

**Original Article****PATTERN OF MUSCULOSKELETAL MANIFESTATION IN PATIENT WITH DIABETES MELLITUS**Faruk AA¹, Shahnewaz SS², Mojumdar SK³, Babu MA⁴**Article History:**

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Abstract:

Background: Diabetic mellitus (DM) both type 1 and type 2 increasing dramatically throughout worldwide. DM involved all the vital organs including musculoskeletal system. **Objective:** The purpose of study was to find out patterns of musculoskeletal manifestation (MSM) in diabetic patients & to find out a strategy to improve the outcome of the MS complications in patients with Diabetes Mellitus.

Material and Methods: This was hospital based observational study conducted on 143 diabetics patients with musculoskeletal manifestations, both men and women (aged 15-70 years) visited in outpatient department and hospital admitted patient in a tertiary care of teaching hospital. Patterns were defined by a meticulous history, relevant general and systemic examination & with the aid of musculoskeletal (MS) Function Assessment semi structured Questionnaire.

Results: MSM are common among patients with type 2 diabetes Out of 143 patients in our study 103(72.03%) were Male and 40(27.97%) were female, and male –female ratio 2.57:1. The age distribution of study patients was 15 to 70 years. Overall, 72.03.% of patients were among the 40-59 years old and about 20.28% were 60 years and mean age of the patients was 55±5. Above which is statistically significant (P= 0.048). The shoulder involvement as adhesive capsulitis (frozen shoulder) was found among 69(48.25%) on the diabetic cohort and statistically significant (P= <.05) and mostly among the housewife (27.99%) and manual worker like cultivator (13.99%). Degenerative osteoarthritis was commonly associated with MSM with DM than inflammatory arthritis.

Conclusion: In our study shows degenerative, non-inflammatory MSM are common among the diabetic patients that leads to significant pain and disability that directly related with poor glycemic control and co-morbidities like stroke and obesity. Early recognition of these complications, and multidisciplinary management between diabetes and rheumatology specialists is necessary to reduce morbidity.

Keywords:

DM- diabetes mellitus;
MSM- musculoskeletal manifestations, Adhesive Capsulitis, Bangladesh

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Introduction:

Diabetes mellitus is one of the most common non communicable disease worldwide. It is the fourth leading cause of death in most developed country and an epidemic in many developing countries like Bangladesh. The rising prevalence of DM and other noncommunicable diseases is driven by multiple factors like unhealthy diets, rapid urbanization, sedentary lifestyle, and increases life expectancy due

to improved healthcare facilities. The chronic complication of diabetics classified into microvascular and macrovascular complications but the other complication like musculoskeletal complication, reduce immunity, and gestational diabetes and dental disease, are not classified into above categories.

Endocrine disorders often cause musculoskeletal symptoms and may even present with rheumatic

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syndromes before the nature of the underlying endocrinopathy is apparent. Patients with either type 1 or type 2 diabetes mellitus frequently have musculoskeletal complaints.

Diabetes mellitus is a chronic metabolic condition characterized by persistent hyperglycemia with resultant morbidity and mortality related primarily to its associated microvascular and macrovascular complications¹.

Although the pathophysiologic effects of hyperglycemia on bones, joints, tendons, and muscles, are not clearly understood but there are well-established associations between diabetes and certain musculoskeletal syndromes¹. Diabetes has major effects on connective tissues, which have significant impact on both the development and outcome of these diseases of cartilage, bone, ligament, and tendon². A variety of musculoskeletal disorders are associated with diabetes. These disorders may cause pain and functional impairment, and influence the ability of patients to adhere to other aspects of diabetes treatment, particularly exercise and weight management³. The precise etiology of most of these musculoskeletal disorders is not clear, neither is the reason for their higher prevalence in diabetes⁴. Rheumatic complaints are common in patients with diabetes. Maintaining good glycemic control by exercise, diet and medication improves and prevents the development of rheumatic complications⁵. Poor glycemic control is associated with increased prevalence of these diabetic complications. Examples of common musculoskeletal disorders include- Adhesive capsulitis (frozen shoulder), Diabetic stiff-hand syndrome, Carpal tunnel syndrome, Flexor tenosynovitis, diffuse idiopathic skeletal hyperostosis, Diabetic amyotrophy, Charcot's arthropathy, Reflex sympathetic dystrophy⁶.

