assessed in Chalder Fatigue Scale (CFS).[12]

Data were collected by face-to-face interview and record review by pretested semi-structured questionnaire. The statistical analyses were conducted using SPSS (Statistical Package for the Social Science) version 26 statistical software. Means and standard deviations for continuous variables and frequency distributions for categorical variables were used to describe the characteristics of the total sample. The Association of continuous variables was assessed by the Student t-test. All p values were two-sided and p values <0.05 were considered significant.

Results

Table I: Baseline characteristics of the patients (n=113)

Baseline characteristics	Frequency	Percentage (%)
Age group (in years)		
18-27	13	11.5
28-37	24	21.2
38-47	19	16.8
≥48	57	50.5
Mean ±SD	47.2 ± 16.0	
Gender		
Male	69	61.1
Female	44	38.9
Duration of symptom (in days) (Mean ±SD)	10.0 ± 6.9	
Comorbidity		
Absent	34	30.1
Diabetes mellitus	51	45.1
Hypertension	49	43.4
Cardiovascular disease	18	15.9
Chronic kidney disease	10	8.8
COPD	7	6.2
Musculoskeletal disorder	3	2.7
Non-musculoskeletal symptoms		
Fever	107	94.7
Cough	102	90.3
Difficulty in breathing	75	66.4
Anosmia	60	53.1
Headache	55	48.7
Others	12	10.6
Severity of disease		
Mild	25	22.1
Moderate	62	54.9
Severe	26	23.0

The mean age of the patients was 47.2 (±16.0) years where majority (n=69, 61.1%) of the patients were male. The mean duration of symptoms of the patients was 10.0 (± 6.9) days. Musculoskeletal disorder was found in 3 (2.7%) patients. Among the patients, 107 (94.7%) patients had fever, 102 (90.3%) patients had cough, 75 (66.4%) patients had difficulty in breathing, 60 (53.1%) patients had anosmia and 55 (48.7%) patients had headache. Out of 113 patients, 62 (54.9%) had moderate illness and 26 (23.0%) patients had severe illness due to COVID-19 virus (table I).

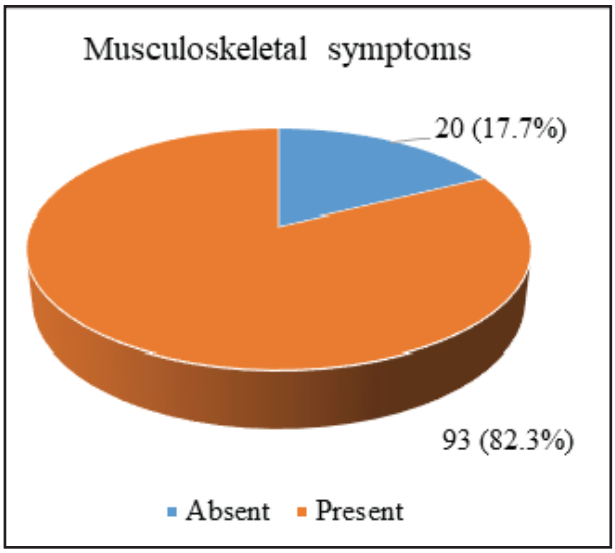

Figure 1: Distribution of patients by musculoskeletal symptoms (n=113)

Among the 113 patients, 20 (17.7%) patients had no musculoskeletal symptoms while 93 (82.3%) patients had musculoskeletal symptoms which included fatigue, myalgia and arthralgia (figure I).

