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Research Article,

Musculoskeletal Symptoms and Its Associated Factors among Post-COVID-19 Patients Attended In a Rehabilitation Centre

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Abstract:

Background: COVID-19 is a pandemic disease affecting a huge number of people around the world. Survivors of COVID-19 complained of exacerbated musculoskeletal symptoms especially for those who had pre-existing problems.

Aim: This study aimed to find out the different types of the musculoskeletal symptom felt by post-covid-19 survivors and to explore the association among those symptoms and associated factors.

Methods: A descriptive type of cross-sectional study was conducted having 90 participants. Participants were selected using a purposive sampling technique. Data were collected from participants through a structured questionnaire using face to face interview.

Results: Among the 90 participants, 63 were male and 27 were female with a mean age of 45.43 years. 80 participants were from the urban area and 10 from rural area. In the location of pain status, 25 complained of pain in the head and neck, 12 in the upper limb, 31 in the lower limb and 22 in the back. Besides, 80 complained of global weakness and 10 did not have. A significant association was found between age of the participants and severity of COVID ($p<0.002$), duration and severity of pain after COVID ($p<0.003$), smoking and global weakness after COVID ($p<0.006$), general health and severity of COVID ($p<0.010$), general health and severity of weakness ($p< 0.02$), general health and severity of pain ($p< 0.05$), exercise before COVID and severity of COVID ($p< 0.001$), recovery from active COVID and severity of weakness ($p< 0.04$).

Conclusion: Musculoskeletal symptoms are features of post-COVID-19 survivors. This study found a signification association between different factors which would be helpful in future for conduction empirical research.

Keywords: COVID-19, Musculoskeletal symptoms.

Interoduction:

China has reported pneumonia cases with idiopathic cause to World Health Organization (WHO) on December 31st, 2019, WHO confirmed that a novel coronavirus was the cause of respiratory problems in a cluster of people in Wuhan city, Hubei Province, in China on January 12th, 2020 [1]. WHO declared coronavirus disease 2019 (COVID-19) as pandemic worldwide and Bangladesh is a part of this worldwide pandemic. COVID-19 caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). In March 2020, the virus was confirmed to have spread in Bangladesh. On March 18th, 2020 the first three known cases were reported in Bangladesh by Institute of Epidemiology Disease Control and Research (IEDCR) [2]. Although the majority of patients who become infected with SARS-CoV-2 are asymptomatic or have mild symptoms, some patients develop severe symptoms that can permanently detract from their quality of life. SARS-CoV-2 is closely related to SARS-CoV-1, which causes severe acute respiratory syndrome (SARS) [3]. Epidemiological data from the SARS pandemic of 2002 to 2004 identified myalgia, muscle dysfunction and osteoporosis as common squeal in patients with moderate and severe forms of this disease. Early studies have indicated that

there is also considerable musculoskeletal dysfunction in some patients with COVID-19 [4]. Studies from patients who contracted moderate and severe SARS-CoV-2 infections have indicated a substantial musculoskeletal burden of this disease, including skeletal muscle, neurological, bone, and joint disorders. Extended ventilator times are also known to induce pro-inflammatory conditions that lead to muscle and bone frailty, which can reduce the overall quality of life. Moreover, the clinical presentation and symptoms include arthralgia, myalgias and generalized weakness that have been reported to occur in one-quarter to one-half of symptomatic patients with COVID-19 [5].

In the current time, COVID-19 pandemic situation has been burning issues around the globe. Regardless of the variety of symptoms and signs, COVID-19 recovered individuals complained of musculoskeletal symptoms which have been ignored since its first identification. From the evidence, it was found that populations over 55 years were more vulnerable to be affected by COVID-19. Besides, individuals suffering from pre-existing co-morbid conditions like diabetes mellitus, hypertension, ischemic heart disease, chronic obstructive pulmonary disease were highly influenced by COVID-19 [6]. From the best knowledge of the researcher, no other studies in Bangladesh intended to find musculoskeletal symptoms and its associated factors among post-COVID survivors. From the earlier scientific evidence, it was disclaimed that inactivity exacerbates the symptoms of musculoskeletal conditions. As the primary prevention of COVID-19 is to be an in-home quarantine, individuals who had pre-existing musculoskeletal symptoms might have the risks of exacerbation of their symptoms. However, the current aimed to find the socio-demographic information, status of musculoskeletal symptoms, level of physical activity and association among theses variables and COVID-19.

