

# Musculoskeletal pain and physical health status among confirmed COVID-19 patients of Bangladesh

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## Article Info

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## Abstract

COVID-19 pandemic is now a great headache for the world population. Respiratory symptoms are the main presentation of COVID-19. However, musculoskeletal pain, headache, loss of taste and smell sense, and neurological manifestations may occur. Identification of patterns of musculoskeletal pain, fatigue and physical health status in COVID-19 is crucial. In this cross sectional study, a total 380 individuals with COVID-19 were recruited from the population following selection criteria. Pain varied widely in hip, neck, leg and calf muscles, back and spine, shoulder, arms and hand, and other parts of the body among the respondents. Inconstant, among respondents of younger age group (aged  $\leq 50$  year), 37.59% had moderate pain, 6.77% had severe pain, 13.91% had mild pain, and 41.17% had no pain. On the other hand, among older respondents (aged  $> 50$  year) 47.37% had moderate pain, 25.44% had severe pain, 13.15% had mild pain, and 14.03% had no pain. The differences between two groups was statistically significant ( $p < 0.05$ ). However, there was no difference in frequency of pain between males and females. Those respondents who had pain was reported having physical health worse than the average compared to that of those who had no pain.

## Introduction

Since December 2019, an outbreak of COVID-19 caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) began at Wuhan, China and is now a global threatening pandemic<sup>1</sup>. Since then, the spread of covid-19 has increased exponentially, with the World Health Organization has declared pandemic on 11 March 2020<sup>2</sup>. As of 24 April 2021, more than 145 million cases and more than 3 million deaths had been reported worldwide<sup>3</sup>. COVID-19 cases are also increasing day by day. According to the Directorate General of Health Services (DGHS) of Ministry of Health and Family Welfare of Government of Bangladesh more than seven hundred forty-two thousand patients with COVID-19 are identified as confirmed cases and more than five hundred deaths (as of 24 April, 2021) across the country<sup>4</sup>. Severe acute respiratory illness with fever and respiratory symptoms, such as cough and shortness of breath, comprise the

working case definition, used to select people for viral testing. This strategy captures typical symptomatic presentation, but imperfectly identifies unusual manifestations, such as patients without respiratory symptoms or only very mild symptoms. One widely cited modeling study concluded that up to 86% of cases might have been missed in China<sup>3</sup>, and reports of patients with unusual presenting symptoms are rising worldwide. However, afebrile non-respiratory symptoms are also noted as important presenting features in patients with covid19 confirmed by real time polymerase chain reaction (RT-PCR).

According to Centre for disease control (CDC) of United States<sup>5</sup> headache, muscle ache, repeated shaking chills and loss of taste and smell may be presenting symptoms for COVID-19. Likewise, other viral fever, body ache is associated with COVID-19. But, we do not know which region or muscles group or joints are mostly involved in COVID-19. For



example, bone breaking low back pain is associated in dengue. Although, muscle pain or body ache is prevailed in COVID-19, but which region of the body and or the limbs are predominantly affected is not well known. Patterns of involvement in the musculoskeletal system is yet to be unveiled. Moreover, untreated acute pain may turn into chronic pain - a complex and challenging condition<sup>6</sup>. The effectiveness of physical conditioning as part of a return to work strategy in reducing sick leave for workers with major illness compared to usual care<sup>7</sup>. Identification of patterns of musculoskeletal involvement in COVID-19 is crucial, because without knowing the scenario appropriate measures such as treatment and medical rehabilitation may not be taken in time and may be resulted with chronic pain and disability. There is no such data published available among Bangladeshi population, so far our knowledge. Keeping this gray area of knowledge, it is warranted to investigate the patterns of musculoskeletal pain and physical health status among Bangladeshi patients with COVID-19. Therefore, we plan to conduct a cross sectional study for assessment of pain and health status of COVID-19 patients across the country. The general objective of the study was to investigate patterns of musculoskeletal involvement among patients with COVID-19. The specific objectives of the study were (i) to investigate the pattern of musculoskeletal system involvement, and (ii) to assess pain and physical functioning among individuals infected with SARS-CoV-2.

