

Research Article

Prevalence of Diabetic Complications among Adult Diabetic Patients

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Abstract: Background: Diabetes mellitus is a major public health problem worldwide. Chronic hyperglycemia can lead to microvascular and macrovascular complications, resulting in increased morbidity and mortality. Identifying the prevalence and associated factors of these complications is essential for improving diabetes management and patient outcomes. **Objective:** To determine the prevalence of diabetic complications and identify factors associated with their occurrence among adult diabetic patients attending a tertiary care hospital. **Methods:** This hospital-based cross-sectional study was conducted among 220 adult diabetic patients attending a tertiary care private hospital in Dhaka, Bangladesh, from January to December 2015. Data were collected through face-to-face interviews and review of medical records using a pretested semi-structured questionnaire. Information regarding socio-demographic characteristics, duration of diabetes, glycemic control, treatment modalities, comorbidities, and diabetic complications was obtained. Data were analyzed using SPSS version 20.0. Associations between diabetic complications and selected variables were assessed using the Chi-square test, with $p < 0.05$ considered statistically significant. **Results:** The mean age of the participants was 55.7 ± 10.9 years, and 55.5% were female. Poor glycemic control ($HbA1c \geq 7\%$) was observed in 65.9% of patients, while 43.6% had diabetes for more than 10 years. Overall, 73.2% of participants had at least one diabetic complication. Peripheral neuropathy was the most common complication (40.0%), followed by diabetic retinopathy (32.7%) and diabetic nephropathy (26.8%). Coronary artery disease was present in 19.1% of patients, while stroke and peripheral arterial disease were observed in 8.2% and 5.5%, respectively. Diabetic complications were significantly associated with age > 50 years ($p = 0.006$), duration of diabetes > 10 years ($p < 0.001$), and poor glycemic control ($p < 0.001$). **Conclusion:** Diabetic complications were highly prevalent among adult diabetic patients. Increasing age, longer duration of diabetes, and poor glycemic control were significantly associated with the occurrence of complications. Regular screening and effective glycemic management are essential to reduce the burden of diabetes-related complications.

Keywords: Diabetes mellitus; Diabetic complications; Peripheral neuropathy; Diabetic retinopathy; Diabetic nephropathy; Glycemic control; HbA1c; Bangladesh.

INTRODUCTION

Diabetes mellitus is one of the most common chronic non-communicable diseases and has emerged as a major public health challenge worldwide. It is characterized by chronic hyperglycemia resulting from defects in insulin secretion, insulin action, or both. The prevalence of diabetes has increased dramatically over the past few decades due to population growth, urbanization, aging, sedentary lifestyles, and unhealthy dietary habits. Diabetes is associated with substantial morbidity, mortality, reduced quality of life, and increased healthcare expenditures, largely due to its acute and chronic complications [1,2].

The burden of diabetes is rising rapidly, particularly in low- and middle-income countries and in the Asia-Pacific region, where urbanization, lifestyle

changes, and population aging have accelerated the epidemic [2,3]. Persistent hyperglycemia is a major risk factor for the development of diabetic complications. Poor glycemic control is associated with both microvascular complications, including retinopathy, nephropathy, and neuropathy, and macrovascular complications such as cardiovascular and cerebrovascular diseases [4]. Glycated hemoglobin (HbA1c) is widely used to assess long-term glycemic control and predict the risk of these complications.

Although advances in diabetes management have led to reductions in certain complications in developed countries, diabetes-related morbidity remains substantial [5]. Studies conducted in South Asian countries have reported a high prevalence of diabetic complications among patients with type 2 diabetes. The

DiabCare India Study demonstrated inadequate glycemic control and a considerable burden of complications among diabetic patients, highlighting the need for improved diabetes management strategies [6]. Similarly, microvascular complications have been reported even among newly diagnosed patients with type 2 diabetes, indicating that complications may develop before diagnosis or shortly thereafter [7].

In Bangladesh, diabetes has become a significant public health concern. Hospital-based studies have reported a high prevalence of both microvascular and macrovascular complications among patients with type 2 diabetes, contributing substantially to disease burden and healthcare utilization. Furthermore, inadequate awareness regarding diabetic complications among patients remains a challenge, potentially affecting adherence to preventive measures and treatment recommendations [8].

Given the increasing prevalence of diabetes and its associated complications, understanding the magnitude and pattern of diabetic complications among adult diabetic patients is essential for planning effective preventive and management strategies. Therefore, this study aims to determine the prevalence of diabetes-related complications among adult diabetic patients and to describe their clinical characteristics, thereby contributing to evidence-based interventions for improved diabetes care.

