

Comparison of Type 2 Diabetes Mellitus and Non-Diabetes General Patients Admitted in Tertiary Level Hospital

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ABSTRACT

Background: Type 2 diabetes mellitus is rising rapidly worldwide and in Bangladesh. It often coexists with hypertension, kidney disease, heart disease, and other conditions, increasing the risk of hospitalization and complicating care. In Bangladesh, most diabetes cases are type 2, affecting a large proportion of adults, with national survey estimates at 9.2% and IDF 2024 projections at 13.2%. Direct comparisons between hospitalized diabetic and non-diabetic patients in Bangladesh are limited. **Aim of the study:** This study aimed to compare the frequency, socio-demographic, clinical, biochemical and comorbidity of diabetic and non-diabetic patients. **Methods & Materials:** This hospital-based comparative study was conducted at the Department of Medicine in Rangpur Community Medical College and Hospital, Rangpur, Bangladesh, from October 2025 to March 2026. The study included 200 patients admitted to the medicine wards, 87 with type 2 diabetes mellitus and 113 without diabetes. Data were collected prospectively using a predesigned case record form and included socio-demographic, clinical, biochemical, comorbidity, and admission diagnosis information. Data were analyzed using SPSS version 26.0, and group comparisons were performed using Chi-square, Fisher's exact, and independent sample t-tests, with $p < 0.05$ considered statistically significant. **Results:** Among the 200 admitted patients, 87 (43.5%) had type 2 diabetes, while 113 (56.5%) did not. Diabetic patients were older, with a mean age of 57.5 years, compared to 42.9 years for non-diabetics ($p < 0.001$). Regarding gender, the male:female ratio was 1.07:1 in the diabetic group, 0.74:1 in the non-diabetic group, and 0.87:1 overall ($p=0.247$). Systolic

blood pressure averaged 125 mmHg in diabetics and 115 mmHg in non-diabetics ($p < 0.001$). Diastolic pressure was also higher in diabetic group 76.8 mmHg vs 73.1 mmHg ($p = 0.027$). Diabetic patients had higher blood sugar (13.9 mmol/L vs 7.2 mmol/L, $p < 0.001$) and higher HbA1c (10.7% vs 5.9%, $p = 0.036$). Their eGFR was lower (68.1 vs 87.2 ml/min; $p < 0.001$). Hypertension was seen in 46% of diabetics and 21.2% of non-diabetics ($p < 0.001$). Infectious diseases were the most frequent reason for admission in both groups 29.9% for diabetic patients and 35.4% for non-diabetics. Overall admission patterns were similar ($p = 0.319$). **Conclusion:** Type 2 diabetes mellitus is increasingly common among hospitalized patients and is associated with a higher burden of adverse clinical and biochemical risk factors than non-diabetic patients. These findings highlight the need for closer monitoring and integrated management to reduce complications and improve outcomes.

Keywords: Type 2 diabetes mellitus; Hospitalized patients; Comorbidities; Glycemic control; Renal function, IDF.

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INTRODUCTION

Type 2 diabetes mellitus, T2DM, is one of the fastest-growing non-communicable diseases worldwide and an increasingly important cause of morbidity, premature mortality, disability and health-system burden. The Global Burden of Disease 2021 study estimated that 529 million people were living with diabetes in 2021 and projected a substantial further rise by 2050, while the NCD Risk Factor Collaboration showed that diabetes prevalence increased steadily across most countries between 1990 and 2022, with treatment coverage remaining inadequate in many low- and middle-income settings^[1,2]. South Asia is particularly affected, because diabetes often develops at a younger age and at a lower body mass index than in many Western populations, reflecting a distinctive metabolic susceptibility in this region^[3]. Bangladesh is experiencing this epidemiological transition rapidly.

Available evidence shows that both diabetes and prediabetes are highly prevalent among Bangladeshi adults, with an increasing trend over time^[4,5]. Nationally representative analyses have also demonstrated important disparities in awareness, treatment, and glycemic control, indicating that a substantial proportion of affected individuals remain undiagnosed or inadequately managed^[5,6]. Diabetes is a growing public health problem in northern Bangladesh. National BDHS 2017-18 data show that 9.2% of Bangladeshi adults had diabetes, 13.3% had prediabetes, and 61.5% of people with diabetes were unaware of their condition⁵. In the 2011 nationwide survey, division-level estimates showed a substantial burden in northern Bangladesh, with diabetes prevalence of 10.2% in Rajshahi and 8.0% in Rangpur^[7]. Moreover, among Bangladeshi adults aged 35 years and above, diabetes prevalence increased from 10.95% in 2011 to 13.75%

in 2017–2018^[8]. Rapid urbanization, population ageing, sedentary lifestyle, dietary transition, obesity, and coexisting hypertension have all contributed to the expanding burden of diabetes in Bangladesh^[4-6]. As a result, T2DM is no longer confined to outpatient chronic disease clinics; it is now frequently encountered among patients admitted to general medical wards.