Materials and Methods:

This cross-sectional study included 90 post-COVID-19 patients attended a rehabilitation centre in Uttara, Dhaka. Participants were included when they have a history of positive COVID-19 test and received medical management with having negative results, complained of musculoskeletal symptoms and age range between 40-60 years. Participants were excluded if they had positive COVID-19 test during study participating period and age range below 40 and over 60 years.

Data collection:

Data were collected through a structured questionnaire comprised of demographic information, physical activity-related information and musculoskeletal related symptoms.

Statistical analysis:

Socio-demographic and musculoskeletal related symptoms were analyzed using descriptive statistics by frequency, percentages in a table and association were made by different categorical variables through inferential statistics using the chi-square test. Microsoft Office Excels 10 Version and statistical package for the social science (SPSS) version 22 software was used for data calculation.

Results:

In this study, 90 participants were selected with 70% (n=63) of male and 30% were female (n=27) (figure-1). The mean age of the participants was 45.43 years with the age range was 35 to 66 years.

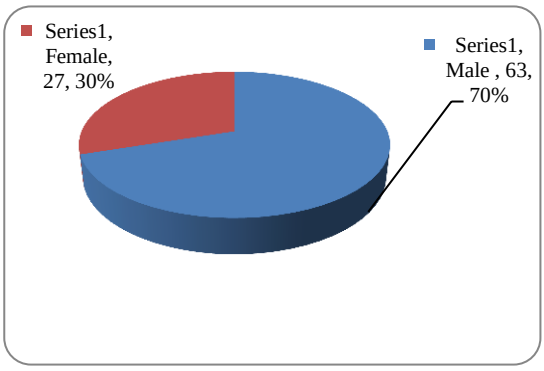

Figure1: Gender distribution of the participants

Among the 90 participants, 10 (11.12%) were from rural and 80 (88.88%) from the urban area. Educational status showed that 50 (55.55%) completed secondary level, 33 (36.66%) graduation levels and only 07 (7.77%) post-graduation level. Regarding the general health status point of view, 46 (51.11%) had good health, 25 (27.77%) had fair health and 19 (21.12%) had poor health. Occupation of the participants showed that 35 (38.88%) were having service holder followed by 20 (22.22%) businessman, 03 (3.33%) housewife, 15 (16.7%) student, banker and 02 (2.22%) retired person whereas, in terms of severity of COVID-19, 60 (66.66%) had mild, 20 (22.22 %) had moderate and 10 (11.12 %) had severe. Meanwhile, 64 (71.11 %) participants did not perform a regular exercise before COVID-19 and 26 (28.89%) performed exercise regularly. In

contrast, 60 (66.66%) did not perform exercise regularly after recovery from COVID-19 and 30 (33.34 %) participants performed exercise regularly after recovery from COVID-19. In the pain status after COVID-19, 57 (63.33%) complained of pain and 33 (36.37%) did not complain of pain. Besides, 55 (61.11%) participants had mild pain, 23 (25.55%) complained of moderate pain and 12 (13.34%) had severe pain. In the location of pain status, 25 (27.77 %) complained of pain in the head and neck, 12 (13.33%) in the upper limb, 31 (34.45%) in the lower limb and 22 (24.45 %) in the back. Besides, 80 (90.00%) complained of global weakness and 10 (10.00%) did not have. The severity of weakness showed 19 (21.11%) had mild, 50 (55.55%) moderate and 21 (27.76%) severe weakness (Table 1).

Table 1: Frequency and percentage of demographic variables and musculoskeletal symptoms of the participants

