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ORIGINAL ARTICLE

Association between Elevated HbA1c Levels and Risk of Trigger Finger in Diabetic Patients

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ABSTRACT

Background: *Diabetes mellitus is a chronic metabolic disorder that not only causes vascular complications but is also associated with musculoskeletal manifestations such as trigger finger, which are often underrecognized. The purpose of the study was to assess the association between elevated HbA1c levels and the risk of developing trigger finger among diabetic patients.* ***Aim of the study:*** *The aim of the study was to assess the association between elevated HbA1c levels and the risk of developing trigger finger among diabetic patients.* ***Methods & Materials:*** *A cross-sectional study at the Medicine Outpatient Department of BIRDEM General Hospital, Dhaka, Bangladesh (Nov 2018–Apr 2019) included 354 type 2 diabetic patients with hand complaints, and demographic and clinical data were collected to assess associations with trigger finger using SPSS and chi-square tests (P < 0.05).* ***Results:*** *Among 354 diabetic patients, trigger finger affected 177 (50%). Age and sex were similar between groups, while diabetes duration >5 years was higher in trigger finger patients (114, 64.4% vs 91, 51.4%; P = 0.018). Hypertension was present in 122 (68.9%) trigger finger patients. HbA1c >6.5% was seen in 122 (68.9%) with trigger finger and 119 (67.2%) without (P = 0.733), showing no significant association.*

Conclusion: *Trigger finger is the most common hand complication in diabetic patients, associated with longer diabetes duration but not with elevated HbA1c levels.*

Keywords: *HbA1c, Trigger Finger, Diabetes Mellitus*

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INTRODUCTION

Diabetes mellitus, regardless of its type, is widely recognized as a chronic metabolic condition that leads to multiple microvascular and macrovascular complications[1]. These complications are well-documented and routinely monitored in clinical practice. Maintaining good glycemic control plays a crucial role in minimizing the onset and progression of microvascular complications such as diabetic retinopathy, nephropathy, and neuropathy[2]. The global prevalence of diabetes continues to increase steadily, contributing substantially to long-term health burdens and diminished quality of life among affected populations[3].

In addition to vascular complications, there is growing recognition of musculoskeletal manifestations associated with diabetes[4]. Several epidemiological investigations have demonstrated links between type 1 and type 2 diabetes, as well as obesity, and various fibroproliferative musculoskeletal disorders of the upper limb that typically present with limited joint mobility[5]. Among these, trigger finger is a frequently encountered and often distressing condition of the hand. It is considered part of the spectrum of diabetic hand disorders, along with limited joint mobility (LJM) and Dupuytren's contracture[6-8]. Diabetes has been identified as an important risk factor for the development of trigger finger, and previous studies have associated this condition with the broader clinical entity referred to as "the diabetic hand," which also encompasses carpal tunnel syndrome, ulnar nerve entrapment, and Dupuytren's disease[9-12].

Stenosing flexor tenosynovitis (FTS), commonly known as trigger finger[13], is characterized by impaired gliding of the

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flexor tendons through the pulley system of the hand, leading to finger locking during flexion. The occurrence of trigger finger is notably higher among individuals with diabetes, affecting up to 20% of diabetic patients compared to only 1%–2% in the general population[14,15]. Moreover, diabetic patients tend to exhibit a higher disease prevalence and poorer therapeutic response. Glycated hemoglobin (HbA1c) serves as a reliable biomarker reflecting average blood glucose levels over approximately three months and is widely used to assess long-term glycemic control[16,17]. Elevated HbA1c levels have been shown to predict the risk of diabetic complications. Although previous research has suggested a possible relationship between poor glycemic control and the development of trigger finger, findings remain inconclusive, and the extent of this association continues to be debated[18].

Despite growing recognition of diabetic hand disorders, the relationship between glycemic control and specific hand complications such as trigger finger remains insufficiently explored. Previous studies have yielded inconsistent findings regarding the role of elevated HbA1c levels in the development of trigger finger, and data from South Asian populations, particularly Bangladesh, are limited. Understanding this association is essential for early identification and prevention of musculoskeletal complications in diabetes. Therefore, the purpose of the study was to assess the association between elevated HbA1c levels and the risk of developing trigger finger among diabetic patients.

Objective

- To assess the association between elevated HbA1c levels and the risk of developing trigger finger among diabetic patients.

METHODS & MATERIALS

This cross-sectional observational study was conducted at the Medicine Outpatient Department of BIRDEM General Hospital, Dhaka, Bangladesh, from November 2018 to April 2019. A total of 354 patients with type 2 diabetes mellitus presenting with hand complaints were included. Participants were selected using purposive convenient sampling based on predefined inclusion and exclusion criteria.