The clinical significance of T2DM extends beyond hyperglycemia alone. Patients with diabetes commonly have multiple coexisting disorders, including hypertension, obesity, dyslipidemia, chronic kidney disease, cardiovascular disease, and cerebrovascular disease^[9]. These comorbidities increase the risk of hospitalization, complicate inpatient management, prolong recovery, and worsen outcomes. In Bangladesh, hospital-based evidence has shown a substantial burden of comorbid conditions among patients with type 2 diabetes, with

hypertension being particularly common^[10]. In addition, diabetic kidney disease has emerged as a major concern because of its close association with progressive renal impairment, cardiovascular complications, recurrent hospital contact, and premature death^[11]. Previous studies have shown that adults with diabetes have higher rates of hospital admission and longer lengths of stay than those without diabetes^[12]. Contemporary inpatient diabetes care guidelines also emphasize that hyperglycemia, hypoglycemia, and glucose variability during hospitalization are clinically important and require careful assessment and management because they are associated with poorer outcomes^[13]. Comparison of admitted diabetic and non-diabetic patients is therefore clinically relevant, as it may help identify differences in sociodemographic profile, blood pressure, renal function, glycemic parameters, comorbidities, and reasons for admission, all of which influence inpatient care needs in tertiary hospitals. However, in Bangladesh, most published studies have focused on community prevalence, risk factors, awareness, or comorbidity patterns in people with diabetes^[4-6,10], whereas comparative hospital-based data between admitted patients with T2DM and non-diabetic patients remain limited, particularly in tertiary-level settings where disease complexity is greater. Generating such evidence is important for identifying the

distinct clinical and biochemical profiles of diabetic inpatients and for informing screening, inpatient monitoring, and integrated management strategies. Therefore, this study aimed to determine the frequency of patients with type 2 diabetes mellitus among hospital admissions and to compare the socio-demographic characteristics, clinical parameters, biochemical profiles, comorbidities, and admission diagnoses between diabetic and non-diabetic patients in a tertiary-level hospital.

METHODS & MATERIALS

This hospital-based comparative study was conducted in the Department of Medicine of a tertiary-level hospital Rangpur Community Medical College and Hospital, Rangpur, Bangladesh, from October 2025 to March 2026. The study included all eligible patients admitted to the medicine wards during the study period. A total of 200 patients were enrolled randomly. Participants were categorized according to their documented diabetes status in hospital records. Patients with incomplete information on diabetes status or other key study variables were excluded. Data were collected prospectively using a predesigned case record form and a structured data extraction sheet. Information recorded included socio-demographic characteristics (age and sex), anthropometric measurements (body mass index), and clinical parameters (pulse and blood pressure). Laboratory variables

included random blood sugar, glycated hemoglobin (HbA1c), serum creatinine, estimated glomerular filtration rate (eGFR), albumin-creatinine ratio (ACR), and lipid profile. Data on comorbidities and admission diagnosis were also collected. The study determines the proportion of hospital admissions with type 2 diabetes mellitus. It also compares socio-demographic characteristics, clinical parameters, biochemical profiles, comorbidities, and admission diagnosis between diabetic and non-diabetic patients. The researchers classify admission diagnoses into the following predefined categories: infectious diseases; gastrointestinal and hepatobiliary diseases; neurologic and psychiatric disorders; respiratory diseases; metabolic and endocrine disorders; renal and urologic diseases; hematologic and rheumatologic diseases; cardiovascular diseases; musculoskeletal disorders; diabetic complications; and others. Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Categorical variables were reported as frequencies and percentages. Continuous variables were shown as mean ± standard deviation. For categorical comparisons, the Chi-square test or Fisher’s exact test was applied. The independent-samples t-test was used to compare continuous variables between two groups. A p-value below 0.05 was considered statistically significant.

RESULTS

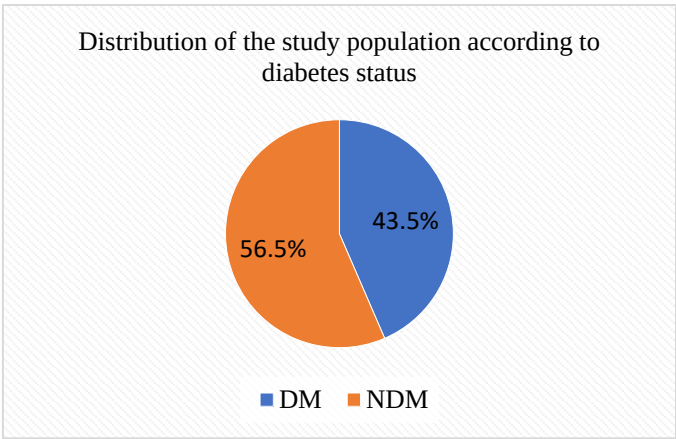


Figure 1 Distribution of the study population according to diabetes status (n=200).

