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Assessment of Physical Deconditioning due to COVID-19 Lock Down: A Comparison between COVID-19 Affected and Non-affected Person

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Abstract

Introduction: *The COVID-19 lockdown significantly reduced physical activity due to home confinement and limited access to fitness facilities, leading to physical deconditioning characterized by decreased strength, endurance, and mobility. Those infected with COVID-19 may have experienced more severe deconditioning due to illness-related inactivity, respiratory issues, and prolonged recovery, particularly in long-COVID cases.* ***Objectives:*** *To find out the physical deconditioning pattern due to lock down.* ***Materials and Methods:*** *This is a Case-control Study carried out Post COVID-19 clinic and Department of Physical medicine & rehabilitation in BSMMU during the period of 01-7-2021 to 30-06-2022. The patients (As Case) attending in post COVID-19 clinic at OPD of BSMMU and persons (As Control) attending the OPD. The subjects were divided into two groups as designated below: Group A: The case group was COVID-19 positive previously and Group B: Control group was the normal individual. So, total sample size is 150 in each group. The data was collected by semi structured questionnaire. The data was analyzed statistically by using Statistical Package for Social Science (SPSS) for Windows version 23.* ***Results:*** *Most participants were in service (98, 30.1%), housewives (81, 24.8%), businessmen (37, 11.3%), and physicians (28, 8.6%), with 82 (25.2%) from various other occupations like garment workers, students, teachers, and bankers. The case group showed mostly mild to moderate fatigue, while the control group had mild or no fatigue (P=0.001). In cases, most had Grade-1 & 2 dyspnea by MMRC, while the control group had Grade-0, 1, & 2. Deconditioning in activities like feeding, dressing, and grooming was common in cases but rare in controls (P=0.001). Personal hygiene deconditioning was mild to moderate in cases, while 108 controls had none, and 63 had mild issues (P=0.001). Moderate deconditioning was common in cases for outlet and active recreation, while controls had no deconditioning. Cases also showed mild to moderate deconditioning in socialization, whereas controls had no or mild deconditioning (P=0.001).* ***Conclusion:*** *This study concluded that deconditioning symptoms were more severe in COVID-19 patients compared to non-infected individuals. Fatigue and dyspnea were common, especially in those with co-morbidities. Daily activities were more significantly affected in COVID-19 patients. Exercise is recommended during lockdowns to reduce physical deconditioning.*

Key words: *Physical Deconditioning due to COVID-19 Lock down, COVID-19 affected and non-affected person.*

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Introduction:

Acute respiratory syndrome due to COVID-19 was found in patients with severe pneumonia in Wuhan at first. It has spread rapidly since its recent identification China. As of 10 April 2020. COVID-19 has been reported in more than 195 countries and some areas across 6

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continents and >2.3 million cases are confirmed, with an estimated mortality risk of ~3.4%[1]. There is no current specific treatment for covid-19, the race is on to develop or repurpose drugs to help end this pandemic. The World Health Organization (WHO) has now launched the SOLIDARITY trial to investigate four potential treatments: chloroquine/hydroxychloroquine; lopinavir and ritonavir; and lopinavir and ritonavir plus interferon-β[2]. COVID-19 pandemic has resulted in a devastating threat to human society in terms of health, economy, and lifestyle. Although the virus usually first invades and infects the lung and respiratory track tissue, in extreme cases, almost all major organs in the body are now known to be negatively impacted often leading to severe systemic failure in some people[3,4]. COVID-19 illness may therefore affect physical, cognitive and psychological function in multiple ways; a combination of low muscle strength due to frailty and impaired endurance due to cardiorespiratory disease is common, complicated by cognitive and psychological deficits[5,6]. Data from the global ISARIC survey (ISARIC) COVID-19 Report, 2020 confirm that people most severely affected by COVID-19 will have had prolonged hospital stays, often spending much of this in bed, contributing to functional decline along with deconditioning. Prolonged immobility in the hospital is associated with a number of impairments including decline in muscle strength, muscle mass, cognitive function, muscle protein synthesis and physical function. Hospitalization is also associated with a decline in activity of daily living (ADL) performance[7]. The workforce delivering COVID-19 rehabilitation must be able to ensure that each patient will need an individualized programme, including aerobic exercise, strength training, balance training, breathlessness management, energy conservation, functional and vocational rehabilitation, and psychological support[8]. Such a programme can be delivered effectively only by a multidisciplinary team, which needs to have access to the full range of physical and occupational therapy, medical, nursing, dietetic, psychology and speech and language staff. The "deconditioning syndrome," a side effect of hospital admission and a consequence of inactivity[9]. Although less dramatic, the months of isolation at home as a result of the Covid-19 pandemic will have an immense deconditioning effect, affecting millions of people. Spending months at reduced levels of activity will have an impact on all 4 aspects of physical fitness—strength, stamina, suppleness, and skill. It is important to appreciate also that there will be a loss of cognitive and emotional wellbeing as a result of isolation and loneliness, and this will increase the risk of dementia[7]. After the pandemic there may be reduction of risk of physical inactivity, dementia, frailty etc but still social care will be needed[10]. It was found that COVID-19 was followed by a deconditioning pandemic. So. reconditioning programme needs to be taken to support physical, cognitive, and emotional activity for all the people living in a community (Douglas et al. 2020)[11]. By this study, an attempt was made to reverse the deconditioning due to COVID-19 and to prevent further harm. It will lead many people to rethink what is happening to them as they live longer and take proper precaution to protect themselves from deconditioning due to COVID-19.

