



Musculoskeletal Characteristics among Diabetic and Non-Diabetic Patients Attended at Centre for the Rehabilitation of the Paralyzed (CRP)

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Abstract

Objectives: This study was aimed to find out the musculoskeletal characteristics, behavioral risk factors and association of the musculoskeletal characteristics of diabetic and non-diabetic population.

Methods: A descriptive type of cross sectional study of 230 participants was conducted where 68 participants were diabetic and 162 were non-diabetic. The sample was selected by using convenient sampling technique. Data was collected from the participants through face to face interview. The structured questionnaire was made using Cornell Musculoskeletal Discomfort Questionnaire (CMDQ).

Results: The study result shows that, among diabetic and non-diabetic participants 57.4% and 56.2% were female and highest number of participants, 26.5% diabetic and 27.2% non-diabetic participants correspondingly were in the age range of 31-40 and 41-50 years. Nearly half of the population 44.1% and 43.8% were housewife in occupation. The majority of diabetic and non-diabetic participants suffered musculoskeletal pain in shoulder 18.80% and 13.60%, lower back 46.40% and 54.60%, and knee 44.90% and 24.10%. Only few participants, 29.9% diabetic and 27.2% non-diabetic patient has experienced paresthesia or numbness. It was found that 38.85% diabetic and 28.50% non-diabetic patients had muscle weakness and the majority of participants, 83.60% and 78.50% patients were facing difficulties during movement. Only a few diabetic and non-diabetic participants experienced swelling 2.9% and 2.5%, joint stiffness 4.4% diabetic and also 2.5% and muscle wasting 1.5% and 1.2%.

Conclusion: Musculoskeletal conditions affect diabetes and non-diabetic people and cause pain, discomfort, and dysfunction. This effect also has an impact on the patient's quality of life. A multidisciplinary team strategy should be employed to treat the musculoskeletal issue of diabetic patients while also raising the standard of care for these patients.

Keywords: Diabetes; Musculoskeletal Characteristic

Abbreviations: MS: Musculoskeletal; COPD: Chronic Obstructive Pulmonary Disease CHF: Congestive Heart Failure; CRP: Centre for the Rehabilitation of the Paralyzed; VAS: Visual Analogue Scale; CMDQ: Cornell Musculoskeletal Discomfort Questionnaire.

Introduction

By 2045, type 2 diabetes is expected to affect up to 95% of adults with diabetes [1], meaning that 693 million people around the world would have the disease by then. Musculoskeletal (MS) issues, such as shoulder capsulitis, reduced joint mobility, trigger finger, Dupuytren's contracture, Charcot's foot, carpal tunnel syndrome, and osteoarthritis, are frequent in people with DM and can cause severe impairment [2]. Over time, a lack of insulin can lead to muscle cell atrophy, which reduces muscle mass and causes joint pain [3]. Muscles play a crucial role in maintaining healthy blood sugar levels. Loss of skeletal muscle mass and strength is a regular occurrence in older persons, and this is a major contributor to MS difficulties [4]. Alterations to the musculoskeletal system can be further propagated by age-related illnesses such Chronic obstructive pulmonary disease (COPD) and Congestive heart failure (CHF) [5]. Quadriceps weakness increases the likelihood of osteoarthritis and disease-related complications, and falls and osteoporosis are the primary causes of fractures in the elderly [6,7]. Lower limb tendinopathies and hip or knee osteoarthritis patients frequently experience motor impairments that may predispose them to sarcopenia and contribute to its progression [8,9]. Musculoskeletal issues and other chronic conditions are among the many negative outcomes of diabetes, which is a worldwide epidemic. Despite the substantial detrimental effect these problems have on people's quality of life, the general public's awareness of them remains low [10]. The musculoskeletal complications of diabetes can be effectively managed, and the quality of life of those affected, with the help of physiotherapy. The purpose of this study is to provide physiotherapists a better idea of how common musculoskeletal issues are in patients

with and without diabetes, so that they can better serve their patients. More jobs for physiotherapists could lead to better care for patients in Bangladesh who are experiencing musculoskeletal issues. A variety of musculoskeletal issues are associated with diabetes mellitus. Even people without diabetic mellitus in Bangladesh are experiencing numerous musculoskeletal problems. This study represents the musculoskeletal characteristic that affects the diabetic and non-diabetic individuals frequently