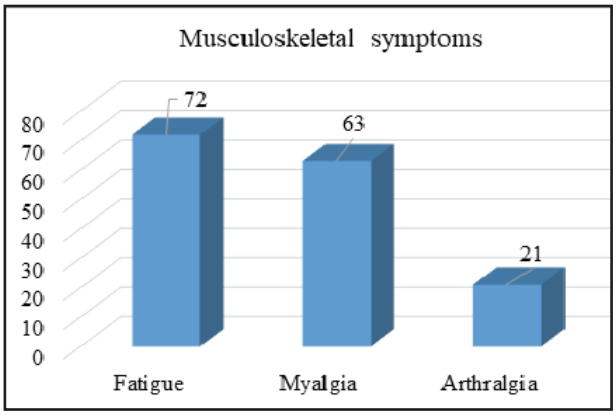

Figure 2: Distribution of patients by musculoskeletal symptoms (n=93)

Figure 2 shows that 72 (77.4%) patients had fatigue, 63 (67.7%) patients had myalgia and 21 (22.6%) patients had arthralgia.

Table II: Distribution of patients by myalgia location (n=63)

Myalgia location	Frequency (f)	Percentage (%)
Widespread	42	66.7
Localized	21	33.3
Myalgia score	6.3±1.6	

Among the 63 patients with myalgia, 42 (66.7%) had widespread myalgia while 21 (33.3%) patients had localized myalgia. The mean myalgia score of the patients was 6.3 (±1.6) (table II).

Table III: Distribution of patients by arthralgia location (n=21)

Arthralgia location	Frequency (f)	Percentage (%)
Hip	12	57.1
Knee	9	42.8
Widespread	9	42.8
Shoulder	8	38.1
Elbow	7	33.3
Ankle	6	28.6
Wrist	5	23.8
Arthralgia score	6.0±2.2	

*Multiple response

Among the 21 patients with arthralgia, 12 (57.1%) had arthralgia in hip, 9 (42.8%) had arthralgia in knee, another 9 (42.8%) had widespread arthralgia. The mean arthralgia score of the patients was 6.0 (±2.2) (table III).

Table IV: Distribution of patients by Chalder fatigue score (CFQ) (n=72)

Chalder fatigue score (CFQ)	Mean± SD	Range
Physica l fatigue (CFQ -11 items 1 -7)	12.9±2.6	7.0 -19.0
Psychological fatigue (CFQ -11 items 8 -11)	3.5±1.8	0.0 -7.0
Total CFQ -11 score (Likert scoring)	16.5±3.6	9.0 -24.0
Total CFQ -11 score (Bimodal scoring)	5.3±1.6	0.0 -10.0

The mean physical fatigue score of the patients was 12.9 (±2.6) and the mean psychological fatigue of the patients was 3.5 (±1.8). The mean total CFQ-11 score of the patients was 16.5 (±3.6) in Likert scoring and 5.3±1.6 in Bimodal scoring (table IV).

Table V: Association of myalgia score and fatigue scores with gender

Characteristics	Gender	Mean±SD	p value
Myalgia	Male (n=37)	6.4±1.6	0.621
	Female (n=26)	6.2±1.5	
Arthralgia	Male (n=18)	6.1±2.3	0.582
	Female (n=3)	5.3±1.5	
Physical fatigue	Male (n=69)	13.7±2.8	0.546
	Female (n=44)	13.3±2.7	
Psychological fatigue	Male (n=69)	3.1±2.0	**<0.001**
	Female (n=44)	4.4±0.7	
Total CFQ score	Male (n=69)	16.9±3.8	0.387
	Female (n=44)	17.7±2.7	

There was no significant statistical difference between male and female patients regarding myalgia score (p=0.621), arthralgia score (p=0.582), physical fatigue score (p=0.546). The mean psychological fatigue score of female patients was significantly higher than male patients (p<0.001). However, there was no significant statistical difference between male and female patients regarding the mean total CFQ score (p=0.387) (table V).

Discussion

The aim of this study was to evaluate the musculoskeletal symptoms in patients with COVID-19 infection attending a tertiary level hospital of Bangladesh. Among the patients, 82.3% patients had musculoskeletal symptoms where 77.4% patients had fatigue, 67.7% patients had myalgia and 22.6% patients had arthralgia.

