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ORIGINAL ARTICLE

Impact of Diabetes Mellitus on the Development of Trigger Finger among Patients attending at a tertiary care hospital

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ABSTRACT

Background: *Hand disorders are common yet often under-recognized complications among patients with type 2 diabetes mellitus (DM). Trigger finger is one of the most frequent manifestations and its association with glycemic control and duration of diabetes remains clinically important. This study aimed to determine the impact of diabetes mellitus on the development and characteristics of trigger finger among patients attending a tertiary care hospital.* ***Methods & Materials:*** *This cross-sectional observational study was conducted in the Medicine Outpatient Department of BIRDEM General Hospital over six months from November 2018 to April 2019. A total of 354 type 2 DM patients presenting with hand complaints were included using purposive convenient sampling. Data were analyzed using descriptive statistics and chi-square tests, with p<0.05 considered significant.* ***Results:*** *Among 354 diabetic patients with hand complaints, the mean age was 56.48±8.06 years and 44.07% were between 51–60 years. Trigger finger was the most common condition (50%), followed by carpal tunnel syndrome (16.1%) and De Quervain's tenosynovitis (15.8%). Among trigger finger patients, 64.41% had diabetes for more than 5 years and 68.93% had HbA1C >6.5% (mean 7.1±2.6). Unilateral involvement was predominant (86.44%), mostly affecting the right hand (49.15%). Grade-2 severity was most frequent (57.1%). Duration of DM was significantly associated with trigger finger (p<0.02), while HbA1C distribution showed no significant difference (p=0.733).* ***Conclusion:*** *Trigger finger is highly prevalent among diabetic patients, particularly those with longer disease duration. Early screening and better metabolic control may help reduce its burden.*

Keywords: *Trigger finger, diabetes mellitus, hand disorders, HbA1C, duration of diabetes.*

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INTRODUCTION

Diabetes Mellitus (DM) is a chronic metabolic disorder characterized by persistent hyperglycemia resulting from impaired insulin secretion, insulin action, or both.[1] It is a major global public health problem and one of the most rapidly increasing non-communicable diseases. Long-standing diabetes is associated with a wide range of microvascular and macrovascular complications, including neuropathy, nephropathy, retinopathy and cardiovascular disease.[2] In addition to these well-recognized complications, diabetes also affects the musculoskeletal system, leading to conditions collectively known as diabetic hand syndrome (DHS).[3] These include limited joint mobility, Dupuytren's contracture, carpal tunnel syndrome and trigger finger.[4]

Trigger finger, also known as stenosing flexor tenosynovitis, is a common hand disorder frequently observed in individuals with diabetes.[5] It occurs when inflammation and thickening of the flexor tendon or A1 pulley obstruct smooth tendon gliding, resulting in pain, clicking, catching, or locking of the affected finger.[6] Studies have consistently shown that the prevalence of trigger finger is significantly higher among diabetic patients compared to the general population, with reported rates ranging from 5% to 20% and even higher in long-standing or poorly controlled diabetes.[7]

Hyperglycemia-induced biochemical changes, including non-enzymatic glycosylation of collagen and accumulation of advanced glycation end products (AGEs), contribute to tendon thickening, reduced elasticity and impaired lubrication.[8] These structural changes predispose diabetic individuals to flexor tendon dysfunction.[9] Moreover, individuals with prolonged duration of diabetes and elevated HbA1c levels are at particularly higher risk, suggesting a strong link between glycemic control and the development of trigger finger.[10]

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Despite its clinical importance, trigger finger remains underdiagnosed and undertreated in diabetic populations, especially in low- and middle-income countries.[11] Early identification is crucial, as untreated cases may progress to severe functional impairment, reduced hand mobility, decreased quality of life and increased dependency.[12]

Understanding the relationship between diabetes and trigger finger in the local context is essential for improving screening, early intervention and patient outcomes. Assessing the frequency, severity grading, duration of diabetes and glycemic control among affected individuals can provide valuable insights for clinicians and policymakers.[13]

OBJECTIVE

The objective of this study was to evaluate the impact of Diabetes Mellitus on the development of trigger finger among patients attending a tertiary care hospital. By identifying the magnitude of the problem and its associated factors, the study seeks to enhance clinical recognition and support better management strategies for diabetic hand complications in Bangladesh.

