

Research article

# Frequency of musculoskeletal disorder of upper limb in Type 2 Diabetes patients

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**ABSTRACT:** Diabetes is a frequently occurring chronic metabolic disease that is characterized by a high blood glucose levels. If left unchecked, it can lead to severe functional impairments such as blindness, renal failure, and coronary artery disease. Approximately 463 million adults (20-79 years) are living with diabetes; by 2045 this will rise to 700 million. **Material and method:** A cross-sectional survey was conducted in National Institute of Diabetes and Endocrinology, Dow University Hospital, Ojha campus. Patients who had T2DM, and were above 35 years of age were included in the study. Anthropometric measurements were recorded, and the remaining data was collected via a self-reporting questionnaire. **Results and discussions:** In this study n=55(36.2%) participants were male and n=97(63.8%) were female, with the average age of 52.9 years, and an average BMI of 29.5kg/m<sup>2</sup>. The mean HBA1C of those diabetic patients was 8.8, and average duration of diabetes of our sample was 6.7 years. Prevalence of MSK disorders was 55.3%. **Conclusions:** There is a high prevalence of musculoskeletal disorders among diabetic patients. There was poor knowledge that upper limb musculoskeletal problems could occur due to diabetes, and a small percentage of patients sought physical therapy treatment for these disorders.

**Keywords:** *diabetes mellitus, musculoskeletal diseases, upper extremity*

## 1. INTRODUCTION

Diabetes is a frequently occurring chronic metabolic disease that is characterized by a high blood glucose level (1). It can result in many musculoskeletal complications, which has been shown to proceed to severe disability in 36-75% of diabetic patients 2-8 and has a high rate of morbidity and mortality (9). It is one of the most commonly occurring non communicable diseases, and has a greater epidemic in low and middle income countries. Diabetes generally occurs in people aged forty and above (1). If left unchecked, it can lead to severe functional impairments such as blindness, renal failure, and coronary artery disease.

The predominance of Type II Diabetes Mellitus (T2DM) is greater than that of Type I Diabetes Mellitus, due to increasing waistlines, a drop in physical activity levels, owing to industrialization of nations (9). T2DM is a hereditary, metabolic disease that causes lifetime neuromusculoskeletal abnormalities 10. This needs proper nursing care and self-management by modifying lifestyles, as well as taking different medications to manage the disease.

Approximately 463 million adults (20-79 years) are living with diabetes; by 2045 this will rise to 700 million. The proportion of people with T2DM is increasing in most countries. 79% of adults with diabetes were living in low- and middle-income countries. 1 in 2 (232 million) people with diabetes were undiagnosed.

The goal of this research was to find determine the most prevalent musculoskeletal disorders in T2DM patients, present in Karachi, Pakistan.

### Material and methods

A cross-sectional survey was conducted in National Institute of Diabetes and Endocrinology, Dow University Hospital, Ojha campus.

The population in this study comprised of T2DM patients. Convenience sample was used to recruit participants.

Patients who had T2DM, and were above 35 years of age were included in the study.

People with type 1 diabetes, gestational diabetes, any history of trauma, or active malignancy were excluded from the study.

A self-designed questionnaire was used for data collection. Participants were explained the components of the questionnaires, and further help was provided by the investigators if there was any confusion regarding the presence of disorders. Measurements were recorded of height, and weight. These were then used to calculate the Body Mass Index (BMI). To record pain intensity of musculoskeletal disorders, Visual Analog Scale (VAS) was used. Weight was measured using an electronic weighing scale (Senior Model DB-6020 - accurate to 0.1kg). Participants were weighed wearing light clothes and no shoes. Standing height was measured with shoes removed and the participant facing away from the wall, with the heels, buttocks, shoulders and head touching the wall and the participant looking ahead. Height was measured using a tape measure (accurate to  $\pm 1/2$ cm). After receiving briefing regarding the use of VAS, participants were asked to label the intensity of their pain.

OpenEpi calculator was used for the estimation of sample size. Taking a confidence interval 95%, and margin of error 7.5 % for a reported prevalence 32.9% (11), the estimated sample size was calculated at 152.