Among the total 200 admitted patients, 87 (43.5%) were diabetic (DM) and 113 (56.5%) were non-diabetic (NDM) Figure 1. Among the 200 participants, diabetic patients were older than non-diabetic patients, with a mean age of 57.51 ± 14.10 years versus 42.93 ± 19.74 years; the

overall mean age was 49.27 ± 18.91 years (p<0.001). For age-group distribution, diabetic patients were mostly >60 years (41.4%) and 46 to 60 years (35.6%). In contrast, non-diabetic patients were primarily aged 16 to 30 years (31.9%) and 31 to 45 years (27.4%), p<0.001. Regarding gender, males made up 51.7% of the diabetic group and 42.5% of the non-

diabetic group, while females accounted for 48.3% and 57.5%, respectively; the male: female ratio was 1.07:1 in the diabetic group, 0.74:1 in the non-diabetic group, and 0.87:1 overall (p=0.247). Concerning BMI, overweight was most common among diabetic patients (54.02%), whereas normal BMI was most prevalent among non-diabetic patients (63.72%);

overall, 53.50% had normal BMI and 41.0% were overweight (p=0.308) *Table I*.

Table I
Socio-demographic and anthropometric characteristics of diabetic and non-diabetic admitted patients.

Variable	DM (n=87) n (%)	NDM (n=113) n (%)	Total (n=200) n (%)	p-value
Age group (Years)				
≤15	0 (0.0%)	2 (1.8%)	2 (1.0%)	<0.001
16-30	3 (3.4%)	36 (31.9%)	39 (19.5%)	
31-45	17 (19.5%)	31 (27.4%)	48 (24.0%)	
46-60	31 (35.6%)	25 (22.1%)	56 (28.0%)	
>60	36 (41.4%)	19 (16.8%)	55 (27.5%)	
Mean ± SD	57.51 ± 14.10	42.93 ± 19.74	49.27 ± 18.91	<0.001
Sex				0.247
Male	45 (51.7%)	48 (42.5%)	93 (46.5%)	
Female	42 (48.3%)	65 (57.5%)	107 (53.5%)	
Ratio	1.07:1	0.74:1	0.87:1	
BMI category				0.308
Under Weight	0 (0.0%)	1 (0.88%)	1 (0.5%)	
Normal	35 (40.23%)	72 (63.72%)	107 (53.50%)	
Overweight	47 (54.02%)	35 (30.97%)	82 (41.0%)	
Obese	5 (5.75%)	5 (4.42%)	10 (5.0%)	

*Chi-square test or Fisher's exact test was employed to test significance of difference

Compared with the non-diabetic group (those without a diabetes diagnosis), diabetic patients (with a confirmed diagnosis) had a slightly higher pulse rate: 80.90 ± 16.38 vs 79.90 ± 14.30 beats/min (p=0.655). They also had higher mean systolic and diastolic blood pressures (124.97 ± 17.90 mmHg and 76.78 ± 11.46 mmHg) compared with non-diabetics (115.36 ± 15.06 mmHg and 73.06 ± 11.76 mmHg), while overall means were 119.60 ± 17.02 mmHg and 74.71 ± 11.75 mmHg

(p<0.001 and p=0.027, respectively). Renal function was lower in diabetics, with a mean eGFR of 68.12 ± 31.79 ml/min versus 87.18 ± 25.33 ml/min in non-diabetics (p<0.001), whereas serum creatinine was 1.31 ± 0.76 mg/dL in diabetics and 1.09 ± 0.83 mg/dL in non-diabetics (p=0.109). Glycemic indices were higher among diabetics: random blood sugar was 13.93 ± 6.17 mmol/L versus 7.22 ± 2.54 mmol/L, and HbA1c was 10.71 ± 14.71% versus 5.89 ± 0.86% (p<0.001

and p=0.036, respectively). ACR was 130.0 ± 110.0 in diabetics and 90.0 ± 75.0 in non-diabetics (<0.001). For the lipid profile, total cholesterol was 176.78 ± 51.44 mg/dL in diabetics and 210.50 ± 53.67 mg/dL in non-diabetics; LDL cholesterol was 105.60 ± 27.57 mg/dL and 112.00 ± 17.09 mg/dL, and HDL cholesterol was 38.05 ± 5.01 mg/dL and 37.50 ± 3.42 mg/dL (p=0.308, p=0.613, and p=0.797, respectively) *Table II*.

Table II
Comparison of clinical and biochemical parameters between diabetic and non-diabetic admitted patients.