- **Inclusion Criteria:**
- Adults aged 41–70 years with type 2 diabetes mellitus and hand complaints
- Both male and female patients
- Patients willing to participate

Exclusion Criteria:

- Patients who underwent surgery during the study period
- Pregnant women
- Severely ill patients
- Known cases of hypothyroidism
- Patients with connective tissue disorders
- Patients with chronic liver disease
- History of antiepileptic drug use
- Patients who did not provide written informed consent

Diabetes status was confirmed using fasting plasma glucose, 2-hour oral glucose tolerance test (OGTT), or HbA1c ≥6.5%. Trigger finger was diagnosed clinically based on impaired finger movement and tenderness at the A1 pulley. Following written informed consent, demographic and clinical data—including age, sex, duration of diabetes, hand complications, hypertension, and HbA1c levels—were collected through patient interviews and review of medical records.

Ethical considerations, including patient confidentiality and informed consent, were strictly maintained throughout the study. Data were analyzed using SPSS software, with categorical variables presented as frequencies and percentages, and continuous variables as means ± standard deviations. Associations between variables were assessed using the chi-square test, with $P < 0.05$ considered statistically significant.

RESULTS

Table – I: Distribution of Hand Complications among Study Participants (*n* = 354)

Hand Complications	Frequency	Percentage (%)
Diabetic cheiroarthropathy	28	7.9
Trigger finger	177	50.0
Carpal tunnel syndrome	57	16.1
De Quervain's tenosynovitis	56	15.8
Diabetic neuropathy (peripheral)	23	6.5
Non-specific tenosynovitis	9	2.5
Nodal osteoarthritis	4	1.1

Trigger finger was the most prevalent, observed in 177 patients (50.0%), followed by carpal tunnel syndrome in 57 patients (16.1%) and De Quervain's tenosynovitis in 56 patients (15.8%). Other less common complications included diabetic cheiroarthropathy in 28 patients (7.9%), diabetic neuropathy (peripheral) in 23 patients (6.5%), non-specific tenosynovitis in 9 patients (2.5%), and nodal osteoarthritis in 4 patients (1.1%).

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Table – II: Demographic and Clinical Comparison of Patients with and without Trigger Finger (*n* = 354)

Variable		Trigger Finger (n = 177)	Other than Trigger Finger (n = 177)	P value
Age (years)	Mean ± SD	55.92 ± 8.47	57.04 ± 7.61	0.190
	Range	41–70	41–69	
Sex	Male	65 (36.72%)	67 (37.85%)	0.827
	Female	112 (63.28%)	110 (62.15%)	
Duration of DM	≤ 5 years	63 (35.59%)	86 (48.59%)	0.018
	> 5 years	114 (64.41%)	91 (51.41%)	

Table II compares key characteristics between patients with trigger finger and those with other hand conditions. The mean age was similar between groups (55.92 ± 8.47 vs 57.04 ± 7.61 years; P = 0.190). Sex distribution was also comparable (36.72% males vs 37.85%; P = 0.827). Duration of diabetes differed significantly, with a higher proportion of trigger finger patients having diabetes for more than 5 years (64.41% vs 51.41%; P = 0.018).

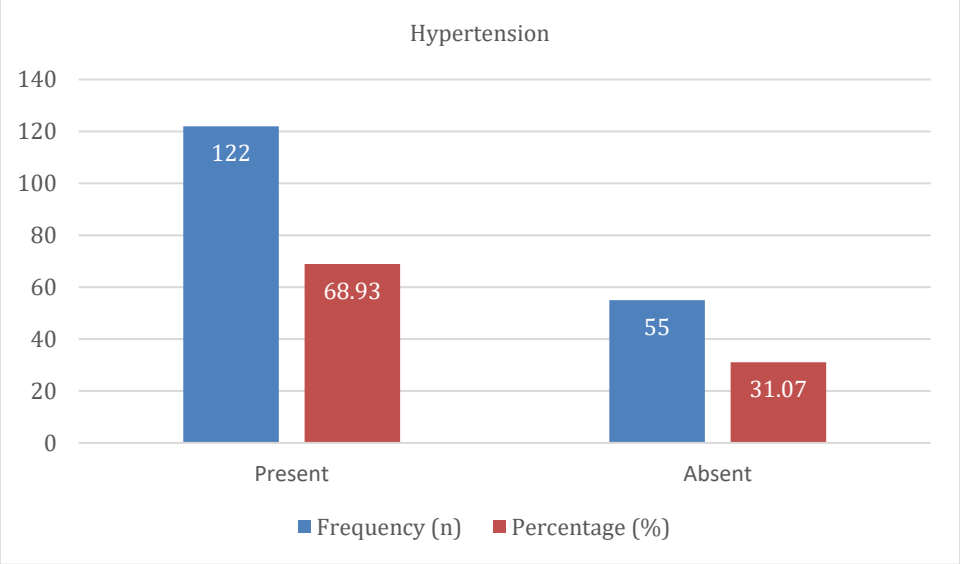

Figure 1: Hypertension Status among Patients with Trigger Finger (*n*=177)

Figure 1 illustrates the prevalence of hypertension among patients with trigger finger. Of the 177 patients, 122 (68.93%) had hypertension, while 55 (31.07%) did not.