METHODS & MATERIALS

This cross-sectional observational study was conducted in the Medicine Outpatient Department of BIRDEM General Hospital over a period of six months from November 2018 to April 2019. The study population consisted of Diabetes Mellitus patients attending the OPD of BIRDEM General Hospital due to any hand complaints. Purposive convenient sampling was used and a total of 354 patients were included. Adult patients aged 41 to 70 years suffering from DM with complaints of hand problems, including both male and female patients with type 2 DM who were willing to participate, were included. Patients who underwent surgery during this period, pregnant women, severely ill patients, known cases of hypothyroidism, connective-tissue disorders, chronic liver disease, individuals with a history of antiepileptic drug use and those not giving written informed consent were excluded.

Diabetes mellitus was diagnosed according to standard criteria: FPG ≥126 mg/dL after at least 8 hours of fasting, 2-hour plasma glucose ≥200 mg/dL during OGTT using 75 g anhydrous glucose, random plasma glucose ≥200 mg/dL with classical symptoms of hyperglycemia, or HbA1C ≥6.5%. Hand complaints or diabetic hand syndrome (DHS) included limited joint mobility, trigger finger, Dupuytren disease and carpal tunnel syndrome. Trigger finger was defined as a condition caused by obstruction of the gliding movement of an inflamed flexor tendon at the narrowed A1 pulley, resulting in pain, clicking, catching, or loss of motion. Severity was graded using the Quinnell system (Grade 0–4).

All patients with hand complaints were initially approached and diabetes was confirmed by OGTT, FBS with 2HAB, or HbA1C. After applying inclusion and exclusion criteria, written informed consent was obtained. Face-to-face interviews were conducted using a semi-structured questionnaire and relevant information was collected from patient registry files. After completion of data collection and checking, data were analyzed using SPSS version 20. Categorical variables were expressed as frequency and percentage, continuous variables as mean and standard deviation and chi-square test was used for associations, with $p<0.05$ considered significant.