Variable	DM (n=87) Mean ± SD	NDM (n=113) Mean ± SD	Total (n=200) Mean ± SD	p-value
Pulse (beats/min)	80.90 ± 16.38	79.90 ± 14.30	80.34 ± 15.22	0.655
Systolic BP (mmHg)	124.97 ± 17.90	115.36 ± 15.06	119.60 ± 17.02	<0.001
Diastolic BP (mmHg)	76.78 ± 11.46	73.06 ± 11.76	74.71 ± 11.75	0.027
eGFR (ml/min)	68.12 ± 31.79	87.18 ± 25.33	77.73 ± 30.16	<0.001
Random blood sugar (mmol/L)	13.93 ± 6.17	7.22 ± 2.54	10.95 ± 5.92	<0.001
Serum creatinine (mg/dL)	1.31 ± 0.76	1.09 ± 0.83	1.19 ± 0.81	0.109
HbA1c (%)	10.71 ± 14.71	5.89 ± 0.86	9.36 ± 12.65	0.036
ACR (mg/g)	130.0 ± 110.0	90.0 ± 75.0	110.93 ± 98.68	<0.001
LP (TG) mg/dL	220.0 ± 90.0	160.00 ± 70.0	186.10 ± 84.54	<0.001
Total cholesterol (mg/dL)	176.78 ± 51.44	210.50 ± 53.67	181.78 ± 52.15	0.308
LDL cholesterol (mg/dL)	105.60 ± 27.57	112.00 ± 17.09	106.43 ± 26.23	0.613
HDL cholesterol (mg/dL)	38.05 ± 5.01	37.50 ± 3.42	37.96 ± 4.72	0.797

*Samples t-test and Mann-Whitney U test was employed to test significance of difference.

Among the comorbid conditions, hypertension was the most frequent in both groups and was more common among patients with diabetes (46.0%) than among those without diabetes (21.2%), with an overall prevalence of 32.0% (p<0.001).

Stroke was present in 23.0% of patients with diabetes and 13.3% of those without, for an overall 17.5% (p=0.109). Chronic kidney disease affected 13.8% of patients with diabetes and 7.1% without, with an overall frequency of 10.0% (p=0.183).

Ischemic heart disease rates were similar in both groups (4.6% with and 4.4% without diabetes), while heart failure was recorded in 4.6% and 2.7%, respectively; the overall frequencies were 4.5% and 3.5% (p=1.000 and p=0.471, respectively) *Table III*.

Table III
Comparison of comorbidities among study population.

Variable	DM (n=87) n (%)	NDM (n=113) n (%)	Total (n=200) n (%)	p-value
Hypertension	40 (46.0%)	24 (21.2%)	64 (32.0%)	<0.001
Heart failure	4 (4.6%)	3 (2.7%)	7 (3.5%)	0.471
Ischemic heart disease	4 (4.6%)	5 (4.4%)	9 (4.5%)	1.000
Chronic kidney disease	12 (13.8%)	8 (7.1%)	20 (10.0%)	0.183
Stroke	20 (23.0%)	15 (13.3%)	35 (17.5%)	0.109

*Chi-square test or Fisher's exact test was employed to test significance of difference.

Infectious diseases were the leading admission diagnosis in both groups, comprising 29.9% of diabetic patients and 35.4% of non-diabetic patients, totaling 33.0% ($p=0.319$). Gastrointestinal and hepatobiliary diseases were the second most frequent, at 20.7% in diabetic and 17.7% in non-diabetic patients, for an overall rate of 19.0%. Neurologic and

psychiatric disorders were more common in non-diabetic patients (11.5%) compared to diabetic patients (3.4%). Respiratory diseases affected 9.2% of diabetic and 6.2% of non-diabetic patients. Metabolic and endocrine disorders accounted for 9.2% of diabetic and 5.3% of non-diabetic admissions. Renal and urologic diseases were reported in 3.4% of diabetic and 6.2%

of non-diabetic patients. Hematologic and rheumatologic disorders were present in 2.3% and 5.3% of patients, respectively, while cardiovascular diseases occurred in 2.3% and 3.5%. Musculoskeletal disorders and diabetic complications with other causes were rare, together accounting for only 1.5% of all admissions *Table IV*.

Table IV
Reasons for admission in hospital among study population.

Admission diagnosis category	DM (n=87)	NDM (n=113)	Total (n=200)	p-value
	n (%)	n (%)	n (%)	
Infectious diseases	26 (29.9%)	40 (35.4%)	66 (33.0%)	0.319
Gastrointestinal/hepatobiliary	18 (20.7%)	20 (17.7%)	38 (19.0%)	
Neurologic/psychiatric	3 (3.4%)	13 (11.5%)	16 (8.0%)	
Respiratory diseases	8 (9.2%)	7 (6.2%)	15 (7.5%)	
Metabolic/endocrine disorders	8 (9.2%)	6 (5.3%)	14 (7.0%)	
Renal/urologic diseases	3 (3.4%)	7 (6.2%)	10 (5.0%)	
Hematologic/rheumatologic	2 (2.3%)	6 (5.3%)	8 (4.0%)	
Cardiovascular diseases	2 (2.3%)	4 (3.5%)	6 (3.0%)	
Musculoskeletal disorders	1 (1.1%)	0 (0.0%)	1 (0.5%)	
Diabetic complications and Other	1 (1.1%)	1 (0.9%)	2 (1.0%)	

*Chi-square test or Fisher's exact test was employed to test significance of difference.