Materials and Methods:

This is a Case-control Study carried out Post COVID-19 clinic and Department of Physical medicine & rehabilitation in BSMMU during the period of 01-7-2021 to 30-06-2022. The patients (As Case) attending in post COVID-19 clinic at OPD of BSMMU and persons (As Control) attending the OPD of department of physical medicine and rehabilitation in BSMMU during the study period was constituted as study population. The subjects were divided into two groups as designated below: Group A: The case group was COVID-19 positive previously and Group B: Control group was the normal individual. So, total sample size is 163 in each group. All participants were assessed by standard measuring instruments: Canadian occupational performance measure (COPM), and exercise performance or dyspnea will be assessed by modified medical research council scale (MMRC scale). The physical functioning after Covid-19 recovery, the condition of exercise performance was assessed. Physical deconditioning were compared between two groups. Collected data was stored under secured lock and key. Occupational performance problems, concerns and issues, interview the client asking about daily activities in self-care, productivity and leisure. Ask the clients about daily activities which they want to do, need to do or are expected to do by encouraging them to think about a typical day. Then ask the client to identify which of these activities are difficult for them to do now to their satisfaction. These activity problems was recorded in Steps 1A, 1B or 1C. Using the scoring card provided, ask the client to rate on a scale 1 to 10, (mild, moderate or severe) the importance of each activity. Place the ratings in the corresponding boxes in 1A, 1B or 1C. The data was analyzed statistically by using Statistical Package for Social Science (SPSS) for Windows version 23.

Results:

Regarding occupation of the participants, most of them were involved in service 98(30.1%), house wives, 81 (24.8 %), businessman 37 (11.3 %) and physician 28 (8.6%). But there are some other participants 82 (25.2 %) of different occupation was found in our findings; they were garments workers, Students, Teachers, Bankers and others (Figure 1). Regarding deconditioning status according to fatigue, it was observed that majority respondents had mild and moderate fatigue in case. But mild fatigue or no fatigue was found more in control group (P=0.001) (Table-I). It was observed that most of the respondents had Grade-1 & 2 dyspnea by MMRC in case. But it was observed that most of the respondents had Grade-0 &1 & 2 dyspnea by MMRC in case (Figure 2). It was observed that most of the respondents had deconditioning on feeding, dressing, bathing and grooming in case. But only a few had deconditioning on feeding, dressing, bathing and grooming in control (Table-II). It was observed

that most of the respondents had deconditioning associated with mild to moderate personal hygiene but 108 respondents had no decondition and 63 had mild problem regarding personal hygiene in control group (Table- III). It was observed that more than majority patients had moderate deconditioning on outlet recreation in case and no moderate deconditioning on outlet recreation in control. Majority had moderate deconditioning on active recreation in case and had mild deconditioning on active recreation in control. Most of the cases had mild to moderate deconditioning on socialization but no or mild deconditioning found on socialization in control (Table-IV).