Variable	Category	Frequency (Percentage)
Educational status	Secondary level	50 (55.55%)
	Graduation level	33 (36.66%)
	Post Graduation level	07 (7.77%)
The living area of the patient	Rural	10 (11.12%)
	Urban	80 (88.88%)
General health	Good	46 (51.11%)
	Fair	25 (27.77%)
	Poor	19 (21.12%)
Severity of COVID-19	Mild	60 (66.66%)
	Moderate	20 (22.22 %)
	Severe	10 (11.12 %)
Occupation of the participants	Service	35 (38.88%)
	Businessman	15 (16.66%)
	Housewife	20 (22.22%)
	Student	03 (3.33%)
	Banker	15 (16.7%)
	Retired person	02 (2.22%)
Daily exercise before COVID 19	Do not perform exercise regularly	64 (71.11 %)
	Performed exercise regularly	26 (28.89%)
Daily exercise after recovery from active COVID 19.	Do not perform exercise regularly	60 (66.66%)
	Performed exercise regularly	30 (33.34 %)
General Pain after COVID 19	Yes	57 (63.33.%)
	No	33 (36.37%)
Severity of pain	Mild	55 (61.11%)
	Moderate	23 (25.55%)
	Severe	12 (13.34%)
	Head and neck	25 (27.77 %)
	Upper limb	12 (13.33%)

Location of MSK pain	Lower limb	31 (34.45%)
	Back	22 (24.45 %)
Global weakness	Yes	80 (90.00%)
	No	10 (10.00%)
Severity of weakness	Mild	19 (21.11%)
	Moderate	50 (55.55%)
	Severe	21 (27.76%)

Cross tabulation among demographic variables, musculoskeletal symptoms and COVID-19 showed a significant association between age of the participants and severity of COVID ($p<0.002$), duration and severity of pain after COVID ($p<0.003$), smoking and global weakness after COVID ($p<0.006$), general health and severity of COVID ($p<0.010$), general health and severity of weakness ($p< 0.02$), general health and severity of pain ($p< 0.05$), daily exercise before COVID and severity of COVID ($p< 0.001$), daily exercise after recovery from active COVID 19 and severity of weakness ($p<0.04$). In contrast, significant associations ($p> 0.05$) were not found between age of participants and pain after COVID, living area and pain after COVID, age of participants and global weakness after COVID, living area of participants and global weakness after COVID, duration and global weakness after COVID, general health and location of musculoskeletal pain, daily exercise before COVID 19 and severity of weakness, daily exercise before COVID 19 and severity of pain, daily exercise before COVID 19 and location of musculoskeletal pain, daily exercise after recovery from active COVID 19 and severity of pain, daily exercise after recovery from active COVID 19 and location of musculoskeletal pain (Table 2).

Table 2: Association between demographic variables, musculoskeletal symptoms and COVID-19

Different variables and COVID-19 parameters	Chi-square value	*p*-value
Age of participants and pain after COVID- 19	9.79	0.140
Age of participants and the severity of pain after COVID- 19	16.15	0.002
Living area and pain after COVID- 19	1.075	0.584
Duration of COVID- 19 and severity of pain after COVID- 19	15.91	0.003
Age of participants and global weakness after COVID- 19	14.210	0.472
The living area of participants and global weakness after COVID- 19	2.270	0.321
Duration of COVID- 19 and global weakness after COVID- 19	49.54	0.491
Smoking of participants and global weakness after COVID- 19	12.43	0.006
General health and Severity of COVID-19	6.677	0.010
General health and severity of weakness	10.75	0.02
General health and severity of pain	10.96	0.05
General health and location of musculoskeletal pain	4.41	0.35
Daily exercise before COVID 19 and severity of COVID-19	20.00	0.001
Daily exercise before COVID 19 and severity of weakness	5.25	0.26
Daily exercise before COVID 19 and severity of pain	4.07	0.39
Daily exercise before COVID 19 and location of musculoskeletal pain	2.63	0.62
Daily exercise after recovery from active COVID 19 and severity of weakness	12.89	0.04

Daily exercise after recovery from active COVID 19 and severity of pain	10.20	0.25
Daily exercise after recovery from active COVID 19 and location of musculoskeletal pain	9.09	0.33

Discussion:

This study stated that among the 90 participants, 70% (n=63) males and the mean age of the participants was 45.43 years with the age range was 35 to 66 years. Residence showed 10 (11.12%) were from rural, 80 (88.88%) from the urban area. Among them, 50 (55.55%) completed secondary level, 33 (36.66%) graduation levels and 07 (7.77%) post-graduation level of education. One-third of the participants (35 (38.88%) of them were service holder followed by businessman 20 (22.22%), student 15 (16.7%), respectively. One retrospective study was conducted in China having 99 post COVID participants with the mean age (±SD) 49.40 (± 18.45) years where 51 (51.51%) were male and 48 (48.49%) were female participants [7]. The main similarity between these studies was the highest number of male participants and more or less similar mean age group. Given that study conducted by Huang and colleagues was in the city of Wuhan, China but the current study participants were from different areas i.e. rural and urban.

