MANIFESTATION OF MUSCULOSKELETAL DISORDERS AMONG DIABETES MELLITUS PATIENTS AT A TERTIARY CENTRE

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ABSTRACT Objectives: Musculoskeletal diseases, or MSDs, are injuries and illnesses that affect the musculoskeletal system or how the human body moves. Diabetes mellitus and several musculoskeletal disorders (MS) are connected (DM). This study aims to examine the connection between musculoskeletal issues and diabetes mellitus in diabetic patients.

Methods: Patients with diabetes mellitus were included in a cross-sectional study. Both the patients’ demographic data and the DM features were noted. Clinical tests and research were used to evaluate musculoskeletal and vascular diseases. The factor correlations of MS illnesses were assessed using univariate and multivariate analysis.

Results: A total of 308 individuals were included, of whom 84.5 percent had type 2 diabetes, and 15.5 percent had type 1 diabetes. Twenty-five percent of the patients had osteoarthritis. Duputrens contracture was detected in 1.29 percent of cases, Carpel tunnel syndrome in 9.0 percent, and reduced joint mobility in 4.22 percent of cases. In 15.5 percent of cases, shoulder capsulitis was detected. Increased prevalence of hand anomalies was linked to long-term diabetes and dyslipidemia.

Conclusions: Numerous elements of diabetes have been connected to musculoskeletal disorders. Haemoglobin A1c levels do not appear to be related to the onset of musculoskeletal disorders.

KEYWORDS Musculoskeletal, Diabetes Mellitus, Carpel Tunnel

Introduction

Diabetes mellitus is a long-term metabolic disorder characterised by persistent hyperglycemia. Its accompanying microvascular and macrovascular consequences are principally responsible for its associated morbidity and mortality. It is widespread; according to contemporary estimates, 7.5% of Australians over 25 have diabetes, with 50% of cases going misdiagnosed. [1] Type 2 diabetes mellitus is present in 85% of these patients. Parenteral insulin supplementation is necessary for the duration of type 1 diabetes, which typically manifests in young people as an autoimmune-mediated illness of pancreatic failure. Insulin resistance is a defining feature of type 2, which is typically diagnosed in adults over 40.

Given its low cost, non-pharmacological composition added aerobically, and cardiovascular advantages, physical activity is an alluring treatment for diabetic patients. Along with food and medication, exercise is regarded as one of the three key components of the best diabetes management. [2] It’s crucial to achieve and keep good glycaemic control because it’s linked to a higher prevalence of diabetic complications. [3] According to a recent meta-analysis, exercise training reduces HbA1C in patients with type 2 diabetes mellitus by a level that should lower the chance of developing diabetic complications. This did not result in a noticeably higher reduction in body mass in the intervention group compared to the control group,[4] showing that fitness training for people with type 2 diabetes has benefits independent of weight loss. Therefore, given its low cost, non-pharmacological nature, and added aerobic and...
cardiovascular benefits, physical activity is a desirable treatment for diabetic patients.

A significant global public health issue is diabetes mellitus (DM). About 451 million diabetics worldwide (aged 18 to 99) as of 2017. By 2045, these numbers were projected to reach 693 million [5]. DM has been linked to a number of musculoskeletal (MS) conditions that can be severely disabling [6, 7]. The following conditions are among them: shoulder capsulitis (SC), limited joint mobility (LJM), trigger finger (TF), Dupuytren’s contracture (DC), Charcot’s foot (CF), carpal tunnel syndrome (CTS), osteoarthritis (OA), and other uncommon problems [8]. It is unclear what mechanism causes these issues in patients with DM. Chronic hyperglycemia is a hallmark of DM, a chronic metabolic condition. High glucose levels can harm connective tissue by altering extracellular matrix components and affecting how cells operate [7,9]. MS problems have hitherto received less attention than vascular consequences of DM, which have been the subject of substantial study. This study was done to discover how common MS disorders are among diabetics in Morocco, what causes them, and how they relate to other diabetes complications such as micro- and macrovascular issues.

Methods

This study was carried out for one year at the Bhima Bhoi Medical College & Hospital, Balangir. After agreeing, patients with Type 2 DM were enrolled in this cross-sectional study. The World Health Organization’s standards for diagnosing diabetes mellitus, which call for a fasting plasma glucose level of ≥ 126 mg/dL (7.0 mmol/l) [10], were used as the eligibility criteria. Patients with a history of hand injuries, central or peripheral nervous system diseases, chronic rheumatic diseases, end-stage renal diseases, and thyroid conditions were disqualified from participating.

All of the study participants’ demographic data, including their age, gender, and body mass index (BMI), were recorded. In addition, clinical information was logged, such as the patient’s lipid profiles, haemoglobin A1C (HbA1c) levels, type and duration of diabetes (measured in years), and anti-diabetic medication. The American Diabetes Association (ADA) criteria were also used to define dyslipidemia [12]. According to ADA guidelines from 2008 [11], diabetes was only deemed to be controlled if the haemoglobin A1c level was less than 7%. Retinopathy, nephropathy, and neuropathy are examples of microvascular consequences of diabetes mellitus (DM). There have also been reports of macrovascular complications (coronary artery disease, peripheral arterial disease, and history of stroke).

We obtained descriptive statistics, such as proportions for categorical variables and mean values for continuous variables. The Chi-square test was used to determine whether the relationship between the prevalence of MS problems and various factors was statistically significant. In order to evaluate the multivariate connections between MS problems and various variables, a multiple logistic regression analysis was performed. Statistical significance was defined as a p-value of 0.05. The Statistical Package for Social Sciences was used to conduct the statistical analysis (SPSS, version 23).