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## Methodology

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This cross sectional study was conducted in the Department of Physical Medicine and Rehabilitation at Bangabandhu Sheikh Mujib Medical University, funded by the Bangladesh Medical Research Council (BMRC) after approval from the national review committee of BMRC, bearing Ref No BMRC/Revenue-Grant/2019-2020/753(1-31) dated 26 June 2020. Participants were selected irrespective of age, sex, socioeconomic status, from those patients tested positive for SARS-CoV-2 in RT-PCR test across the country. We approached to 386 individuals with RT-PCR positive for SARS-CoV-2 for the telephonic interview for this study between October to December 2020. The response rate was 98.45% (380 out of 386 individuals). Any individual tested positive for COVID-19 having cognitive impairment and hearing problem; and the individual who were not able to communicate in Bengali were excluded from the study. Among the remain 6 individuals, 2 (0.5%) denied to be enrolled in this study and the rest of 4 (1.03%) was excluded from the study due to cognitive impairment. Finally, a total

380 individuals with COVID-19 were recruited from the population following selection criteria. Non-randomized sampling method was considered to recruit the participants considering all the available telephone numbers for the study population accessed from different RT-PCR lab of the government of the people's republic of Bangladesh. The survey was conducted using pre structured interviewer administered questionnaire. Cognitive ability of the responded was assessed by brief cognitive rating scale (BCRS)<sup>8</sup>. To assess musculoskeletal (MSK) pain intensity visual analogue scale (VAS, 0-10 cm) was considered<sup>9</sup>. Validated Bangla version of short form-12 V2 (SF-12v2) survey instrument<sup>10</sup> was used to assess physical global health. Telephonic interview was conducted for this survey which took about 20-25 minutes for each interview. Participants' phone numbers were collected from the RT-PCR tests result sheet of directorate general of health services. To assess the patterns of musculoskeletal involvement, data was collected by obtaining presenting symptoms, and meticulous history of pain. Pre-existence of any known rheumatic disorder was noted specifically and were excluded from the study. All the data was compiled and sorted properly and the numerical data were analyzed statistically by using Statistical Package for Social Scientists (SPSS-22.0). The results were expressed as percentage and mean±SD. Comparison of proportions was made with chi-square tests. Comparison of ordinal variables was made with Wilcoxon rank-sum tests.  $P \leq 0.05$  was considered as the level of significance.

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## Results

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In this telephonic survey consisting 380 respondents, males were found more frequently (65.53%) infected with SARS-CoV-2. Majority (70%) of the participants were aged 50 years or younger, and respondents older than 50 was 30%. Majority (76.58%) of the respondents were married, 15.79% unmarried, and others (divorced/widowed) was 7.63%. Majority (66.05%) of the respondents had normal body weight, 30.53% were over-weight, 2.89% were obese, and 0.5% was under-weight. Among all respondents, 18.42% were homemaker, 16.84% retired personnel, 15% businessman, 13.95% healthcare workers, 12.37% students, 10.53% bankers, 5.26% administrative workers, 3.18% garments workers, 2.37% members of law-enforcing agencies, and others were 1.31%. Majority of the respondents (50.26%) were from upper-middle income family, 26.84% from lower-middle income family, 17.37% from high income family, and only 5.53% were from low income family (Table I).

