

Prevalence of Musculoskeletal Disorders in Diabetic Patients in Tertiary Care Hospitals of Twin Cities

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Author's Contribution

^{1,4,6}Substantial contributions to the conception or design of the work; or the acquisition, ^{2,3}Drafting the work or revising it critically for important intellectual content, ⁷⁻⁸analysis, or interpretation of data for the work, ⁵Final approval of the study to be published

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ABSTRACT

Objective: This study aims to show prevalence of musculoskeletal problems in diabetic patients in tertiary care hospitals of twin cities.

Methodology: Descriptive cross-sectional study was conducted in tertiary care hospitals of Rawalpindi and Islamabad, from August to December 2023. A sample of 285 diabetic patients with age range 25-45 years was included. Nordic Musculoskeletal Questionnaire was used as a tool in this research for determination of musculoskeletal disorders present in different regions of the body, such as, neck, upper and lower back, upper and lower limbs. SPSS version 23 was used to analyse the data.

Results: The participants' age was divided into 2 categories; category 1, ranging from 25-35 years (30.2%) and category 2 ranging from 36-45 years (69.8%). The mean age of participants was 37.66±5.72 years. This study shows considerable prevalence among 285 diabetic patients, majority 49.8% had trouble in low back followed by trouble in ankle 47.8%, trouble in shoulder 43.2%, trouble in knee 40%, and trouble in neck 36.5%, during last 12 months. Diabetic patients prevented from doing their normal work during last 12 months and majority 44.2% was low back followed by 36.8% was shoulder, 32.6% was knee, 32.2% was ankle and 29.1% was neck. Those who had trouble during last 7 days and majority 45.3% involved low back, followed by 40.4% shoulders, 36.8% knee and ankle, respectively and 35.8% had trouble in neck.

Conclusions: In our study, high prevalence of musculoskeletal problems was seen in low back, shoulders, knees and neck of diabetic patients. The prevalence of musculoskeletal conditions (region wise) in diabetic patients was evaluated by Standardized Nordic Musculoskeletal Questionnaire.

Key words: Musculoskeletal disorders, Pain, Diabetes Mellitus, Prevalence

Introduction

Diabetes which is a prevalent global condition, is characterized by high blood glucose level resulting from insufficient production of insulin or altered insulin action.¹ It is classified as type 1 (insulin-dependent) and type 2 (insulin-independent) diabetes, with risk factors such as obesity, pancreatic diseases, ethnicity, family history, age and sedentary lifestyle.² Treatment options include insulin pumps, medication, diet and exercise.³ According to the World Health Organization (WHO), 422 million people are diabetic, with 90% having type 2 diabetes.⁴ As of 2015, the worldwide occurrence of diabetes was approximated at 415 million and is projected to surge to more than 642 million by 2040, with Asians experiencing the most pronounced impact from the diabetes epidemic.⁵

The escalating prevalence of diabetes brings forth several complications, among which MSDs play a significant role. MSDs affect nerves, muscles, joints, bones, tendons and ligaments.⁶ MSD manifestations correlated with diabetes include

peripheral neuropathy, muscle cramps, carpal tunnel syndrome. Musculoskeletal manifestations frequently associated with diabetes mellitus encompass muscle cramps, muscle infarction, loss of deep tendon reflexes, peripheral neuropathy, reflex sympathetic dystrophy syndrome, stiff hands syndrome, neuropathic joints, carpal tunnel syndrome, and adhesive capsulitis of the shoulder, tenosynovitis, diffuse idiopathic skeletal hyperostosis, and Dupuytren contracture.⁷ A study was conducted which determined the prevalence of musculoskeletal disorders in type 1 and 2 diabetes mellitus. The findings indicated a considerable prevalence of musculoskeletal disorders in individuals with diabetes. The combined prevalence of MSDs among adults diagnosed with diabetes mellitus was 58.1% (95% CI 41.42%–73.96%), with the hand being the most frequently reported affected region i.e.33.05%.⁸ Another study showed osteoarthritis, fibromyalgia, frozen shoulder and tendinitis as common complications both in type 1 and 2 diabetes.⁹

It is crucial for health care professionals to understand the relation among MSDs and diabetes. Musculoskeletal pathologies pose a significant public health challenge, leading to pain, impaired function in affected limbs, and work absenteeism. This adversely affects both the healthcare system and individuals with diabetes, involving the utilization of primary care hospitals, disruptions in daily life, and decreased productivity due to functional limitations and activity restrictions.¹⁰ The need for this study arises from the scarcity of local data regarding the burden of MSDs among diabetic patients in Pakistan, particularly in the context of tertiary care hospitals serving a diverse population. Identifying the prevalence and types of musculoskeletal disorders in diabetic individuals can guide healthcare providers in early recognition, prevention, and intervention strategies.