RESULTS

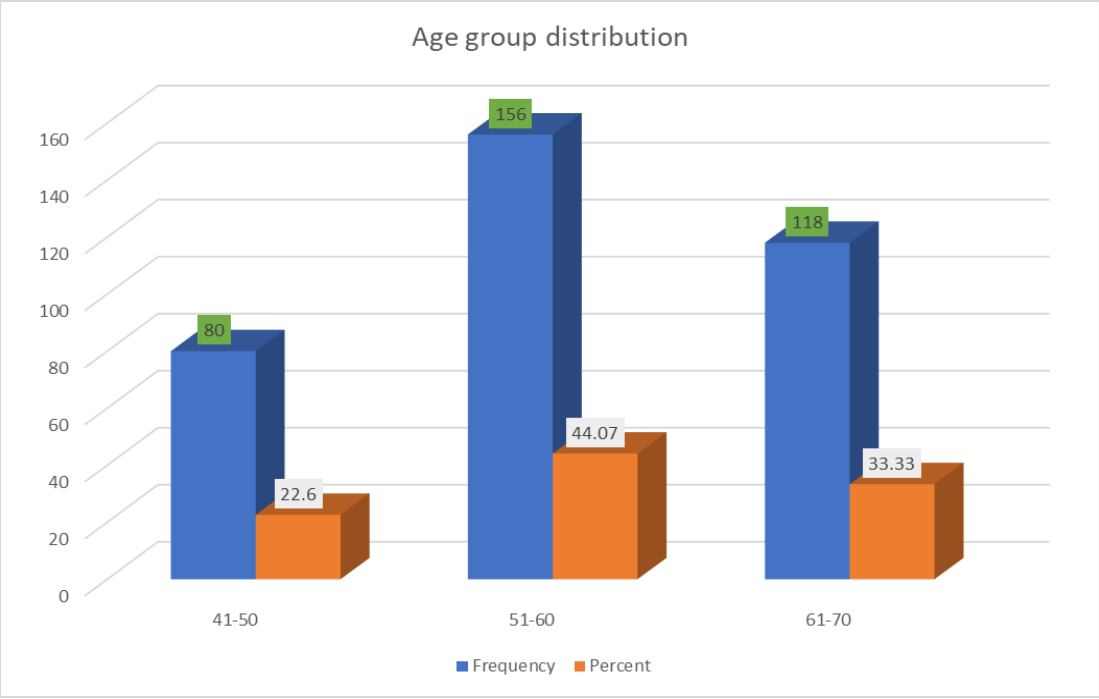

Figure – 1: Age group distribution of patients (*n*=354)

Total 354 diabetes mellitus (type-2) patients with complaints of hand complaints were included in this study. Mean age was 56.48±8.06 years. Maximum age was 70 years and minimum age 41 years. Majority of the patients was belonged to age group 51-60 years (44.07%). Among rest 22.60% were 41-50 years and 33.33% were 61-70 years of age (Figure 1).

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Of all 354 patients of DM with hand complaints, almost half of the patients had trigger finger (50%). Among rest 16.1% had carpal tunnel syndrome, 15.8% had De-Quervain's tenosynovitis, 7.9% had Diabetic cheiroarthropathy, 6.5% had Diabetic peripheral neuropathy, 2.5% had Non-specific tenosynovitis and only 1.1% had nodal osteoarthritis (Table I).

Table – I: Distribution of various hand complications among participants (*n*=354)

Hand complications	Frequency	Percentage
Diabetic cheiroarthropathy	28	7.9%
Trigger finger	177	50%
Carpal tunnel syndrome	57	16.1%
De-Quervain's tenosynovitis	56	15.8%
Diabetic peripheral neuropathy	23	6.5%
Non-specific tenosynovitis	9	2.5%
Nodal osteoarthritis	4	1.1%

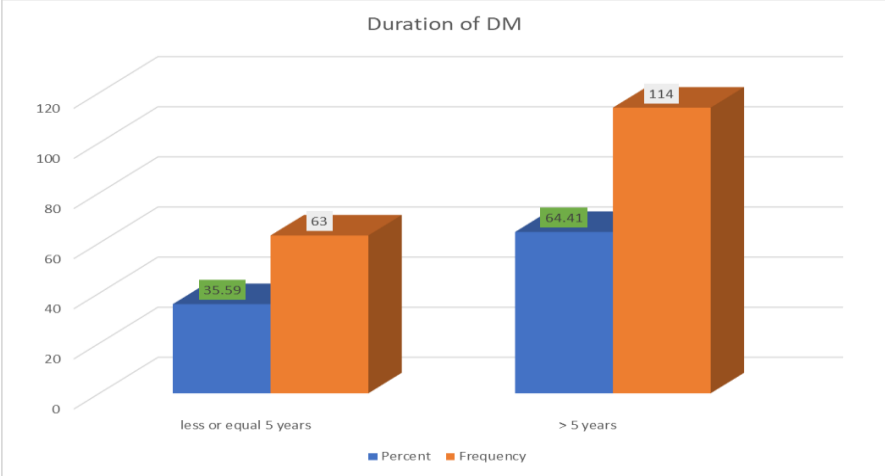

Figure – 2: Duration of DM in patients of trigger finger. (n=177)

Of all patients of trigger finger, majority (64.41%) had more than 5 years of duration of Diabetes and rest 35.59% had equal or less than 5 years of duration (Figure 2).