Table-I		
Sociodemographic and Clinical Characteristics of the Respondents (N=380)		
	Particulars	n (%)
	≤50 year	266 (70.0)
	>50 year	114 (30.0)
Sex	Male	249 (65.53)
	Female	131 (34.47)
Marital Status	Married	291 (76.58)
	Unmarried	60 (15.79)
	Others (Divorced/Widowed)	29 (7.63)
Occupation	Homemaker	70 (18.42)
	Retired from active job	64 (16.84)
	Business	57 (15.0)
	Healthcare workers	53 (13.95)
	Students	47 (12.37)
	Bankers	40 (10.53)
	Administrative workers	20 (5.26)
	Garments workers	12 (3.18)
	Members of law-enforcing agencies	9 (2.37)
	Others	5 (1.32)
Body Mass Index (BMI)	Normal	251 (66.05)
	Over weight	116 (30.53)
	Obesity	11 (2.89)
	Underweight	2 (0.5)
Socio-economic status	Lower income group	21 (5.53)
	Lower middle income group	102 (26.84)
	Upper middle income group	191 (50.26)
	Higher income group	66 (17.37)
Reasons of testing	Symptoms presence	306 (80.5)
	Direct exposure with confirmed case	175 (46.1)
	Healthcare assistance to COVID cases	30 (7.9)
	Others	13 (1.8)
Mode of possible exposure	Direct exposure with known case	175 (46.1)
	Indirect exposure	64 (16.8)
	Unknown	141 (37.1)
Appearance of Symptoms	Before testing	306 (80.5)
	After testing	56 (14.7)
	Asymptomatic	18 (4.7)
Presenting Symptoms	Respiratory Cluster symptoms	289 (76.05)
	Musculoskeletal pain	184 (48.42)
	Headache	61 (16.05)
	Smell sensation loss	51 (13.4)
	Eye ache	6 (1.58)
	Taste sensation loss	3 (0.7)
	Abdominal pain	2 (0.5)
	Others	4 (1.1)

n= number of the respondents, %=percent

Most of the respondents (80.5%) chose to test (RT-PCR) for covid-19 due to symptoms development. Moreover, 46.1% had history of direct exposure with confirmed case for covid-19. Besides, 7.9% had history of providing healthcare assistance to the covid-19 cases (Table 1). Considering mode of exposure, 46.1% had direct exposure while 16.8% had indirect exposure with the confirmed case of COVID-19. However, 37.1% respondents were not aware about any exposure with the COVID-19 patients. Majority (80.5%) cases developed symptoms before going for testing while 14.7% developed symptoms over the time after testing for COVID-19. However, 4.7% remained asymptomatic. Among all respondents, the most frequent symptoms were respiratory clusters symptoms including fever, cough, rhinorrhea and breathlessness (76.05%) followed by musculoskeletal pain (48.42%), headache (16.05%), and smell sensation loss (13.4%). Besides taste sensation loss was found 0.7% of cases, abdominal pain in 0.5% of cases and other symptoms in 1.1% cases (Table I).

Among respondents of younger age group (aged  $\leq 50$  year), 37.59% had moderate pain, 6.77% had severe pain, 13.91% had mild pain, and 41.17% had no pain. On the other hand, among older respondents aged  $>50$  year) 47.37% had moderate pain,

25.44% had severe pain, 13.15% had mild pain, and 14.03% had no pain. The differences between two groups was statistically significant ( $p < 0.05$ ). Among 249 males, 43.77% had moderate, 13.25% mild, 10.44% had severe pain, and 32.53% had no pain. Similarly, among 131 females, 35.11% had moderate, 16.03% had severe, 13.74% had mild pain, and 35.19% had no pain. The differences between two groups were not significant ( $p > 0.05$ ). Among 291 married respondents, 41.24% had moderate, 13.40% mild, 12.03% severe pain, and 33.33% had no pain; whereas among 60 unmarried respondents, 25% had moderate pain, 18.11% mild, 10% severe pain and, 46.67% had no pain. Among other group (divorced and widow) 65.52% had moderate pain, 24.14% severe pain, 3.45% had mild pain, and 6.89% had no pain. The differences between three groups were statistically significant ( $p < 0.05$ ). The pain was more frequent among high income group compared to others. Among this group, 46.97% had moderate pain, 24.24% had severe pain, 12.12% had mild pain, and only 16.67% had no pain, whereas among 21 lower incoming respondents, 38.10% had moderate pain, 19.05% had mild pain, 9.52% had severe pain, and 33.33% had no pain. The difference between the groups were significant ( $p < 0.05$ ) (Table II).