Methodology

A descriptive cross-sectional study was conducted from August to December 2023. The data was collected from diabetic patients of tertiary care hospitals in Rawalpindi and Islamabad after taking permission from concerned authorities of hospitals. The study has considered all the ethical requirements and was approved by the institutional ethical review board. A sample size was calculated as 285 with the help of the formula $n = Z^2 \cdot P(1-P)/d^2$; where 'n' is sample size, 'z' is confidence interval (95%), and 5% margin of error. Non-probability convenience sampling technique was used in the study. The following inclusion had been used for sample selection; Individuals between the ages of 25-45 years, both gender male and females, patients with confirmed diagnosis of diabetes mellitus (Type 1 and Type 2), patients with controlled and uncontrolled diabetes, individuals having minimum 5 years of diabetic history and individuals willing to participate in the study.

The exclusion criteria included; post-menopausal women, patients with known rheumatologic complaints, diagnosed patients of musculoskeletal disorders, cancer, cardiomyopathies and individuals on long term corticosteroid therapy.

Standardized Nordic Musculoskeletal Questionnaire: It can be used as a questionnaire or as structured interview. NMQ consists of 18

questions.¹¹ A body map indicates nine symptom sites which are neck, shoulder, upper back, lower back, elbow, wrist, hip, knees and ankles. Individuals are inquired about any MSK trouble in last 12 months and last 7 days which has affected normal activity. A standard questionnaire along with consent form was used to obtain required information. Confidentiality of participants was maintained throughout the procedure. Nordic Musculoskeletal Questionnaire was used as a tool in this research for determination of musculoskeletal disorders present in different regions of the body, such as, neck, upper and lower back, upper and lower limbs. This questionnaire comprised of 28 multiple choice questions to which some participants answered yes while others had no problem. It was divided on the basis of 3 major questions with further subheadings. First section referred to trouble (pain, numbness, ache, discomfort) in any of the 9 regions of the body during last 12 months. Second section was for those who said yes to the previous question. It inquired about prevention from doing normal work in last 12 months due to trouble in any of the affected regions. Third section was for those who had trouble in any of the affected regions during last 7 days.

Results

Table I shows socio demographics of the population as category 1, ranging from 25-35 years (30.2%) and category 2 ranging from 36-45 years (69.8%). The mean age of participants was 37.66 ± 5.72 years. Amongst 285 participants, 139 (48.8%) were male and 146 (51.2%) were female. 3 categories of socioeconomic status were included in the study as; low class 88 (30.9%), 178 (62.5%) middle class and 19 (6.7%) high class. 199 (69.8%) people were living in urban area whereas, 86 (30.2%) were living in rural area. BMI was divided into 4 categories as per standard.

The first category included BMI less than 18.5 kg/m^2 (underweight), second category was BMI ranging from $18.5-24.9 \text{ kg/m}^2$ (normal), third category was BMI $25-29.9 \text{ kg/m}^2$ (overweight) and fourth category included BMI more than 30 kg/m^2 (obese). 30 (10.5%) individuals were underweighted. 141 (49.5%) were falling in the second category. 88 (30.9%) were overweight and 26 (9.1%) were obese. The mean derived from the data was $23.99 \pm 3.97 \text{ kg/m}^2$. 144 (50.5%)

participants did not have any history of Diabetes in family. However, 141 (49.5%) had a positive family history of Diabetes. Participants were questioned about their lifestyle whether they were sedentary (44.2%) or active (55.8%).