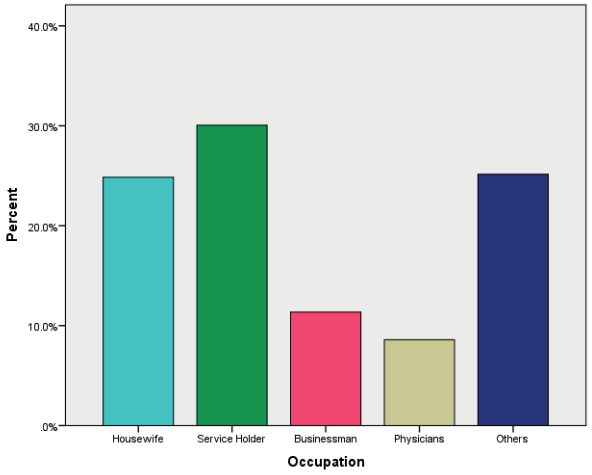

Figure.1: Distribution of occupation of the patients included in the study (N=326).

Table I: Distribution of fatigue of the study subject (N=326)

	Fatigue				P-value
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	17	53	67	18	0.001
Control	61	106	4	0	

Results were expressed as frequency and percentage (%),n= Number of patients in each group

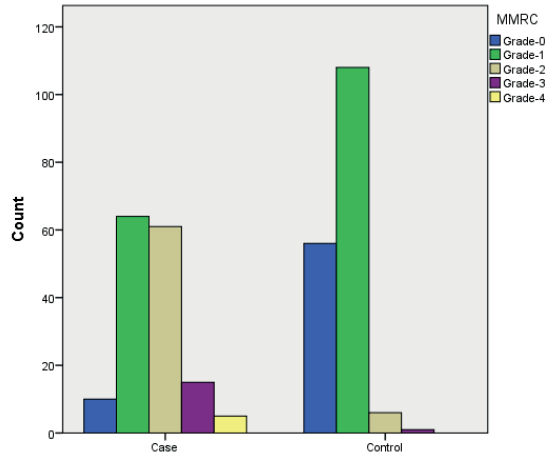

Figure-2: Bar diagram shows the distribution of the deconditioning severity according to MMRC.

Table II: Distribution of the deconditioning status according to personal care (N=326

	Feeding				P-value
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	68	58	23	6	
Control	169	1	1	0	0.001
	Dressing				
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	65	60	23	7	
Control	166	5	0	0	0.001
	Bathing				
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	42	60	46	7	0.001
Control	160	11	0	0	
	Grooming				
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	64	58	29	4	
Control	151	20	0	0	0.001

Results were expressed as frequency, n= Number of patients in each group

Table III: Distribution of the deconditioning severity associated With functional mobility (N=326)

	Transfers				P-value
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	11	56	72	16	
Control	132	39	0	0	0.001
	Indoors				
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	19	58	62	16	
Control	52	118	1	0	0.001
	Outdoors				
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	6	51	79	19	
Control	15	149	7	0	0.001

Results were expressed as frequency, n= Number of patients in each group

Table IV: Distribution of the deconditioning severity according to leisure (N=326)

	Outlet recreation				P-value
	No (n)	Mild(n)	Moderate (n)	Severe (n)	
Case	16	60	65	14	0.001
Control	84	87	0	0	

Results were expressed as frequency, n= Number of patients in each group

Discussion:

In the present series, a total of 326 respondents were included. Out of them, 213 (65.3 %) were male and 113 (34.7 %) were