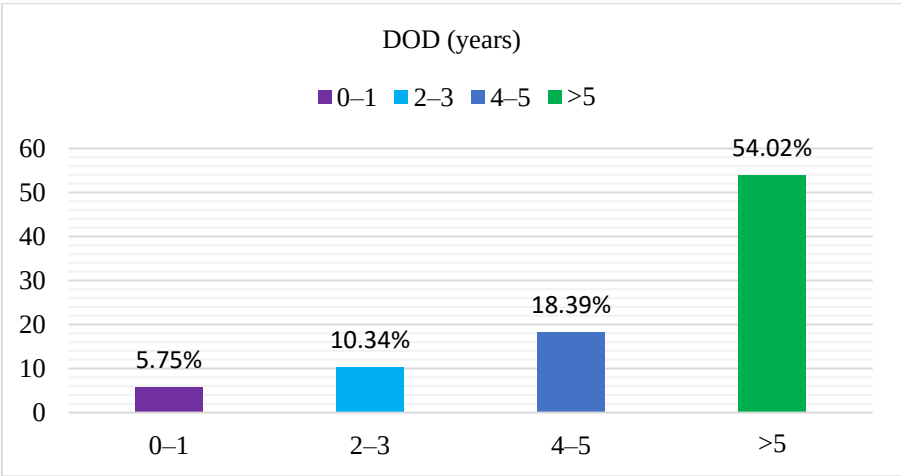


Figure 2 Duration of diabetes among diabetic patients.

Among diabetic patients, most had diabetes for more than 5 years, 47 (54.02%). The other duration groups were 0 to 1 year (5; 5.75%), 2 to 3 years (9; 10.34%), and 4 to 5 years (16; 18.39%). The mean duration of diabetes was 8.36 ± 5.67 years (*Figure 2*).

DISCUSSION

This study demonstrated that hospitalized patients with type 2 diabetes mellitus (T2DM) had a distinctly higher cardiometabolic and renal risk profile than non-diabetic admitted patients.

The present study found a high proportion of diabetic patients among all admissions (43.5%). This rate is much higher than the estimated diabetes rate in the general adult population of Bangladesh, which is reported to be around 9% to 13% [4,5].

National data also show that diabetes in Bangladesh has increased progressively over time. It rose from 10.95% in 2011 to 13.75% in 2018 among adults aged 35 years or older[8]. The BDHS 2017–18 reported an age-standardized diabetes prevalence of 9.2%[5]. Although north-zone-specific evidence remains limited and is largely based on small, non-representative studies, one regional study identified diabetes as a major public health concern in northern Bangladesh[14]. This scarcity of robust regional estimates may be due to most Bangladeshi epidemiological data coming from national surveys or divisional analyses rather than from a defined north-zone population. Similar findings are reported in Bangladesh hospital studies, although not directly comparable. For example, a study in Dhaka found that 50.2% of admissions to the

medicine ward had diabetes[15]. Another study found hospital admission was more common among adults with diabetes (14.2% vs. 6.6%)[16]. These observations suggest that hospital admissions are especially common among people with diabetes. This high rate may result from the study being conducted in a high-level hospital. Such hospitals admit more older adults and those with complex metabolic, kidney, heart, or infection issues[15,16]. The diabetic group was substantially older, with a mean age of 57.51 ± 14.10 years, compared with 42.93 ± 19.74 years in the non-diabetic group ($p < 0.001$). More than two-fifths of diabetic patients were aged 60 years or older. This pattern matches hospital-based studies, which find that diabetic inpatients are typically older and more likely to have chronic comorbidities. These comorbidities increase the likelihood

of admission and complicate inpatient management^[8,17-19]. In our study, there was sex difference in frequency: male 51.7% in the diabetic group versus 42.5% in the non-diabetic group ($p=0.247$). There was also no significant difference in BMI. In this South Asian hospital, the risk of diabetes-related admission may depend more on age, disease duration, and metabolic burden than on crude anthropometric measures. This is possible because Asian populations often develop T2DM and its complications at relatively lower BMI thresholds^[19,20]. Additionally, low awareness, limited treatment, poor sugar control, and lack of readiness for diabetes care outside large hospitals likely contribute to late diagnosis and referral of complicated cases to higher-level facilities^[21,22]. Consistent with these factors, our diabetic cohort was older, had higher blood pressure, poorer sugar control, and lower kidney function than non-diabetic patients.