Table-II

## Distribution of pain among the respondents

Parameters	Pain Intensity				Test statistics
	No pain	Mild pain	Moderate pain	Severe Pain	
Age					$\chi^2 = 44.22$ $p = 0.00^a$ $df = 4$
$\leq 50$ years	111 (41.17)	37 (13.91)	100 (37.59)	18 (6.77)	
$>50$ years	16 (14.03)	15 (13.15)	54 (47.37)	29 (25.44)	
Gender					$\chi^2 = 4.18$ $p = 0.24^a$ $df = 4$
Male	81 (32.53)	33 (13.25)	109 (43.77)	26 (10.44)	
Female	46 (35.19)	18 (13.74)	46 (35.11)	21 (16.03)	
Marital status					$\chi^2 = 24.79$ $p = 0.00^b$ $df = 6$
Married	97 (33.33)	39 (13.40)	120 (41.24)	35 (12.03)	
Unmarried	28 (46.67)	11 (18.11)	15 (25.0)	6 (10.0)	
Others	2 (6.89)	1 (3.45)	19 (65.52)	7 (24.14)	
Socio demographic status					$\chi^2 = 17.83$ $p = 0.03^a$ $df = 12$
Lower income group	7 (33.33)	4 (19.05)	8 (38.10)	2 (9.52)	
Lower middle income group	36 (35.29)	14 (13.25)	41 (40.19)	11 (10.78)	
Upper middle income group	74 (38.74)	25 (13.09)	75 (39.27)	17 (8.90)	
Higher income group	11 (16.67)	8 (12.12)	31 (46.97)	16 (24.24)	

<sup>a</sup>p value was obtained from chi-square test

<sup>b</sup>p value was obtained from Fisher's exact test.

Table-III

## Distribution of pain in different parts of the body and pain intensity

	Frequency n (%)	Pain intensity			Test statistics
	Mild pain (%)	Moderate pain (%)	Severe pain (%)		
Musculoskeletal pain	Hip	78 (20.53)	1 (0.26)	58 (15.26)	19 (5)
Neck	35 (9.21)	1 (0.26)	26 (6.84)	8 (2.10)	p = 0.00b
Leg and calf muscles	20 (5.26)	2 (0.52)	13 (3.42)	5 (1.31)	$\chi^2 = 258.17$
Back and Spine	19 (5.0)	3 (0.78)	11 (2.89)	5 (1.31)	
Shoulder	6 (1.58)	1 (0.26)	5 (1.31)	0	
Arms and hands	4 (1.05)	1 (0.26)	1 (0.26)	2 (0.52)	
Others	22 (5.78)	5 (1.31)	12 (3.15)	5 (1.31)	
Headache	61 (16.05)	29 (7.63)	25 (6.57)	7 (1.84)	
Eye	6 (1.58)	4 (1.05)	2 (0.53)	0	

bp value was obtained from chi-square test.

Pain varied widely in hip, neck, leg and calf muscles, back and spine, shoulder, arms and hand, and other parts of the body among confirmed COVID-19 study respondents. Among musculoskeletal system, the most frequent involved joint was hip joint (20.53%). Among all cases, 15.26% had moderate and 5% had severe hip pain. Neck pain was found in 9.21% of cases and moderate pain was reported in 6.84%, and severe pain 2.10% of cases. Moreover, 5.26% cases had leg and calf muscle pain, 5% back and spine pain, 1.58% shoulder, 1.05% arms and hands, and 5.78% had pain in others region. Among all respondents, 16.05% had headache of which majority had mild to moderate headache (7.63%, and 6.57% respectively, and 1.84% had severe headache. Additionally, 1.58% had pain in the eyes. The differences between the pain of various parts of the body were statistically significant ( $p < 0.05$ ) (Table III).