Table I: Baseline Socio-Demographic Characteristics.		
Variable	Distribution (Groups)	N(%)
Age groups (years)	25-35	86(30.2)
	36-45	199(69.8)
Gender	Male	139(48.8)
	Female	146(51.2)
Socioeconomic Status	Low	88(30.9)
	Middle	178(62.5)
	High	19(6.7)
Residential Status	Urban	199(69.8)
	Rural	86(30.2)
BMI in Kg/m ²	< 18.5	30(10.5)
	Normal 18.5-24.9	141(49.5)
	Overweight 25-29.9	88(30.9)
	Obese more than 30	26(9.1)
Family History of Diabetes	No	144(50.5)
	Yes	141(49.5)
Lifestyle	Sedentary	126(44.2)
	Active	159(55.8)

Table II shows prevalence among 285 diabetic patients, majority 49.8% had trouble in low back followed by trouble in ankle 47.8%, trouble in shoulder 43.2%, trouble in knee 40%, and trouble in neck 36.5%, during last 12 months (Table I).

Body regions		Trouble during last 12 months	Work prevented during last 12 months	Trouble during last 7 days
Neck	No	181 (63.5%)	202 (70.9%)	183 (64.2%)
	Yes	104 (36.5%)	83 (29.1%)	102 (35.8%)
Shoulder	No	162 (56.8%)	180 (63.2%)	170 (59.6%)
	Yes	Right	105 (36.8%)	115 (40.4%)
		Left	7 (2.5%)	
	Bilateral	96 (33.7%)		
Elbow	No	243 (85.3%)	273 (95.8%)	267 (93.7%)
	Yes	Right	12 (4.2%)	18 (6.3%)
		Left	9 (3.2%)	
		Bilateral	27 (9.5%)	
Wrists/Hands	No	215 (75.4%)	234 (82.1%)	236 (82.8%)
	Yes	Right	51 (17.9%)	48 (16.8%)
		Left	10 (3.5%)	
		Bilateral	51 (17.9%)	
Upper Back	No	211 (74.0%)	252 (88.4%)	230(80.7%)
	Yes	74 (26.0%)	33 (11.6%)	55 (19.3%)
Lower Back	No	143 (50.2%)	159 (55.8%)	156 (54.7%)
	Yes	142 (49.8%)	126 (44.2%)	129 (45.3%)
Hips/Thighs	No	202 (70.9%)	218 (76.5%)	217 (76.1%)
	Yes	83 (29.1%)	67 (23.5%)	68 (23.9%)
Knees	No	171 (60.0%)	192 (67.4%)	180 (63.2%)
	Yes	114 (40.0%)	93 (32.6%)	105 (36.8%)
Ankles/Feet	No	163 (57.2%)	193 (67.7%)	180 (63.2%)
	Yes	122 (47.8%)	92 (32.2%)	105 (36.8%)

Diabetic patients prevented from doing their normal work during last 12 months and majority 44.2% was low back followed by 36.8% was shoulder, 32.6% was knee, 32.2% was ankle and 29.1% was neck. Those who had trouble during last 7 days and majority 45.3% involved low back, followed by 40.4% shoulders, 36.8% knee and ankle, respectively and 35.8% had trouble in neck.

Data shows considerable prevalence among 285 diabetic patients, majority 49.8% had trouble in low back followed by trouble in ankle 47.8%, trouble in shoulder 43.2%, trouble in knee 40%, and trouble in neck 36.5%, during last 12 months (figure 1). Diabetic patients prevented from doing their normal work during last 12 months and majority 44.2% was low back followed by 36.8% was shoulder, 32.6% was knee, 32.2% was ankle and 29.1% was neck (figure 2). Those who had trouble during last 7 days and majority 45.3% involved low back, followed by 40.4% shoulders, 36.8% knee and ankle, respectively and 35.8% had trouble in neck (figure 3).

Discussion

From our research we have been able to clearly expose the association between diabetes and an increased prevalence of musculoskeletal disease,

verifying that patients with diabetes are more likely than healthy people to suffer from these problems. Among diabetic patients, the prevalence of MSDs was high. The overall prevalence of all MSDs was 58.15 % (95% CI: 41.4 %-73.9%).⁵ The hand and shoulder were most frequently reported affected areas.