Method

This work aimed to evaluate the musculoskeletal characteristics of individuals who had diabetes to those who did not have the condition by employing a cross-sectional study design and a quantitative research paradigm. Participants in the study included both diabetic and non-diabetic patients who sought treatment at the Musculoskeletal Unit of the Centre for the Rehabilitation of the Paralyzed (CRP) in Savar. Because of time restrictions (01.02.2023 – 31.06.2023), only 230 people were chosen to participate in the study utilizing an easy sampling technique that was based on inclusion/exclusion criteria, even though the sample size that was expected to be used was 384. The inclusive criteria were met by adults aged 18 and older who suffered from musculoskeletal disorders; however, the exclusion criteria were not met by pregnant women, patients who had recently undergone surgery, or those who suffered from certain medical illnesses. Through the use of a structured questionnaire, we were able to assemble this data by using the Cornell Musculoskeletal Discomfort Questionnaire (CMDQ), the Visual Analogue Scale (VAS), and a demographic information table. At each and every stage of the data collecting and analysis process, ethical considerations were taken into account, and the tools that we utilized to do so were SPSS version 26 and Microsoft Office Excel 2013. It is essential knowledge to understand that the findings of this study link musculoskeletal characteristics in people with and without diabetes to a range of factors.

Results

Socio demographical information					
Variables	Categories	Diabetic		Non-diabetic	
		Frequency (n=68)	Percent	Frequency (n=162)	Percent
Age Range	20-30 years	1	1.5	37	22.8
	31-40 years	18	26.5	30	18.5
	41-50 years	17	25	44	27.2
	51-60 years	17	25	33	20.4
	> 60 years	15	22.1	18	11.1

Gender	Female	39	57.4	91	56.2
	Male	29	42.6	71	43.8
Marital status	Married	56	82.4	117	72.2
	Unmarried	2	2.9	29	17.9
	Divorced	2	2.9	4	2.5
	Separated	2	2.9	2	1.2
	Widow	6	8.8	10	6.2
Living area	Urban	18	26.5	58	35.8
	Semi-urban	37	54.4	81	50
	Rural	13	19.1	23	14.2
Working hour per day	1-3 hours	11	16.2	17	10.5
	4-6 hours	21	30.9	68	42
	7-9 hours	28	41.2	58	35.8
	10-12 hours	8	11.8	17	10.5
	>12 hours	0	0	2	1.2
BMI	Below 18.5	0	0	6	3.7
	18.5-24.9	28	44.1	65	43.8
	25-29.9	32	47.1	74	45.7
	30-34.9	8	8.8	17	6.8

Table 1: Socio demographical information of diabetic and non-diabetic participants.

The table 1 below compares the demographics of people with and without diabetes in a sample of 230 people. Age range, sex, marital status, location, daily job hours, body mass

index, and BMI are all factors to consider. Each variable's frequency and percentage distribution are detailed.

	Diabetic		Non-diabetic	
	Frequency	Percent	Frequency	Percent
Neck	3	7.35	22	13.6
Shoulder	13	26.47	22	13.6
Upper Back	0	0	8	4.9
Lower Back	32	46.4	88	54.3
Elbow	2	2.9	0	0
Forearm	2	2.9	6	3.7
Wrist	3	4.3	4	2.5
Hip	1	1.4	6	3.7
Knee	31	44.9	39	24.1
Lower leg	0	0	2	1.2
Ankle	1	1.4	3	1.9
Foot	2	2.9	7	4.3

Table 2: Body pain.

The table 2 illustrates diabetic and non-diabetic pain location frequency and proportion. Neck, shoulder, upper

and lower back, elbow, forearm, wrist, hip, knee, lower leg, ankle, and foot pain.

Cornell Musculoskeletal Discomfort Questionnaire					
Variables	Categories	Diabetic		Non-diabetic	
		Frequency (n=68)	Percent	Frequency (n=162)	Percent
i. Experiencing ache, pain, discomfort during the last work week	1-2 times last week	1	1.5	56	34.6
	3-4 times last week	20	29.4	59	36.4
	Once every day	21	30.9	15	9.3
	Several times every day	8	11.8	32	19.8
ii. Severity of ache, pain, discomfort during the last work week	Slightly uncomfortable	16	23.5	50	30.8
	Moderately uncomfortable	36	52.9	88	54.3
	Very uncomfortable	16	23.5	24	14.8
iii. Ache, pain, discomfort interfering with ability to work	Not at all	11	16.2	40	24.7
	Slightly interfered	40	58.8	96	59.3
	Substantially interfered	17	25	26	16

Table 3: Cornell Musculoskeletal Discomfort Questionnaire (CMDQ).

Table 3 shows diabetic and non-diabetic CMDQ findings. The table comprises three variables: experiencing ache, pain, or discomfort during the last work week; degree of ache,

pain, or discomfort; and ache, pain, or discomfort interfering with work. The table shows that diabetics experience more discomfort and work disruption than non-diabetics.