Sarkar et al in a cross-sectional study the compared rheumatic manifestations in a cohort of diabetic patients with a group of patients attending a rheumatology clinic of a medical college⁷. Some studies have indeed compared the prevalence of certain manifestations in diabetics such as diffuse idiopathic skeletal hyperostosis with that of rheumatic controls⁸. This study was thus undertaken to find out the patterns of musculoskeletal manifestation in diabetic patients and to find out a strategy to improve the outcome of musculoskeletal complications in patients with diabetic mellitus.

Material and Methods:

This is a retrospective cross-sectional case control study was carried out among 143 patients who attended at outpatient department and admitted in medicine ward of Shaheed Monsur Ali Medical College and Hospital, Uttara. Dhaka, Bangladesh from July 2022 to July 2023 who fulfilled the inclusion criteria and data were collected in a pre-design case record form. All data was collected by using a preformed data sheet, this was done by detailed history, complete physical examinations, performing relevant tests and data were analysis with the aid of musculoskeletal (MS) Function Assessment semi structured Questionnaire. After collection, data were checked and analysis by using the statistical package for social sciences (SPSS) Version 25.0. Results presented by choosing variables in form of tables, graph, percentage, charts etc. Those who refused to give consent voluntarily and patients who had inflammatory arthritis, history of trauma to joint were excluded from the study

Results:

During the period of one year a total number of 143 consecutive diabetic patients with musculoskeletal manifestations were studied. Out of 143 patients in our study 103(72.03%) were male and 40 (27.97%) were female; giving male-female ratio 2.57:1 (Figure-1).

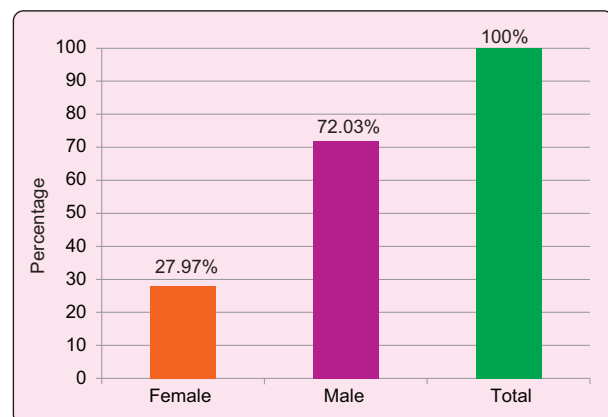


Figure 1: Distribution of the patient in relation to gender (n=143)

The age distribution of study patients were 15 to 70 years. Overall, 72.03 % of patients were among the 40-59 years old and about 20.28% were 60 years and above which is statistically significant (P = .048) (Table-I).

Regarding occupation, housewives and unemployed were the most common groups of our study accounting

Table-I
Distribution of the patients in age categories (n=143)

Age (in years)	Number of patients	Percent
15-39	11	7.69
40-59	103	72.03
60-70	29	20.28
Total	143	100

for 27.97% and 20.28% respectively followed by service holder 16.08%, cultivator 13.99%, manual worker 5.59% (Table-II).

Table-II
Occupational distribution of the patients with musculoskeletal manifestations (n =143)

Occupation	Number of patients	Percent
Service	23	16.08
Business	20	13.99
Labour	08	5.59
Cultivator	20	13.99
Housewife	40	27.99
Unemployed	29	20.28
Other	03	2.12
Total	143	100

The common clinical pattern of MSK was shoulder involvement as adhesive capsulitis (frozen shoulder) which was found among 69 (48.25%) patients. Limited joint mobility 29(20.28%) Diabetic amyotrophy 26(18.18%) Flexor tenosynovitis 8(5.596%) Carpal tunnel syndrome 5(3.494%) Dupuytren's contracture 3(2.09%) Diffuse idiopathic skeletal hyperostosis 3(2.09%) The present study has observed that adhesive capsulitis and limited joint mobility are common and statistically significant ($P < .05$) (Table-III).