The mean age of the patients was 47.2 (±16.0) years where half of the patients were from ≥48 years age group. The study which examined the prevalence of fatigue in individuals recovered from the acute phase of COVID-19 illness found patients with mean age of 49.8 (±15.0) years.[13]

Majority of the patients of this study was male patients. The study conducted in Dhaka Medical College and Hospital also found male predominance.[14] Studies outside Bangladesh found similar results.[11,15] This is partly due to biology (genetics and immunology), but it is also driven by gender (life style) factors such as higher levels of smoking and drinking among men compared to women.[16]

Musculoskeletal symptoms were found in 82.3% patients which included fatigue, myalgia and arthralgia. Other study also found that 87.4% reported of at least 1 symptom after recovered from COVID-19.[15]

Majority of the patients (63.7%) of this study had fatigue. The Turkish study found 86.4% COVID-19 infected patients had fatigue.[11] In Ireland, it was reported 53.2%.[13] It Italy, it was stated 87.4%.[15] It was reported that rest can lead to various adverse effects such as changes in total muscle mass, metabolic activity, muscle denervation and a loss of contractile force with increasing fatigue and reduced muscle strength.[17]

Out of the 113 patients, majority (55.8%) patients had myalgia. The study of Carfì, et al.[15] found 48.0% patients had myalgia in acute stage. Other study found 71.8% COVID-19 infected patients had myalgia.[11] The systematic review and meta-analysis of Abdullahi, et al.[18] found 19% patients with myalgia. Among the 63 patients with myalgia, 42 (66.7%) had widespread myalgia while 21 (33.3%) patients had localized myalgia. Tuzun, et al.[11] also found majority patients with widespread myalgia.

Arthralgia is an important clinical complaint seen in many virus infections.[19] Out of the 113 patients, 18.6% patients had arthralgia. Reported prevalence of arthralgia was 49.5%.[11] Among the 21 patients with arthralgia, 12 (57.1%) had arthralgia in hip, 9 (42.8%) had arthralgia in knee, another 9 (42.8%) had widespread arthralgia. Similar findings were reported by other studies.[11]

The mean physical fatigue score of the patients was 12.9 (±2.6) and the mean psychological fatigue of the patients was 3.5 (±1.8). The mean total CFQ-11 score of the patients was 16.5 (±3.6) in Likert scoring and 5.3±1.6 in Bimodal scoring. The reported mean of physical fatigue score, psychological fatigue score, total CFQ-11 (Likert scoring) and total CFQ-11 (Bimodal scoring) were 11.38 ± 4.22, 4.72 ± 1.99, 15.8 ± 5.9 and 4.2 ± 3.5 respectively.[13]

Female patients had significantly higher psychological fatigue scores than male patients (4.4±0.7 vs 3.1±2.0). Townsend, et al.[13] reported that female gender were over-represented with fatigue. Due to higher pain and muscle symptoms female had higher fatigue score than male.[20] It has been known for a long time that gender and social class are related to many health inequities, such as differences in life expectancy. Fatigue is one such inequity. Many diseases follow a social gradient. Gender and social class interact closely and lead to differences in distribution of resources. Perhaps fatigue is a bodily expression of ill-being, which is related to other health inequities, economic factors and unequal assets in life. Women in the lowest socioeconomic class are more prone to feel fatigued and therefor might be less likely to be physically active. The gap in fatigue between men and women was largest among those below 55 years of age which indicates that factors related to gender inequalities regarding household responsibilities and

child raising may be responsible.[21]

This study has several limitations. First, long-term follow-up could not be done. Second, this was a cross-sectional study and participants were from one center rather than multiple centers. It provides no information regarding cause or effect relationships.

Conclusion

The present study revealed that majority of the COVID-19 patients had musculoskeletal symptoms, where fatigue and myalgia were the most frequent symptoms. Fatigue was related to severity of disease. Female gender were over-represented with fatigue.

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