Blood pressure findings further support the clustering of cardiometabolic risk in diabetic inpatients. Mean systolic and diastolic blood pressure were higher in the diabetic group: 124.97 ± 17.90 versus 115.36 ± 15.06 mmHg, and 76.78 ± 11.46 versus 73.06 ± 11.76 mmHg, respectively. Hypertension was present in 46.0% of diabetic patients, compared with 21.2% of non-diabetic patients ($p < 0.001$). These findings are highly concordant with previous work from Bangladesh and elsewhere. Prior studies show that hypertension is one of the most common comorbidities among patients with T2DM and an important amplifier of macrovascular and microvascular injury^[17,23,24]. Some cohorts report even higher hypertension prevalence than observed here, often above 50% to 70%^[14,17]. The somewhat lower proportion in our diabetic sample may reflect differences in age structure, referral pathways, pre-admission treatment, or under-documentation in retrospective records. Clinically, the implication is clear. Every admitted patient with T2DM should undergo blood pressure assessment and early antihypertensive treatment where appropriate. Glucose control alone is insufficient to reduce vascular risk^[17,23,24].

Renal impairment was also more evident among diabetic patients. Mean eGFR was significantly lower in the diabetic group: 68.12 ± 31.79 versus 87.18 ± 25.33 ml/min, $p < 0.001$. Chronic kidney disease, CKD, was present in 13.8% versus 7.1%. However, the latter difference did not reach statistical significance. This overall pattern aligns with contemporary literature. Diabetic kidney disease is common among people with T2DM and is driven by long-standing hyperglycemia, hypertension, and vascular injury^[25-28]. The non-significant

CKD comparison in our cohort likely reflects limited sample size rather than a lack of a true relationship. The direction of effect was consistent, and the eGFR difference was robust. Clinically, these data support routine inpatient renal risk stratification. This should include serum creatinine, eGFR, urine albumin assessment where feasible, and medication review. This is especially important because renally cleared antidiabetic and antihypertensive drugs may require adjustment during acute illness^[25-27].

The glycemic findings show poor antecedent and acute glucose control among diabetic admissions. Random blood sugar was 13.93 ± 6.17 mmol/L in diabetic patients compared with 7.22 ± 2.54 mmol/L in non-diabetic patients ($p < 0.001$). HbA1c was also significantly higher: $10.71 \pm 14.71\%$ versus $5.89 \pm 0.86\%$ ($p = 0.036$). The mean duration of diabetes was 8.36 ± 5.67 years. More than half of diabetic patients (54.02%) had diabetes for more than 5 years. These observations are consistent with studies showing that poor glycemic control is associated with infection, prolonged hospitalization, metabolic decompensation, and greater inpatient care needs^[15,29-32]. However, one recent cohort reported that long-term HbA1c was not independently associated with bacterial infectious risk after adjustment. This suggests that age, frailty, treatment intensity, and comorbid disease may partly mediate the association^[32]. This nuance may explain why our study found markedly worse glycemia in diabetic patients but no statistically significant difference in the overall admission-diagnosis pattern. Nevertheless, the heavy use of insulin in the diabetic group, regular insulin 48.3%, mixed insulin 14.9%, and basal insulin 4.6%, underscores the presence of a clinically important subgroup. These patients have advanced or poorly controlled disease and require structured inpatient glucose monitoring and discharge planning^[15,29,32].

Stroke was more frequent among diabetic patients (23.0% vs. 13.3%). However, this difference was not statistically significant, possibly due to sample size, varied admission diagnoses, or incomplete records of prior cerebrovascular disease. This finding aligns with broader evidence: diabetes increases both stroke risk and adverse stroke outcomes^[9,33-35]. The infectious category was the leading cause of admission in both groups: 29.9% in diabetics and 35.4% in non-diabetics. There was no significant overall difference ($p=0.319$). This may be because our comparator group included all non-diabetic general medicine admissions, rather than a healthier community sample. As a result, there was a high background infectious

burden, which may have reduced between-group differences. This partially differs from diabetes-specific inpatient studies, especially from South Asia, where infections often dominate admissions among patients with diabetes^[10,15,30].

LIMITATIONS

This was a single-center study with a relatively small sample size. This design may limit generalizability and reduce statistical power for some comparisons. In addition, reliance on hospital records may have introduced missing data and documentation bias. The cross-sectional inpatient comparison could not establish causal relationships.

CONCLUSION

In conclusion, the study found that the frequency of hospitalized patients with type 2 diabetes mellitus is progressive and has a higher burden of adverse clinical and biochemical risk factors than non-diabetic patients. Specifically, these risk factors include older age, elevated blood pressure, poor glycemic control, reduced estimated glomerular filtration rate (eGFR), and a higher incidence of hypertension. The findings suggest that admitted diabetic patients require closer monitoring and integrated management, which may help reduce both inpatient and long-term complications.

RECOMMENDATIONS

Hospitalized patients with type 2 diabetes mellitus should receive routine screening and integrated management for blood pressure, glycemic control, and renal function. Early identification of comorbidities and complications is essential. Larger multicenter prospective studies are recommended to confirm these findings and improve generalizability.