Table – III: Comparative Distribution of HbA1c Levels among Patients with and without Trigger Finger (*n* = 354)

Variable		Trigger Finger (n = 177)	Other than Trigger Finger (n = 177)	P value
HbA1c level	≤ 6.5%	55 (31.07%)	58 (32.77%)	0.733
	> 6.5%	122 (68.93%)	119 (67.23%)	

Table III shows the distribution of HbA1c levels between patients with trigger finger and those with other hand conditions. Among trigger finger patients, 55 (31.07%) had HbA1c ≤ 6.5%, while 122 (68.93%) had HbA1c > 6.5%. In the non-trigger finger group, 58 patients (32.77%) had HbA1c ≤ 6.5% and 119 (67.23%) had HbA1c > 6.5%. The difference was not statistically significant (P = 0.733).

DISCUSSION

Trigger finger, characterized by impaired gliding of the flexor tendons through the A1 pulley, emerged as the most prevalent hand disorder in this study, followed by carpal tunnel syndrome and De Quervain's tenosynovitis. These findings underscore the multifactorial nature of trigger finger development, with longer duration of diabetes and coexisting hypertension identified as notable contributing factors. The high prevalence highlights the importance of early recognition and timely management to prevent functional impairment and enhance quality of life among diabetic patients.

In this cohort, trigger finger was observed in 177 patients (50.0%), followed by carpal tunnel syndrome (16.1%) and De Quervain's tenosynovitis (15.8%). These results align with previous research demonstrating heightened susceptibility of diabetic patients to musculoskeletal hand disorders. Kuczmarski et al.[19] reported that trigger finger prevalence in diabetic populations ranges from 5% to 20%, substantially higher than in non-diabetic individuals. Similarly, Dong et al.[20] found that carpal tunnel syndrome affects

approximately 14% of type 2 diabetic patients, closely mirroring the 16.1% observed in our study. Hassan et al.[21] also reported an elevated risk of De Quervain's tenosynovitis among diabetic patients, particularly with advancing age. Collectively, these findings reinforce that diabetes significantly predisposes individuals to a spectrum of hand complications, with trigger finger being the predominant manifestation.

The demographic and clinical analysis revealed that mean age and sex distribution were comparable between patients with and without trigger finger, suggesting that these factors were not significantly associated with the condition in this cohort. However, the duration of diabetes differed significantly, with 64.41% of trigger finger patients having diabetes for more than five years compared to 51.41% in the non-trigger finger group (P = 0.018). These observations are consistent with Sarkar et al.[22], who reported that over half (56.31%) of patients with trigger finger had diabetes, with nearly equal sex distribution. Kuczmarski et al.[19] also highlighted that trigger finger occurs at a markedly higher rate in diabetic patients compared to non-diabetic populations, emphasizing the influence of prolonged diabetes on musculoskeletal complications and the need for early monitoring and intervention.

A substantial proportion of patients with trigger finger (68.93%) had hypertension, whereas 31.07% did not. This aligns with previous studies indicating a notable prevalence of hypertension among individuals with diabetic hand disorders. Mustafa et al.[23] reported a significant association between hypertension and diabetic cheiroarthropathy, while Shayea et al.[24] observed that 26% of trigger finger patients had hypertension, highlighting the potential role of systemic vascular factors in the development or progression of musculoskeletal complications in diabetes.

Regarding glycemic control, most patients with trigger finger had HbA1c levels >6.5%, while fewer had HbA1c ≤6.5%. Although this difference was not statistically significant, the high prevalence of elevated HbA1c is consistent with prior studies suggesting a potential link between poor glycemic control and flexor tendon pathology. Rydberg et al.[10] found that higher HbA1c levels increased the risk of developing trigger finger in both type 1 and type 2 diabetes, indicating that chronic hyperglycemia may predispose to tendon complications. Similarly, Vance et al.[18] reported an association between elevated HbA1c and flexor tendon disorders, including trigger finger. These findings collectively suggest that glycemic control may influence the risk of musculoskeletal complications in diabetes, even though this study did not demonstrate a statistically significant association.

Limitations of the study

All study participants were recruited from a single tertiary care center specialized in diabetes management; therefore, the findings may not fully represent the overall diabetic population in Bangladesh.

Conclusion

Trigger finger was the most common hand complication among diabetic patients, and a longer duration of diabetes was associated with its development. Hypertension was frequently observed in these patients. However, elevated HbA1c levels were not significantly associated with the occurrence of trigger finger, suggesting that poor glycemic control alone may not directly increase its risk.

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