female and male: female ratio was 1:0.64. The mean age of the patients in the study were 40.76±11.46 years. In a study, Townsend et al.[12] reported that out of 128 participants, mean age was (49.5 ± 15) years; and 54% were female that is some extent similar to this study. Researchers reported that the deconditioning can occur at any age, but amongst older adults can occur more rapidly and be more severe[13,14,15,16]. Many respondents in case group had HTN (61 in number) and only 10 had TB. Rinaldo,[17] reported that twenty-six (34%) had a diagnosis of systemic hypertension, 9 (12%) of diabetes, 3 (4%) of ischemic heart disease, and 3 (4%) of arrhythmia which correlates well with our study. In another study, researchers reported that older people and individuals with underlying chronic diseases are at high risk of responding worse to the viral infection and death[18]. Majority respondents had mild and moderate fatigue in case. But mild fatigue or no fatigue was found more in control group. In our study, the distribution of fatigue of the study patients in relation to deconditioning status showed that majority (89.4%) patients had fatigue in case and 106 (64.6%) in control. Similarly, Pasini et al.[19] reported that many patients who have been suffering by Covid-19 suffer of long-Covid syndrome, with symptoms of fatigue and muscular weakness that characterize post-acute sequelae SARS-CoV-2 infection (PASC). In a study, Townsend[12] examined potential predictors of fatigue following COVID-19 infection, evaluating indicators of COVID-19 severity, markers of peripheral immune activation and circulating pro-inflammatory cytokines. In that study out of 128 participants, more than half reported persistent fatigue (67/128; 52.3%) at median of 10 weeks after initial COVID-19 symptoms. Werner et al.[20] emphasized that patients with fatigue often complain that physical exertion produces an increase of complaints, leading to a greater need for rest and more time spent in bed. They also emphasized that this is due to a bad physical fitness and that physical deconditioning is a perpetuating factor in fatigue. We also used MMRC scale in our study. In a report, WHO,[6] stated that out of seventy-five patients, 39 patients had a critical, 18 severe, and 18 mild-moderate disease assessed by MMRC. Most of the respondents had deconditioning on feeding, dressing, bathing and grooming in case. But only a few had deconditioning on feeding, dressing, bathing and grooming in control. It was found that most of the respondents had deconditioning associated with mild to moderate personal hygiene but 108 respondents had no decondition and 63 had mild problem regarding personal hygiene in control group. In a study, Guilcher et al.[21] concluded that participants described a substantial lack of physical, cognitive, and social activities, which led to deconditioning. Recommendations to address deconditioning include: (1) measuring physical/psychological function and well-being throughout hospitalization; (2) redesigning hospital environments (e.g., create social spaces); and (3) increasing access to rehabilitation during acute hospital stays, while patients wait for the next point-of-care. The finding of the higher number of patients observed in indoor as compared to control is correlated well with the physical inactivity which lead to deconditioning. Fettes et al.[22] stated that prolonged physical and social isolation related to increased disability in basic and instrumental activities of daily living, and greater difficulty in daily activities. These findings suggest disability in daily activities is associated with prolonged physical or social isolation and inactivity. It was observed that majority respondents had mild to moderate deconditioning on transfers, indoors activity and outdoor performances in case group but majority respondents had mild deconditioning on transfers, indoors activity and outdoor performances in control group. In the context of our findings, Bentlage et al.[23] observed that diminished habitual physical activity and increased sedentary levels have been found as a result of COVID-19 home-confinement. Consequences of inactivity, including a higher mortality rate and poorer general health and fitness, have been reported. In this context, Bethesda et al.[24] reported that the access to health care, medications and medical supplies, food security, finances, transportation, and affordability of technology were needs and concerns of older adults with low socioeconomic status during the pandemic. Majority patients had deconditioning on transportation in case, but less amount found in control. About three fourth patients had deconditioning on shopping in case and in control it was less in amount. Majority patients had deconditioning on finances in case and less amount in control. Crawford et al.[25] reported that as employees restart work and leadership tries to get back to meeting production and revenue standards, it is important to consider ways to reintegrate employees into standard work without increasing MSD (Musculoskeletal disorder) risk by providing right tools and ergonomic equipments and a wide range of workplace adjustment. Most of the respondents had deconditioning on paid/unpaid work in case and also in control. Majority patients had deconditioning on household management more or less same in case and in control. Maximum respondents had deconditioning on play skills in case and less in control. More than majority patients had moderate deconditioning on outlet recreation in case and no moderate deconditioning on outlet recreation in control. Majority had moderate deconditioning on active recreation in case and had mild deconditioning on active recreation in control. Most of the cases had mild to moderate deconditioning on socialization but no or mild deconditioning found on socialization in control. Di Lorito et al.[26] reported that the added risks and effects of deconditioning on people with reduced capability to do paid/unpaid work, require considerable efforts among clinicians to ensure that they initiate and maintain physical activity in prolonged periods of social distancing. Delivering rehabilitation in the same way as before the pandemic might not be feasible or sustainable and innovative approaches must be found. The recommendations provided by many international organizations to maintain active lifestyles during these times mainly target the general population[23]. Supervised physical activity programs are urgently needed, with the option to group-play physical activity programs. In a study[18,19] it was found that COVID -19 has an unforeseen impact on physical activity and sport, affecting professional, elite,

collegiate, tactical, occupational, and recreational activities.

Conclusions:

From the present study, it may be concluded that deconditioning features were more in COVID-19 affected individuals than the normal persons. Deconditioning like fatigue and dyspnea were most common features and the people with multiple co-morbidities. During COVID-19 pandemic activity of daily livings was also affected in normal individual but more in COVID-19 affected patients. During any lockdown period exercises should be recommended for all individual.

Conflict of Interest: None.

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