Physical health was measured by Validated Bangla version of short form- 12 V2 (SF-12v2) survey instrument. About 49.21% respondents had both MSK pain, and physical health worse than the average, whereas, 19.21% had physical health worse than the average but had no pain. The difference between two variables was significant ( $P < 0.05$ ) (Table IV).

Table-IV

## Pain and Health Status of the respondents

	Physical Health status		p value
	Physical health better than average n (%)	Physical health worse than average n (%)	
No Pain	54 (14.21)	73 (19.21)	0.02a
Pain	66 (17.36)	187 (49.21)	

<sup>a</sup>p value obtained from chi-square test.

Physical health status was measured using SF-12v2.

## Discussion

This study found older respondents suffered more from all severity (mild, moderate and severe) of pain compared to young age group. Another study found similar findings. They found clinical manifestations of muscle pain caused by COVID-19 were more likely to be experienced by adult patients rather than pediatric patients<sup>11</sup>. As older patients are commonly involved in osteoarthritis arthritis, polymyositis etc., they can have pain symptoms more compared to young people. With each passing year, human aging triggers a decline in cognitive abilities. Diet, exercise, lifestyle, and co-morbidities are factors that accelerate a person's biological age (hypertension, diabetes, obesity). Changes in the hematopoietic stem cell (HSC) pool lead to the loss of function in both the innate and adaptive immune systems as people age.

This study found among 380 participants, majority were males (65.53%) infected with COVID-19. The enhancing mortality rate from COVID-19 for males found (2.4 times) higher than females also found by another study<sup>12</sup>. The explanations for the sex differences in COVID-19 are perhaps multifaceted including variations in immune response, higher incidence of pre-existing disease, biological differences between the sexes such as high levels of androgens in men, differences in lifestyle such as smoking habits as well as differences in underlying comorbidities<sup>13,14,15</sup>.

Most frequent symptoms were found respiratory clusters symptoms including fever, cough, rhinorrhea and breathlessness (76.05%) followed by musculoskeletal pain (48.42%), headache (16.05%) and abdominal pain in 0.5% of

cases. Another literature reported the clinical symptoms at the onset of illness in patients with COVID-19, in which fever was the most common symptom (98%), followed by cough (76%), dyspnea (55%), muscle pain or fatigue (44%), and headache (8%)<sup>16</sup>, which is similar to this study finding.

Among different types of pain, this study reveals that joint pain found among 22.63% males and 13.15% females. Rest complained of bone pain or pain in the muscles. Majority of the male and female respondents suffered from headache (22.89%) followed by hip pain (21.84%). According to another study<sup>17</sup>, patients with SARS Cov-2 also reported myalgia (49.3–60.9%), headache (35.4–55.8%), sore throat (12.5–23.2%), chest pain (10.4%), and abdominal pain (3.5%). Similar result found in a literature review<sup>18</sup>, the most common musculoskeletal manifestation found by them was myalgia (48 studies; 80%).

However, about 1 in every 2 confirmed COVID-19 individuals who had MSK pain was reported having physical health worse than the average. We didn't find any such data in the literature to compare with our findings.

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## Conclusion

This telemedicine based cross-sectional study was conducted among adults to assess the musculoskeletal pain within the context of COVID-19. Among the respondents, older age group suffered more with pain compared to younger age group. According to intensity of pain, participants from all age group suffered more from moderate pain. Across the marital status, all groups (unmarried, married and others) mentioned about moderate pain. Among musculoskeletal system, the reported involvement of hip joint was highest (one-fifth) and next category was neck. More than fifteen percent respondents complained about mild to moderate headache. To address this issue urgently pain rehabilitation intervention should be designed for COVID-19 infected patients. Additionally, post COVID follow up research is recommended.

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