FUNDING

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CONFLICT OF INTEREST

None declared

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

REFERENCES

- Ong KL, Stafford LK, McLaughlin SA, Boyko EJ, Vollset SE, Smith AE, Dalton BE, Duprey J, Cruz JA, Hagins H, Lindstedt PA. Global, regional, and national burden of diabetes from 1990 to 2021, with projections of prevalence to 2050: a systematic analysis for the Global Burden of Disease Study 2021. *The Lancet*. 2023 Jul 15;402(10397):203-34.
- NCD Risk Factor Collaboration, NCD-RisC. Worldwide trends in diabetes prevalence and treatment from 1990 to

- 2022: a pooled analysis of 1108 population-representative studies with 141 million participants. *Lancet*. 2024;404(10467):2077-2093.
3. Narayan KV, Kondal D, Daya N, Gujral UP, Mohan D, Patel SA, Shivashankar R, Anjana RM, Staimez LR, Ali MK, Chang HH. Incidence and pathophysiology of diabetes in South Asian adults living in India and Pakistan compared with US blacks and whites. *BMJ open diabetes research & care*. 2021 Mar 26;9(1).
 4. Akhtar S, Nasir JA, Sarwar A, Nasr N, Javed A, Majeed R, Salam MA, Billah B. Prevalence of diabetes and pre-diabetes in Bangladesh: a systematic review and meta-analysis. *BMJ open*. 2020 Sep 1;10(9):e036086.
 5. Hossain MB, Khan MN, Oldroyd JC, Rana J, Magliago DJ, Chowdhury EK, Karim MN, Islam RM. Prevalence of, and risk factors for, diabetes and prediabetes in Bangladesh: Evidence from the national survey using a multilevel Poisson regression model with a robust variance. *PLOS Global Public Health*. 2022 Jun 1;2(6):e0000461.
 6. Ahsan KZ, Iqbal A, Jamil K, Haider MM, Khan SH, Chakraborty N, Streatfield PK. Socioeconomic disparities in diabetes prevalence and management among the adult population in Bangladesh. *Plos one*. 2022 Dec 20;17(12):e0279228.
 7. Akter S, Rahman MM, Abe SK, Sultana P. Prevalence of diabetes and prediabetes and their risk factors among Bangladeshi adults: a nationwide survey. *Bulletin of the World Health Organization*. 2014 Jan 10;92:204-13A.
 8. Chowdhury MA, Islam M, Rahman J, Uddin MJ, Haque MR. Diabetes among adults in Bangladesh: changes in prevalence and risk factors between two cross-sectional surveys. *BMJ Open*. 2022 Aug 1;12(8):e055044.
 9. Iglay K, Hannachi H, Howie PJ, Xu J, Li X, Engel SS, et al. Prevalence and co-prevalence of comorbidities among patients with type 2 diabetes mellitus. *Curr Med Res Opin*. 2016;32(7):1243-1252.
 10. Shuvo SD, Hossen MT, Riazuddin M, Hossain MS, Mazumdar S, Parvin R, Elahi MT. Prevalence of comorbidities and its associated factors among type-2 diabetes patients: a hospital-based study in Jashore District, Bangladesh. *BMJ open*. 2023 Sep 1;13(9):e076261.
 11. Koye DN, Magliano DJ, Nelson RG, Pavkov ME. The global epidemiology of diabetes and kidney disease. *Advances in chronic kidney disease*. 2018 Mar 1;25(2):121-32.
 12. Comino EJ, Harris MF, Islam MF, Tran DT, Jalaludin B, Jorm L, Flack J, Haas M. Impact of diabetes on hospital admission and length of stay among a general population aged 45 year or more: a record linkage study. *BMC health services research*. 2015 Jan 22;15(1):12.
 13. Committee AD. 16. Diabetes Care in the Hospital: Standards of Care in Diabetes—2026. *Diabetes Care*. 2025 Dec 8;49(Suppl 1):S339.
 14. Farhana J, Kumar A, Hasan M, Uddin N. Prevalence, Awareness and Risk Factor of Diabetes in the Northern Region of Bangladesh.
 15. Hasan MR, Haque PT, Munira M, Bithi TI, Karim R, Alam MF, Kader MA, Mithila MF. Reasons of Hospitalization of Subjects with Type 2 Diabetes Compared to Non-diabetes General People: Experience from a Medical College Hospital of Dhaka City. *Bangladesh Journal of Endocrinology and Metabolism*. 2025 Jan 1;4(1):33-7.
 16. Shariful Islam SM, Lechner A, Ferrari U, Laxy M, Seissler J, Brown J, Niessen LW, Holle R. Healthcare use and expenditure for diabetes in Bangladesh. *BMJ global health*. 2017 Jan;2(1):e000033.
 17. Rani S, Rahman SM, Pricilla RA, David KV. Reasons for hospitalisation among patients with diabetes in a secondary care hospital in South India: A retrospective study. *Indian Journal of Endocrinology and Metabolism*. 2022 Mar 1;26(2):127-32.