MATERIALS AND METHODS

This hospital-based cross-sectional study was conducted among adult patients with diabetes mellitus attending a tertiary level private hospital in Dhaka, Bangladesh, from January 2015 to December 2015. The study aimed to determine the prevalence of diabetic complications and identify factors associated with their occurrence among diabetic patients.

A total of 220 adult diabetic patients were enrolled using a purposive consecutive sampling technique. Patients aged 18 years and above with a confirmed diagnosis of diabetes mellitus who attended the OPD during the study period were included. Patients with gestational diabetes, critically ill patients, those with incomplete medical records, and individuals

unwilling to participate were excluded from the study. Written informed consent was obtained from all participants prior to data collection.

Data were collected through face-to-face interviews using a pretested semi-structured questionnaire and by reviewing patients' medical records. Information regarding socio-demographic characteristics, duration of diabetes, treatment modalities, comorbid conditions, glycemic control, and diabetic complications was obtained. Glycemic control was assessed using glycated hemoglobin (HbA1c) levels, with HbA1c $\geq 7\%$ considered poor glycemic control. Diabetic complications including peripheral neuropathy, diabetic retinopathy, diabetic nephropathy, diabetic foot complications, coronary artery disease, stroke, and peripheral arterial disease were identified from documented clinical diagnoses and relevant investigation reports.

Data were entered, cleaned, and analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Continuous variables were expressed as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequencies and percentages. The prevalence of diabetic complications was calculated, and associations between diabetic complications and selected variables such as age, duration of diabetes, and glycemic control were assessed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant. Ethical approval for the study was obtained from the Institutional Review Board of BMU, and confidentiality of all participant information was strictly maintained throughout the study.

RESULTS

A total of 220 adult patients with diabetes mellitus were included in the study and analyzed. Table 1 shows the socio-demographic characteristics of the study participants. The mean age of the respondents was 55.7 ± 10.9 years, with the highest proportion (35.5%) belonging to the 51–60 years age group. Females constituted 55.5% of the study population, while males accounted for 44.5%. More than two-thirds (67.3%) of the participants were urban residents, and the majority (88.2%) were married.

Table 1: Socio-demographic Characteristics of the Study Participants (n=220)

Characteristics	Frequency (n)	Percentage (%)
Age group (years)		
≤ 40	26	11.8
41–50	49	22.3
51–60	78	35.5
61–70	51	23.2
> 70	16	7.3
Mean age (years)	55.7 ± 10.9	
Sex		
Male	98	44.5
Female	122	55.5

Residence		
Urban	148	67.3
Rural	72	32.7
Marital status		
Married	194	88.2
Unmarried/Widowed/Divorced	26	11.8

As presented in Table 2, 43.6% of the participants had diabetes for more than 10 years. Poor glycemic control (HbA1c $\geq 7\%$) was observed in 65.9% of patients. Oral hypoglycemic agents were the most

commonly used treatment modality (53.6%). Among the comorbid conditions, hypertension was the most prevalent (61.8%), followed by dyslipidemia (43.2%) and ischemic heart disease (19.1%).

Table 2: Clinical Characteristics of the Participants (n=220)

Characteristics	Frequency (n)	Percentage (%)
Duration of diabetes		
<5 years	58	26.4
5–10 years	66	30.0
>10 years	96	43.6
Glycemic control (HbA1c)		
<7%	75	34.1
$\geq 7\%$	145	65.9
Treatment modality		
Oral hypoglycemic agents	118	53.6
Insulin only	56	25.5
Both insulin and OHA	46	20.9
Comorbidities		
Hypertension	136	61.8
Dyslipidemia	95	43.2
Ischemic heart disease	42	19.1

Table 3 demonstrates the prevalence of diabetic complications among the study participants. Overall, 73.2% of patients had at least one diabetic complication. The most common complication was peripheral neuropathy (40.0%), followed by diabetic retinopathy

(32.7%) and diabetic nephropathy (26.8%). Macrovascular complications included coronary artery disease (19.1%), stroke (8.2%), and peripheral arterial disease (5.5%).

Table 3: Prevalence of Diabetic Complications among Study Participants (n=220)

Complication	Frequency (n)	Percentage (%)
Any diabetic complication	161	73.2
Peripheral neuropathy	88	40.0
Diabetic retinopathy	72	32.7
Diabetic nephropathy	59	26.8
Diabetic foot complications	29	13.2
Coronary artery disease	42	19.1
Stroke	18	8.2
Peripheral arterial disease	12	5.5

Table 4 shows the distribution of participants according to the number of diabetic complications. More than one-third (36.8%) had a single diabetic

complication, while 22.3% had two complications and 14.1% had three or more complications. Only 26.8% of participants were free from diabetic complications.