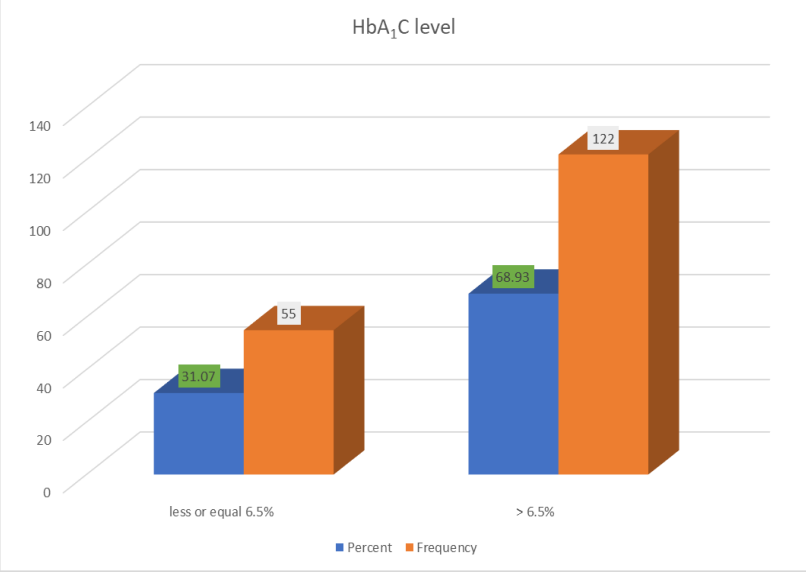

Figure – 3: HbA_1C level in patients of trigger finger (*n*=177)

Of all patients of trigger finger, majority (68.93%) had HbA_1C level more than 6.5% whereas 31.07% had equal or less than 6.5%. Mean HbA_1C level was 7.1±2.6 (Figure 3).

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Among all patients of trigger finger, majority (86.44%) had unilateral hand involvement whereas 13.56% had bilateral hand involvement. Of all unilateral hand involvement, most involvement (49.15%) was right hand and rest 37.29% was left hand (Table II).

Table – II: Distribution of hand involvement in patients of trigger finger (*n*=177)

Hand involvement	Frequency	Percentage
Unilateral	153	86.44%
Left hand	66	37.29%
Right hand	87	49.15%
Bilateral	24	13.56%

Of all patients of trigger finger, majority had grade-2 (57.1%) stage. Among rest, 21.3% had grade-3 , 18.6% had grade-1 and only 2.8% had grade-4 stage (Table III).

Table – III: Distribution of grading of trigger finger. (*n*=177)

Grading of trigger finger	Frequency	Percentage
Grade- 1	33	18.6%
Grade- 2	101	57.1%
Grade- 3	38	21.3%
Grade- 4	5	2.8%

Majority patients of trigger finger had duration of DM for more than 5 years (64.41%) and other 35.59% were equal or less than 5 years of DM. Distribution of participants were significantly different in patients of trigger finger and other than trigger finger (p<0.02) (Table IV).

Table – IV: Comparative distribution of duration of DM among patients of trigger finger and other than trigger finger (*n*=354)

Duration of DM	Trigger finger (n = 177)	Other than trigger finger (n = 177)	P value
Equal or less than 5 years	63(35.59%%)	86(48.59%)	0.018
More than 5 years	114(64.41%)	91(51.41%)	

p value determined by Chi-square test

Majority patients of trigger finger had HbA_1C level for more than 6.5% (68.93%) and other 31.07% had equal or less than 6.5% of HbA_1C level. Distribution of participants were similar in patients of trigger finger and other than trigger finger (p=0.733) (Table V).

Table – V: Comparative distribution of HbA_1C level among patients of trigger finger and other than trigger finger (*n*=354)

HbA_1C level	Trigger finger (n = 177)	Other than trigger finger (n = 177)	P value
Equal or less than 6.5%	55(31.07%)	58(32.77%)	0.733
More than 6.5%	122(68.93%)	119(67.23%)	

p value determined by Chi-square test

DISCUSSION

This study assessed the impact of diabetes mellitus on trigger finger among 354 patients presenting with hand complaints. The mean age of the participants was 56.48±8.06 years, with the majority belonging to the 51–60-year age group, which aligns with the age range in which musculoskeletal manifestations of diabetes are commonly reported. Deshmukh and Akarte, similarly noted that musculoskeletal complications are more prevalent among middle-aged and older diabetic individuals, supporting our findings.[14] Trigger finger was found in 50% of all diabetic patients with hand complaints, which is considerably high and suggests a substantial burden of diabetic hand syndrome in this population.

