International Journal of Science and Research (IJSR)
ISSN: 2319-7064
Impact Factor 2025: 7.089

Musculoskeletal Manifestations in Type 2 Diabetes Mellitus: A Cross-Sectional Observational Study

Dr. Madhavi Mathkar[1], Dr. Smita Patil[2]

[1]Junior Resident, Department of General Medicine, DY Patil Hospital, Navi Mumbai

[2]Professor and Head, Department of General Medicine, DY Patil Hospital, Navi Mumbai

Abstract: ***Musculoskeletal manifestations are common yet under-recognized complications of Type 2 Diabetes Mellitus (T2DM), contributing significantly to pain and disability. This cross-sectional study evaluates musculoskeletal involvement, pain severity, functional disability using the Modified Health Assessment Questionnaire (MHAQ), and hand findings in 96 patients with T2DM. The prevalence of musculoskeletal manifestations was high, with knee osteoarthritis (37.5%) and frozen shoulder (25%) being the most common. Hand involvement included trigger finger (16.7%), carpal tunnel syndrome (16.7%), and Dupuytren's contracture (6.2%). Pain was frequently moderate to severe, and over half of patients had moderate disability (51%). These findings emphasize the need for routine musculoskeletal assessment in diabetic care.***

Keywords: Type 2 Diabetes Mellitus, Musculoskeletal manifestations, Pain, MHAQ, Hand findings, Disability

1. Introduction

Type 2 Diabetes Mellitus (T2DM) is associated with a spectrum of musculoskeletal complications that significantly impair quality of life. Chronic hyperglycemia leads to accumulation of advanced glycation end products, resulting in collagen stiffness and periarticular tissue changes.

These alterations predispose patients to conditions such as frozen shoulder, osteoarthritis, and hand syndromes including trigger finger and Dupuytren's contracture. Musculoskeletal involvement contributes to chronic pain, reduced mobility, and difficulty in performing activities of daily living. Despite this, such complications remain under-evaluated in routine clinical practice .

2. Methodology

Study Design and Setting

A hospital-based **cross-sectional observational study** was conducted in a tertiary care centre (DY Patil Hospital, Navi Mumbai), OPD and IPD patients between September 2025 to January 2026. This is a study in part of an on-going thesis study regarding musculoskeletal manifestations in Type 2 DM and their relation with glycemic control.

Study Population

- Total sample size: **96 patients with T2DM**
- Inclusion: Adults (>18 years) diagnosed with T2DM
- Exclusion: Patients with trauma, inflammatory arthritis, or systemic connective tissue disorders

Sampling Method

- **Consecutive sampling** was used until the required sample size was achieved.

Data Collection

Data were collected using a structured case record form including:

1) Musculoskeletal Assessment

Patients were clinically evaluated for:

- Frozen shoulder
- Osteoarthritis (knee and hip)
- Trigger finger
- Carpal tunnel syndrome
- Dupuytren's contracture
- DISH and Charcot joint

Diagnosis was based on standard clinical criteria such as restriction of movement, pain, tendon thickening, and deformities.

2) Pain Assessment

Pain severity was categorized as:

- Mild
- Moderate
- Severe
- Not reported

3) Functional Disability (MHAQ)

a) Assessed using **Modified Health Assessment Questionnaire (MHAQ)**
b) Covers 8 domains: dressing, arising, eating, walking, hygiene, reach, grip, and daily activities
c) Scoring:
   - 0 = no difficulty
   - 3 = unable to perform
d) Final score: mean of all items (range 0–3)

4) Hand Findings

Detailed examination included:

- Trigger tenderness
- Pain on passive movement
- Finger swelling
- Flexion deformity
- Skin tethering
- Pretendinous bands
- Flexed posture

5) Statistical Analysis
- Data analyzed using **SPSS version 22**
- Results expressed as frequencies, percentages, and mean ± SD
- Descriptive analysis used for musculoskeletal, pain, and functional outcomes

3. Results & Discussion

1) Prevalence of Musculoskeletal Manifestations
Musculoskeletal involvement was common:
- Knee osteoarthritis: **37.5%**
- Frozen shoulder: **25.0%**
- Hip osteoarthritis: **12.5%**
- Trigger finger: **16.7%**
- Carpal tunnel syndrome: **16.7%**
- Dupuytren's contracture: **6.2%**

These findings indicate a **high burden of both joint and periarticular disorders**, with predominance of large joint (knee, shoulder) involvement and significant hand pathology.

The results are consistent with existing literature reporting high prevalence of musculoskeletal disorders in diabetic populations, attributed to collagen glycation and microvascular damage.

2) Pain Severity
Pain was a major symptom:
- Mild: **26.0%**
- Moderate: **28.1%**
- Severe: **26.0%**
- Not reported: **19.8%**

Nearly **54% of patients experienced moderate to severe pain**, indicating that pain is a dominant clinical feature contributing to reduced functionality.

3) Functional Disability (MHAQ)
Functional assessment revealed:
- Mild disability: **29.2%**
- Moderate disability: **51.0%**
- Severe disability: **19.8%**
- Mean MHAQ score: **1.58 ± 0.46**

More than half of the patients had **moderate disability**, suggesting considerable impairment in activities such as:
- Dressing
- Walking
- Gripping
- Reaching

These findings highlight the **functional impact of musculoskeletal complications**, which may interfere with diabetes self-care and physical activity.

4) Hand Findings
Hand manifestations were notable:
- Trigger tenderness: **16.7%**
- Pain on passive movement: **16.7%**
- Flexed posture: **16.7%**
- Finger swelling: **16.7%**
- Skin tethering: **6.2%**
- Pretendinous bands: **6.2%**
- Flexion deformity: **6.2%**

These findings suggest:
- Tendon involvement (trigger finger)
- Nerve compression (carpal tunnel)
- Fibrotic changes (Dupuytren's)

Hand involvement significantly affects **fine motor function**, grip strength, and daily activities, making it clinically important.

5) Overall Interpretation
- Musculoskeletal manifestations are **highly prevalent**
- Pain is **frequent and often severe**
- Functional disability is **moderate to severe in majority**
- Hand involvement is **clinically significant and functionally limiting**

The results reinforce that musculoskeletal complications are a **major but under-recognized contributor to morbidity in T2DM**.

4. Conclusion

Musculoskeletal manifestations in Type 2 Diabetes Mellitus are common and significantly contribute to pain and disability. Moderate functional impairment, as assessed by MHAQ, is seen in the majority of patients. Hand involvement further exacerbates functional limitations. Routine screening and early management of musculoskeletal complications are essential to improve quality of life in diabetic patients.

References

[1] Gaur A, et al. Prevalence and functional impact of musculoskeletal disorders in T2DM patients.
[2] George K, et al. Prevalence and associated factors of musculoskeletal manifestations in diabetes mellitus.
[3] Singh K, et al. Musculoskeletal manifestations in Type 2 Diabetes Mellitus: A cross-sectional study.
[4] Sarkar P, et al. Musculoskeletal disorders and glycemic control in diabetic patients.
[5] Shohda M, et al. Upper limb musculoskeletal abnormalities in diabetes mellitus.
[6] Bellary S, et al. Functional disability and musculoskeletal complications in diabetes.
[7] Majjad A, et al. Prevalence of musculoskeletal disorders in diabetic patients.