 18. Shikdar YA, Mosli HH, Shikdar NA, Alshanketi RM, Shikdar NA, Malebary RM, Aboznadah WM, Shikdar MA, Shikdar Y, Mosli H, Shikdar N. Diabetes mellitus and related admission factors among hospitalized patients in King Abdul-Aziz University Hospital in Jeddah, Saudi Arabia. *Cureus*. 2022 May 25;14(5).
 19. Gosmanov AR, Mendez CE, Umpierrez GE. Challenges and strategies for inpatient diabetes management in older adults. *Diabetes Spectrum*. 2020 Aug 1;33(3):227-35.
 20. Alsaadon H, Afroz A, Karim A, Habib SH, Alramadan MJ, Billah B, Shetty AN. Hypertension and its related factors among patients with type 2 diabetes mellitus—a multi-hospital study in Bangladesh. *BMC Public Health*. 2022 Jan 29;22(1):198.
 21. Chowdhury HA, Paromita P, Mayaboti CA, Rakshanda S, Rahman FN, Abedin M, Rahman AF, Mashreky SR. Assessing service availability and readiness of healthcare facilities to manage diabetes mellitus in Bangladesh: Findings from a nationwide survey. *PloS one*. 2022 Feb 16;17(2):e0263259.
 22. Khan N, Oldroyd JC, Hossain MB, Islam RM. Awareness, treatment, and control of diabetes in Bangladesh: evidence from the Bangladesh Demographic and Health Survey 2017/18. *International Journal of Clinical Practice*. 2022;2022(1):8349160.
 23. Yildiz M, Esenboğa K, Oktay AA. Hypertension and diabetes mellitus: highlights of a complex relationship. *Current opinion in cardiology*. 2020 Jul 1;35(4):397-404.
 24. Petrie JR, Guzik TJ, Touyz RM. Diabetes, hypertension, and cardiovascular disease: clinical insights and vascular mechanisms. *Canadian Journal of Cardiology*. 2018 May 1;34(5):575-84.
 25. de Boer IH, Khunti K, Sadusky T, Tuttle KR, Neumiller JJ, Rhee CM, Rosas SE, Rossing P, Bakris G. Diabetes management in chronic kidney disease: a consensus report by the American Diabetes Association (ADA) and Kidney Disease: Improving Global Outcomes (KDIGO). *Kidney international*. 2022 Nov 1;102(5):974-89.
 26. Triozzi JL, Parker Gregg L, Virani SS, Navaneethan SD. Management of type 2 diabetes in chronic kidney disease. *BMJ Open Diabetes Research & Care*. 2021 Jul;9(1):e002300.
 27. Neumiller JJ, St. Peter WL, Shubrook JH. Type 2 diabetes and chronic kidney disease: an opportunity for pharmacists to improve outcomes. *Journal of Clinical Medicine*. 2024 Feb 28;13(5):1367.
 28. Hustrini NM, Susalit E, Harimurti K, Haryoso IS, Legrans AE, Damarjati K, Minangsih S, Nurhisana L, Zaini MM, Oktavianti S, Pratiwi S. Prevalence, incidence and risk factors of chronic kidney disease in people with diabetes and hypertension, and the prognosis and kidney function decline in Indonesia: a multicentre cross-sectional study in primary care centres. *BMJ open*. 2025 Oct 1;15(10):e103779.
 29. Critchley JA, Carey IM, Harris T, DeWilde S, Hosking FJ, Cook DG. Glycemic control and risk of infections among people with type 1 or type 2 diabetes in a large primary care cohort study. *Diabetes care*. 2018 Oct 1;41(10):2127-35.
 30. Kim EJ, Ha KH, Kim DJ, Choi YH. Diabetes and the risk of infection: a national cohort study. *Diabetes & metabolism journal*. 2019 Oct 21;43(6):804.
 31. Carey IM, Critchley JA, DeWilde S, Harris T, Hosking FJ, Cook DG. Risk of infection in type 1 and type 2 diabetes compared with the general population: a matched cohort study. *Diabetes care*. 2018 Mar 1;41(3):513-21.
 32. Lemoine E, Dusenno M, Schuers M. Glycemic control and bacterial infectious risk in type 2 diabetes: A retrospective cohort from a primary care database. *Plos one*. 2024 Dec 13;19(12):e0314287.
 33. Lau LH, Lew J, Borschmann K, Thijs V, Ekinci EI. Prevalence of diabetes and its effects on stroke outcomes: a meta-analysis and literature review. *Journal of diabetes investigation*. 2019 May;10(3):780-92.
 34. Afroz A, Alam K, Hossain MN, Biswas A, Ali L, Magliano DJ, Billah B. Burden of macro-and micro-vascular complications of type 2 diabetes in Bangladesh. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2019 Mar 1;13(2):1615-22.
 35. Afroz A, Zhang W, Loh AJ, Lee DX, Billah B. Macro-and micro-vascular complications and their determinants among people with type 2 diabetes in Bangladesh. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews*. 2019 Sep 1;13(5):2939-46.