More than half 46 (51.11%) of the participants were having good health, followed by 25 (27.77%) had fair health and 19 (21.12%) had poor health. Amongst them, 57 (63.33%) complained of pain and 33 (36.37%) did not complain of pain. Besides, 55 (61.11%) participants had mild pain, 23 (25.55%) complained of moderate pain and 12 (13.34%) had severe pain. In the location of pain status, 25 (27.77 %) complained of pain in the head and neck, 12 (13.33%) in the upper limb, 31 (34.45%) in the lower limb and 22 (24.45 %) in the back. A similar study conducted in the two Spanish universities to find out the musculoskeletal pain among the 1198 students during the lockdown period. In this study, participants 837 (69.86%) complained of neck pain, 162 (13.52%) shoulder pain, 57 (4.75%) elbow pain, 20 (1.66%) hip joint pain and 22 (1.84) knee joint pain [8]. The main similarity between the studies was the regions of musculoskeletal complaint were almost in a similar location. In contrast, this study participant was from different professionals but the study conducted by Leiros-Rodriguez only focused on the only one group of participants that were university students.

This study demonstrated that 64 (71.11 %) participants did not perform a regular exercise before COVID-19 and 26 (28.89%) performed exercise regularly. In contrast, 60 (66.66%) did not perform exercise regularly after recovery from COVID-19 and 30 (33.34 %) participants performed exercise regularly after recovery from COVID-19. The study conducted by Ambrose and colleagues [9] aimed to find outpatient and caregiver guide to managing COVID-19 patients at home. This study demonstrated a dose based exercise programs including exercises for chest, limbs and trunk with specific durations. From the best knowledge of the researcher any studies yet to find the exercise status of COVID-19 patients. Therefore, the current research helped to find a level of exercise importance at the individual level of COVID-19 patients. Given that dissimilarities between two of the studies were very much clear to the reader. The current study focused that majority of individuals did not perform exercise regularly; whereas, Ambrose and colleagues focused on the importance of dose based regular exercise. The main similarity between the studies is the role of exercise for post-COVID-19 patients.

This study also found a significant association between age of the participants and severity of COVID ($p<0.002$), duration and severity of pain after COVID ($p<0.003$), smoking and global weakness after COVID ($p<0.006$), general health and severity of COVID ($p<0.010$), general health and severity of weakness ($p< 0.02$), general health and severity of pain ($p< 0.05$), daily exercise before COVID and severity of COVID ($p< 0.001$), daily exercise after recovery from active COVID 19 and severity of weakness ($p< 0.04$). Studies conducted by different researchers found a similar significant association ($p<0.05$) between exercise and musculoskeletal symptoms [10] age and duration of COVID and severity of COVID ($p<0.05$) [11]. In contrast, no significant associations ($p> 0.05$) were found between age of participants and pain after COVID, living area and pain after COVID, age of participants and global weakness after COVID, living area of participants

and global weakness after COVID, duration and global weakness after COVID, general health and location of musculoskeletal pain, daily exercise before COVID 19 and severity of weakness, daily exercise before COVID 19 and severity of pain, daily exercise before COVID 19 and location of musculoskeletal pain, daily exercise after recovery from active COVID 19 and severity of pain, daily exercise after recovery from active COVID 19 and location of musculoskeletal pain. Besides, researchers around the world assessed to find out the correlation between COVID-19 and musculoskeletal symptoms predominately low back pain. One study conducted by Sagat and colleagues did not find any significant association between home quarantine and musculoskeletal symptoms like low back pain, neck pain, shoulder pain, general weakness ($p > 0.05$) [12]. The similarity between the current study and this study was the assessment of musculoskeletal symptoms and quite the opposite, Sagat and colleagues included a large number of respondents (463) and the current study only included a minimum (90).

Conclusion:

This study forms a foundation to assess the musculoskeletal symptoms among post-COVID-19 patients and their associate factors. Despite a few limitations of the study, the results might have drawn attention to the scientific community to conduct more research on musculoskeletal symptoms and post COVID-19 survivors.

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