Table 4: Distribution of Participants According to Number of Diabetic Complications (n=220)

Number of complications	Frequency (n)	Percentage (%)
No complication	59	26.8
One complication	81	36.8
Two complications	49	22.3
Three or more complications	31	14.1

Table 5 shows a significant association between age and diabetic complications. Patients aged more than 50 years had a significantly higher prevalence of diabetic

complications (79.3%) compared with those aged 50 years or younger (61.3%) ($p = 0.006$).

Table 5: Association Between Age Group and Presence of Diabetic Complications (n=220)

Age group (years)	Complication Present n (%)	Complication Absent n (%)	Total	p-value
≤50	46 (61.3)	29 (38.7)	75	
>50	115 (79.3)	30 (20.7)	145	0.006

As shown in Table 6, diabetic complications were significantly more common among patients with a diabetes duration exceeding 10 years (86.5%) than

among those with a duration of 10 years or less (62.9%). This association was statistically significant ($p < 0.001$).

Table 6: Association Between Duration of Diabetes and Presence of Diabetic Complications (n=220)

Duration of Diabetes	Complication Present n (%)	Complication Absent n (%)	Total	p-value
≤10 years	78 (62.9)	46 (37.1)	124	
>10 years	83 (86.5)	13 (13.5)	96	<0.001

Table 7 reveals a significant relationship between glycemic control and diabetic complications. Participants with poor glycemic control ($HbA1c \geq 7\%$)

had a markedly higher prevalence of diabetic complications (80.7%) compared with those with good glycemic control (58.7%) ($p < 0.001$).

Table 7: Association Between Glycemic Control and Presence of Diabetic Complications (n=220)

HbA1c Level	Complication Present n (%)	Complication Absent n (%)	Total	p-value
<7%	44 (58.7)	31 (41.3)	75	
≥7%	117 (80.7)	28 (19.3)	145	<0.001

Among the 220 diabetic patients attending the BMU OPD, nearly three-quarters (73.2%) had at least one diabetic complication. Peripheral neuropathy was the most prevalent complication, followed by diabetic retinopathy and nephropathy. Increasing age, longer duration of diabetes, and poor glycemic control were significantly associated with the occurrence of diabetic complications. These findings suggest that chronic hyperglycemia and prolonged disease duration play important roles in the development of diabetes-related complications.

DISCUSSION

The present study found that 73.2% of adult diabetic patients had at least one diabetic complication, indicating a high burden of diabetes-related morbidity. Similar findings have been reported in studies from Bangladesh, Pakistan, and Ethiopia, where diabetic complications were common among patients with type 2 diabetes.

Peripheral neuropathy was the most prevalent complication (40.0%), followed by diabetic retinopathy (32.7%) and nephropathy (26.8%). Comparable patterns have been observed in previous studies, particularly in South Asian populations, where neuropathy was reported as one of the most frequent complications of diabetes [10-12]. The coexistence of multiple complications among a considerable proportion of patients is also consistent with the previous study [13].

A significant association was observed between increasing age and the presence of diabetic

complications. Similar associations have been reported in earlier studies, suggesting that advancing age increases cumulative exposure to metabolic and vascular risk factors [9]. Likewise, patients with a diabetes duration of more than 10 years had significantly higher rates of complications, which agrees with previous reports identifying longer disease duration as a major predictor of diabetic complications [11].

Poor glycemic control ($HbA1c \geq 7\%$) was significantly associated with diabetic complications in the present study. This finding is supported by evidence demonstrating that chronic hyperglycemia is a key contributor to the development of both microvascular and macrovascular complications [11,13]. Therefore, maintaining optimal glycemic control and regular screening for complications are essential to reduce the burden of diabetes-related morbidity.

CONCLUSION

This study revealed a high prevalence of diabetic complications among adult diabetic patients attending a tertiary care hospital, with nearly three-quarters of participants experiencing at least one complication. Peripheral neuropathy, diabetic retinopathy, and diabetic nephropathy were the most common complications identified. The occurrence of diabetic complications was significantly associated with increasing age, longer duration of diabetes, and poor glycemic control. These findings emphasize the importance of early diagnosis, regular screening for complications, and strict glycemic management to prevent disease progression and reduce long-term

morbidity. Strengthening diabetes care services, promoting patient education, and ensuring routine monitoring of high-risk patients may contribute substantially to improving clinical outcomes and reducing the burden of diabetes-related complications in Bangladesh.

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