Results

308 people with diabetes mellitus participated in the study. 53 years, 44 to 63 years old was the patients’ median age. In addition, 46 percent of the population were men, and 54 percent were women. (Table 1).

The median duration of diabetes was 7 years 4-13. Seventeen percent of our patients had more than 10 years of diabetes. 51.7% were treated with insulin or a oral hypoglycemic. The mean HbA1c value was 8.4±1.8. Poor glycemic control was noted in 67.9% of patients. The mean BMI value was 25.4±3.7kg/m2. 46.7% of the patients were overweight, while 15.4% were obese. In this study, 148 patients (48.05%) had dyslipidemia, and 156 (50.6%) had one or more microvascular complications of diabetes.

Retinopathy, nephropathy, and neuropathy together accounted for 28%, 16%, and 12% of these patients. There were 14 patients (4.5%) with DM macrovascular problems (coronary artery disease, peripheral arterial disease, and history of stroke). Additionally, while three diseases in the same patient were uncommon, one disorder was observed in 25.8% of patients and two disorders in 5.1% of patients, respectively (3.5 percent). The prevalence rates according to demographic and clinical characteristics of patients are shown in Table 2.

Age over 50 and dyslipidemia were the only variables in the multivariate analysis that were substantially linked to an increased prevalence of one or more MS diseases. Age above 50 was a risk factor for both SC and OA. Additionally, a longer diabetes history seems to increase the risk. Patients with diabetes for more than ten years were more likely to suffer hand problems. OA was more prevalent in women. Nephropathy and being overweight appeared to be strongly linked to OA. Dyslipidemia was substantially linked to a higher risk of SC and hand diseases.

Discussion

Numerous research has evaluated MS problems in diabetic patients. In the past, research mostly evaluated specific elements, primarily anomalies in the upper limb in MS. Furthermore, the connection between MS problems and dyslipidemia has been disregarded. However, the current study looked at a number of variables, including vascular problems and dyslipidemia, that are linked to an increased prevalence of MS diseases in Type 1 DM and Type 2 DM.

This study found three significant results. First, 34 percent of those with diabetes mellitus had musculoskeletal issues. Osteoarthritis and hand conditions were the most prevalent MS side effects. Second, the onset of various MS symptoms was substantially correlated with age above 50 and dyslipidemia. Thirdly, no association between haemoglobin A1c level and musculoskeletal problems was discovered.

Over one-third of the enrolled patients had one or more musculoskeletal problems. Several earlier investigations have found a prevalence of between 36 and 75 percent of diabetes individuals [12,13]. The inclusion of both type 1 and type 2 DM may have contributed to the lower prevalence of MS complications in the current study. Age over 50 and dyslipidemia were discovered to be related to musculoskeletal diseases in the current investigation. which is consistent with earlier investigations. [14,15]

Compared to non-diabetic people, diabetes patients have a higher incidence of hand diseases. [14] Duputren’s contracture was detected in 1% of cases, Carpel tunnel syndrome in 9.7%, and restricted joint mobility in 3.9% of cases of hand diseases. In 15.3 percent of cases, shoulder capsulitis was found. An higher prevalence of hand deformities was linked to long-term diabetes and dyslipidemia. According to earlier reports, the occurrence varied between 26 and 64 percent [16,17].
Table 1 Descriptive characteristics

|                      |           |
|----------------------|-----------|
| Age years            | 54        |
| BMI kg/m²            | 24.9 ± 3.6|
| Hemoglobin A1c       | 8.5 ± 1.9 |
| Duration of DM years | 8         |

Table 2 Clinical descriptions

| MS disorders               | Type 1 DM | Type 2 DM | P-value |
|----------------------------|-----------|-----------|---------|
| Dupuytren’s contracture    | 0         | 4         | 0.545   |
| Trigger Finger             | 4         | 20        | 0.397   |
| Limited joint mobility     | 0         | 13        | 0.151   |
| Carpel Tunnel Syndrome     | 3         | 25        | 0.964   |
| Osteoarthritis             | 4         | 73        | 0.001   |

Compared to the general population, persons with type 1 and type 2 diabetes have a higher incidence of hand deformities. A consistent finding is the link between hand deformity and the length of diabetes, but not with age or sex. [18] Most musculoskeletal issues emerge in diabetic patients younger than in the general population, and they appear to be related to the length of DM [19]. The long-term glycemic regulation of diabetes is likely related to the musculoskeletal abnormalities seen in these patients. However, no direct link between the disease’s metabolic management and the connection could be demonstrated.

Conclusion

The musculoskeletal system is one of the major consequences of diabetes mellitus. Osteoarthritis is one of the most prevalent diseases. The long-term metabolic effects of diabetes mellitus increase the prevalence of or directly cause a number of rheumatic diseases. Higher levels of diabetic complications occur when diabetes is poorly controlled. Certain rheumatic disorders may get worse as a result of poor glycemic control. Diabetes management should be based on pharmacotherapy, food, and a regular, suitable physiotherapy programme. In order to decrease the frequency and severity of complications, we advise all diabetic patients to include an appropriate exercise regimen in their diabetes management, under the supervision of their doctor.

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Conflict of interest

There are no conflicts of interest to declare by any of the authors of this study.

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