The frequency of various hand disorders in this study is comparable to findings from similar studies in Bangladesh. Roy documented trigger finger as one of the most common hand conditions among diabetic patients attending BIRDEM, consistent with our observed prevalence.[15] Additionally, Bhowmik and Upadhyaya, reported a high occurrence of rheumatic manifestations in diabetes, including stenosing tenosynovitis, further supporting the high frequency recorded in our study.[16]

Duration of diabetes showed a strong association with the development of trigger finger. In our study, 64.41% of trigger finger cases had diabetes for more than five years. Zyluk and Puchalski, noted that long-standing hyperglycemia leads to glycation of collagen and thickening of tendon sheaths, predisposing patients to trigger finger, which supports our observations.[17] Similarly, Rosenbloom highlighted that connective-tissue disorders increase with duration of diabetes, reinforcing the association found in our study (p < 0.02).[18]

Poor glycemic control also appeared to influence the development of trigger finger. In our study, 68.93% of affected patients had HbA1c >6.5% with a mean of 7.1±2.6. Lui et al., demonstrated that chronic hyperglycemia accelerates tendon

degeneration and impairs collagen remodeling, a mechanism that may explain the high frequency of trigger finger in patients with elevated HbA1c levels.[19] Although the association between HbA1c and trigger finger was not statistically significant in our comparison (p = 0.733), the clinical trend suggests a relationship consistent with previous findings.

Hand involvement in our study revealed that 86.44% of patients had unilateral trigger finger, with right-hand involvement being most common (49.15%). This pattern has been described in earlier studies; Schulman et al., reported similar unilateral predominance and suggested that hand dominance may play a role in symptom distribution.[20] Additionally, Chuang et al., explained that mechanical stress on flexor tendons contributes to stenosing tenosynovitis, supporting the higher involvement of the dominant hand.[21]

Regarding severity, most patients in our study presented with grade-2 trigger finger (57.1%), followed by grade-3 (21.3%) and grade-1 (18.6%). Shultz et al., found that grade-2 and grade-3 trigger finger were the most common presentations among diabetic patients, aligning closely with our severity pattern.[22] Dardas et al., further noted that diabetic individuals tend to present with more advanced grades of stenosing tenosynovitis due to delayed health-seeking behaviors and chronic tendon changes.[23]

Carpal tunnel syndrome (16.1%) and De Quervain's tenosynovitis (15.8%) were also common in our cohort. Islam et al., identified a high frequency of carpal tunnel syndrome among diabetic patients with neuropathy in Bangladesh, comparable to our findings.[24] Similarly, Oktayoglu et al., showed that metabolic conditions like diabetes significantly increase the risk of carpal tunnel syndrome, supporting the coexistence of multiple hand disorders in diabetic individuals observed in this study.[25]

Overall, our findings strongly support the existing evidence that diabetes mellitus contributes significantly to the development of trigger finger and other hand disorders. The high frequency, association with longer disease duration and predominance of poor glycemic control emphasize the importance of routine musculoskeletal screening in diabetic patients. Early diagnosis and management may reduce disability and improve hand function, as suggested by Langer et al.[26]

LIMITATIONS OF THE STUDY

This study was conducted in a single tertiary care hospital with a purposive sampling method, which may limit the generalizability of the findings to the wider diabetic population. The cross-sectional design does not allow establishment of a causal relationship between diabetes and trigger finger. Additionally, the study relied partly on patient-reported history, which may introduce recall bias and some potential confounding factors such as occupation-related hand strain were not fully controlled.

CONCLUSION

Trigger finger was found to be highly prevalent among patients with type 2 diabetes mellitus, particularly those with longer disease duration and poor glycemic control. The predominance of moderate-to-severe grades highlights the need for early screening and timely management of hand disorders in diabetic patients. Strengthening glycemic control and incorporating routine musculoskeletal assessment into diabetes care may help reduce the burden of trigger finger and improve overall quality of life.

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Conflicts of interest
There are no conflicts of interest.

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