The investigation was done after obtaining authorization from ethical committee, Dow University of Health Sciences. All information was gathered by the researchers. Participants were briefed regarding the study, and the potential benefits that would be gained from developing an understanding of the common musculoskeletal disorders that ail T2DM patients.

### DATA ANALYSIS

Information was evaluated through SPSS v21. Quantitative factors like age, body mass index, duration of diabetes, as well as HBA1C levels for normally distributed data mean and standard deviation were calculated. Categorical variables e.g. (gender, socioeconomic status, severity, areas) have been described using frequencies and percentages, and association between categorical variables were further explored using Chi-square test to check the proportion among different abnormalities of upper limb. P -values 0.05 or less are considered significant.

### Results

In this research n=55 (36.2%) participants were male and n=97 (63.8%) were female with the average age of 52.9 years, and an average BMI of 29.5kg/m<sup>2</sup>. The mean HBA1C of those diabetic patients was 8.8, and average duration of diabetes of our sample was 6.7 years. Prevalence of MSK disorders was 55.3%. Participants had an average working day of 5 hours. Independent t-test was applied to our data set. MSK disorders were compared with different variables. Age of participants, BMI, duration of diabetes, were highly significant (p-value of 0.028, 0.035 and 0.015 respectively).

No strong association was found between MSK disorders with working hours per day, and HBA1C (p-value of 0.556 and 0.469 respectively).

The site of pain of the most patients was shoulder with 49.3%, elbow with 20.4%, wrist with 17.1% and least was finger with 4.5%.

Complications include paresthesia (53%), muscle weakness (44.7%), movement difficulties (25%), stiffness (34.2%), inflammatory disorder (11.2%) and cramps (2%).

The highest percentage observed regarding duration of MSK dysfunction people with less than 6 months was 30.3%.

Most patients relied on medication (96.6%), with only 19.1% undergoing physiotherapy treatment and 18.4% receiving both medical and physiotherapy intervention.

Among the participants who were receiving physiotherapy treatment, 2.6% had positive results, pain increased in 12.5% of patients, and no change in 5.3% patients.

### Discussion

This research was conducted to determine the prevalence of MSK disorders in upper limb among type 2 diabetic patients in OJHA campus, Dow University of Health Sciences.

A majority of participants in our study experienced pain or discomfort, with the most common severity of moderate pain with 40.8%.

A similar study was done in Bangladesh, with a large majority suffering from moderate and severe pain (74%). One difference from our study was that there was a lower prevalence of upper limb disorders in this study (12).

The most common disorder we observed was frozen shoulder (24.3%). Other disorders included: carpal tunnel syndrome (5.9%), osteoarthritis of hand (4.6%), trigger finger (3.9%), cubital tunnel syndrome (1.3%), Dupuytren's contracture (3.9%), and other MSK disorders (9.2%).

A similar study was conducted in Pakistan in 2013 by Saera et al. Common disorders in their study were frozen shoulder, tendonitis, trigger finger, carpal tunnel syndrome and Dupuytren's contracture; with frozen shoulder the most prevalent (11).

Another study done in Turkey by Ardic et al had a high prevalence of frozen shoulder and Dupuytren's contracture (13).

Another study conducted in Bangladeshi correlates with our findings of BMI and duration of diabetes, but did not have significant results in relation to age (14).

Although our study did not find significant changes in pain experienced in T2DM patients, this could indicate that those who are suffering from long term diabetes require a blended approach of physical therapy and medical intervention, in order to limit the complications of the disease, and improve the quality of life.

### Conclusion

There is a high prevalence of musculoskeletal disorders among diabetic patients. There was poor knowledge that upper limb musculoskeletal problems could occur due to diabetes, and a small percentage of patients sought physical therapy treatment for these disorders. The shoulder joint was mostly affected, with frozen shoulder the most common among all the musculoskeletal disorders. There was also a positive association of MSK disorder with duration of diabetes, age and BMI. The complications that come with diabetes are often overlooked and neglected, which eventually lead to disabilities. Proper care and rehabilitation are necessary components for people who have long term diabetes.

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