Table-III
Distribution of individual MSK abnormalities in patients with DM (n=143)

MSK abnormalities	Number of patients	Percent
Adhesive capsulitis	69	48.25
Limited joint mobility	29	20.28
Diabetic amyotrophy	26	18.18
Flexor tenosynovitis	08	5.59
Carpal tunnel syndrome	05	3.49
Dupuytren's contracture	03	2.09
Diffuse idiopathic Skeletal hyperostosis	03	2.09
Total	143	100

Discussion:

Many systemic conditions have musculoskeletal manifestations. True arthritis is the initial manifestation of the underlying illness in some systemic diseases. Musculoskeletal complaints (MSCs) are among the diabetes patient are major health problems worldwide and the most frequent cause of long-term sickness leave in Norway.^{10,11} Epidemiological studies shows several personal, occupational, and psychological factors are related to MSM¹². Even though most of these musculoskeletal disorders remains obscure however, connective tissue disorders, neuropathy or vasculopathy may have a synergistic effect on the increased incidence of musculoskeletal disorders in DM. According to Crispin and Alcocer, prolonged hyperglycemia in uncontrolled diabetic patients results in collagen glycosylation. Glycosylated collagen is less soluble, offers increased resistance to collagenases and accumulates in connective tissue, which not only alters the extra cellular matrix structure and function but also affects cell viability¹³. Also, vascular endothelial growth factor, which is associated with DM vascular disease, appears to be involved in the synovial proliferation of the subacromial bursa and shoulder joint contraction in type 2 DM patients with rotator cuff tendinopathy¹⁴. Finally, Rosenbloom et al. demonstrated an association between limited joint mobility syndrome and microvascular disease, suggesting that alterations in periarticular connective tissue are related to changes occurring in the microvasculature¹⁵.

In comparison to other study, Ramchurn et al. observed trigger finger predominately presented complication among type 2 diabetes mellitus patients followed by limited joint mobility¹⁵. Sarker et al and Saera et al shows the most common musculoskeletal manifestation were adhesive capsulitis^{16;17}

The present study has observed that adhesive capsulitis and limited joint mobility are common and are more frequently seen in diabetic clinics than rheumatology clinics. The limitation of this study is that some of the association or lack of association is due to referral bias. Despite these limitations, there is little doubt that certain rheumatic complaints are seen more frequently in diabetics than otherwise.

Some of the complications have a known direct association with diabetes, whereas others have a suggested but unproven association. Effective management requires detailed medical history and

relevant physical examination. Laboratory tests aids little in management, particularly in patients of developing country like Bangladesh. In our study, among 143 patients, 103(72.03) were Male and 40(27.97%) were female giving male–female ratio 2.57:1. The age distribution of study patients was 15 to 70 years. Maximum numbers of patients were in the age group of 40 to 59 years (72.03%). Occupation of the patients with musculoskeletal manifestations showed majority patients were Housewife (27.99%). Other was business (13.99%), Service (16.08%). Unemployed (20.28%) and cultivator (13.99%). Individual MSM abnormalities in patients with DM showed majority patients had Adhesive capsulitis (frozen shoulder) 48.25%, Limited joint Mobility 20.28%, Diabetic amyotrophy 18.18%. Others had Flexor tenosynovitis 5.59%.

Conclusion:

Considering the information gathered from the study, it can be concluded that MSMs in patients with DM are much more problematic among diabetic patient. From the present study it may be said that the most common condition of MSM in patient with DM is adhesive capsulitis of shoulder joint and it is the leading cause of disability in diabetic patient. It also concluded MSM are more common among the age of 55 years old when other co morbidities influencing the patient's activity daily life (ADL). Assessment and early management of musculoskeletal problems in diabetic patient prevent pain, morbidity and mortality in this patient group. Large scale prospective study is required for further evaluation.

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