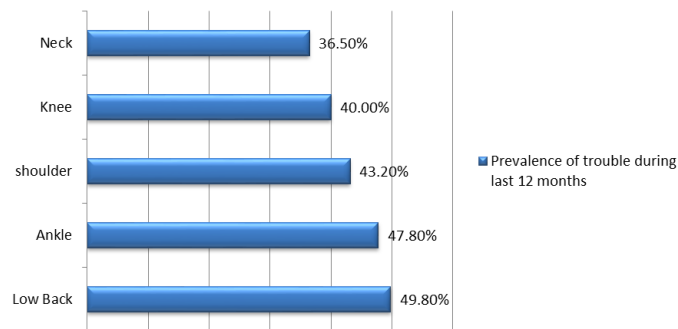


Figure 1: Prevalence of trouble during last 12 months.

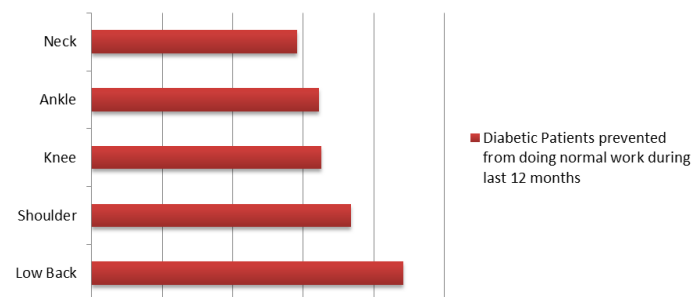


Figure 2. Diabetic patients prevented from doing normal work during last 12 months.

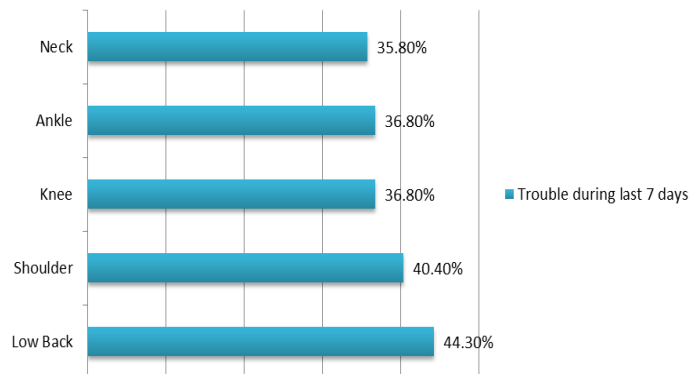


Figure 3. Trouble during last 7 days.

In particular our research found that residents with diabetes often suffer musculoskeletal

disorders, including those of the lower back (a 22.1 % frequency), feet and ankles (uncovering an incidence rate of 28.9 %), shoulders (experienced by 23.6 %,) knees especially which had an uncanny level of occurrence. Such figures clearly stress the problem's severity, showing that musculoskeletal disorders on persons with diabetes represent a serious burden. According to a previous study there is high prevalence of musculoskeletal disorders in diabetic patients, highlighting low back pain as a common problem.¹² As per another study, The most common MS pains were knee pain (9% of patients overall and 45 % among those with both ankylosing spondylitis or inflammation disorders) and low back pain (38.7 %).¹³ Chronic neck pain and low back pain diagnosed by a medical doctor occurred in 32% and 38% of people over the age of seventy with diabetes, according to one Spanish study.¹⁴ The relatively high rate of lower back, foot and ankle disorders indicates that musculoskeletal complications among the diabetic population are particularly broad in their breadth. All of these numbers seem to be in harmony with this new consensus developing among the medical profession, and point out that musculoskeletal problems arising from people with diabetes can also be hyperventilated by neuropathy caused by microvascular complications leading to chronic inflammation.¹⁵⁻¹⁶

Conclusion

Musculoskeletal problems are something to be cautious, about as they can impact regions of the body to extents. A high prevalence of trouble during 12 months, prevention from doing normal work during 12 months and trouble during last 7 days was seen in low back, shoulders, knees and neck.

Recommendations: Future studies should aim at creating awareness among diabetic patients about the musculoskeletal disorders to prevent them from further complications and not to ignore the initial signs and symptoms caused by diabetes or MSK disorders and consult the referred physician regarding the problem.

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