	Diabetic		Non-diabetic	
	Frequency	Percent	Frequency	Percent
PCID	3	4.4	9	5.6
Cervical radiculopathy	1	1.5	6	3.7
Cervical rib	0	0	1	0.6
Frozen Shoulder	7	10.3	15	9.3
Supraspinatus Tendinitis	2	2.9	2	1.2
Tennis Elbow	3	4.4	3	1.9
Carpal tunnel syndrome	1	1.5	1	0.6
Thoracic pain	1	1.5	3	1.9
Spondylosis	7	10.3	18	11.1
Spondylolisthesis	7	10.3	6	3.7
PLID	2	2.9	19	11.7
Rheumatoid arthritis	1	1.5	6	3.7
Mechanical LBP	2	2.9	12	7.4
LBP with radiculopathy	3	4.4	15	9.3
Scoliosis	1	1.5	0	0
Thigh pain	0	0	2	1.2
Knee Osteoarthritis	12	17.6	11	6.8

Ligament injury	0	0	4	2.5
Knee pain	4	5.9	4	2.5
Post Fracture	1	1.5	7	4.3
Ankle sprain	3	4.4	3	1.9
Heel spur	1	1.5	1	0.6
Plantar fasciitis	1	1.5	4	2.5
Undiagnosed	5	7.4	9	5.6
Total	68	100	162	100

Table 4: Diagnosed musculoskeletal problems.

Table 4 compares diabetes and non-diabetic musculoskeletal disorders. The table lists PCID, frozen shoulder, spondylosis, mechanical LBP, knee osteoarthritis,

ankle sprain, heel spur, and plantar fasciitis. Diabetics are more likely to have PCID, frozen shoulder, and spondylosis.

Variables	Categories	Diabetic		Pearson's Chi-square	P value
		Yes	No		
Age Range	20-40 years	19	67	19.919	0.001*
	41-60 years	34	77		
	> 60 years	15	18		
Gender	Female	39	91	0.027	0.493
	Male	29	71		
BMI	<25	28	71	7.363	0.008*
	>25	40	91		

*P<0.05, P value <0.05 indicates significant association.

Table 5: Association between Socio-demographic variables and diabetes mellitus.

Table 5 investigates socio-demographic factors with diabetes. The table has categories for age range, gender, and BMI. Pearson's chi-square value, p-value, and diabetes and non-diabetic case frequencies are shown. Age and BMI appear to be linked to diabetes.

Discussion

This study studied diabetes and musculoskeletal characteristics. The 230 people included 68 diabetes and 162 non-diabetics. Diabetics had significantly different musculoskeletal traits than non-diabetics. Diabetics had a greater prevalence of musculoskeletal diseases than the overall population [11-13]. Type 2 diabetes was more prevalent among 41-60-year-olds (p=0.001). Gender didn't effect diabetes prevalence. Diabetes was more frequent in women in Norway. Both diabetes and non-diabetic categories were dominated by housewives. Chronic musculoskeletal illnesses increased with inactivity [14]. BMI also predicted diabetes risk (p=0.008) [15]. Smoking increases type 2 diabetes risk [16] (p=0.039). This study revealed no significant association between junk food consumption and diabetes (p=0.594), yet past research has linked it to type 2 diabetes [17]. Betel nut consumption was linked to type 2 diabetes (p=0.034) [18].

Exercise improves diabetes management and quality of life [19]. Diabetics and non-diabetics experienced increased shoulder, lower back, knee, and neck musculoskeletal pain. Diabetics experienced increased neck, shoulder, and knee pain (p<0.05). Older age, female gender, and overweight were also connected to musculoskeletal disorders [20,21]. Diabetes worsened pain (p=0.042) [22]. Participants reported muscle weakness and movement difficulties, with diabetes strongly related with muscle weakness (p=0.001). Diabetics have greater musculoskeletal diseases than non-diabetics [23]. Osteoarthritis and frozen shoulder were the most common diagnoses. Osteoarthritis affected 17.6% of diabetics. 10.3% of diabetics experienced frozen shoulder, according to studies. This study links diabetes to musculoskeletal characteristics. Diabetes prevalence and musculoskeletal consequences were associated to age, BMI, smoking, betel nut intake, and exercise. Musculoskeletal disorders (MSDs) were most common among diabetics and non-diabetics in the shoulder, knee, and lower back.

Early detection and management were needed to prevent impairment in this population. However, a small sample size, lack of diabetes type distinction, and restricted time and resources hindered the study. Methodological quality and homogeneity should benefit future research. MSD treatment and quality of life research is needed. The researcher advised equal representation of diabetes and non-diabetic patients, higher sample sizes, longer study durations, and samples from multiple Bangladeshi clinics and hospitals.

Author Contributions

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GROUP 1: Conception of the work, Acquisition and Analysis of data

GROUP 2: Revising the work critically for important intellectual content

GROUP 3: Final approval of the version to be published

GROUP 4: Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Conflicts of Interest

No conflict of interest.

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