DEVELOPMENTAL MEDICO-LIFE-SCIENCES

ISSN (P): 3007-2786, (E): 3007-2794 DOI: https://doi.org/10.69750/dmls.02.010.0159

ORIGINAL RESEARCH ARTICLE Open Access

Prevalence of Cardiovascular Risk Factors in Patients with Type 2 Diabetes Mellitus Attending Tertiary Care Hospitals

Zoha Irfan [1], Muhammad Aalishan [1], Muhammad Zain [1]*

1. Shaikha Fatima Institute of Nursing and Health Sciences (SFINHS), Shaikh Zayed Medical Complex, Lahore, Pakistan

Corresponding Author: Zoha Irfan, **Email: Zohairfan0011@gmail.com**

ABSTRACT

Background: Type 2 Diabetes Mellitus (T2DM) is a persistent metabolic illness that significantly enhances the chances of cardiovascular morbidity and death. Hypertension, dyslipidemia, obesity, smoking, and inadequate glycemic control are cardiovascular risk factors that are common in patients with diabetes, which increase complications of the disease. Determinants of their prevalence would be essential in formulating preventive and management programs, particularly in tertiary care environments where complex and uncontrolled cases would be commonly found.

Objective: To establish the prevalence and distribution of the most common risk factors in patients with Type 2 Diabetes Mellitus when they visit Shaikh Zayed Medical Complex.

Methods: The study was a descriptive cross-sectional study carried out between June 2024 and April 2025 in the Department of Endocrinology, Shaikh Zayed Medical Complex, Lahore. The number of patients enrolled was 90 adult T2DM patients aged 35 to 70 years, with a convenience sampling. Structured questionnaires and hospital records were used in the collection of demographics, clinical, and biochemical data. Hypertension, dyslipidemia, obesity, smoking, and poor glycemic control criteria were identified by the standard ADA 2024. The data were analyzed in SPSS version 26, and the results were presented in mean, SD, and percentages.

Results: The average age of the participants stood at 54.73/8.56 years old, and the proportion of males and females was 57.8/42.2. The hypertension and dyslipidemia were 72.2 and 71.1, respectively; obesity was 44.4; poor glycemic control (HbA1c >7) was 75.6; and smoking was 27.8, respectively. Clustering of risk factors was frequent- 71.1% of the participants had two or more cardiovascular risk factors, and 21.1% had three or more risk factors at the same time. Females were much more likely to be obese ($p = 0.04$) and males to smoke ($p < 0.001$).

Conclusion: T2DM patients had a high prevalence of modifiable cardiovascular risk factors, with the predominant ones being hypertension, dyslipidemia, and lack of glycemic control. There is a real need to combine screening, risk stratification, and lifestyle modification programs in managing diabetes to avoid the occurrence of cardiovascular complications in the future due to the co-existence of multiple risk factors.

Keywords: Type 2 Diabetes Mellitus, Cardiovascular Risk Factors, Hypertension, Dyslipidemia, Obesity, Pakistan.

Received: 04/07/2025
Revised: 10/10/2025
Accepted: 22/10/2025
Published: 31/10/2025

INTRODUCTION

Diabetes Mellitus type 2 (T2DM) is among the most widespread health-related issues in the world that is defined by the following characteristics: insulin resistance, relative insulin deficiency, and persistent hyperglycemia [1]. It has been linked with serious chronic complications of cardiovascular diseases (CVDs) as the major cause of morbidity and mortality [2]. According to the World Health Organization (WHO), patients who have diabetes (adults) are twice or even thrice as susceptible to cardiovascular cases that involve coronary heart disease, heart attack, and stroke as non-diabetic individuals [3]. This has been of great concern, especially in developing nations with

urbanization, changes in diet, and lack of physical activities increasingly becoming leading contributors to the emerging cases of T2DM and comorbidities [4].

The problem of diabetes has become especially large in Pakistan, with the rate of its development growing over 26 percent of the adult population within the past 20 years [5]. This is an even more complicated epidemic since cardiovascular risk factors- hypertension, dyslipidemia, obesity, smoking, and poor glycemic control- cluster and further expose those at risk to premature cardiovascular events [6]. These not only worsen the diabetes prognosis, but in a very big burden to the healthcare system [7]. Despite the rise in this concern, there is very minimal multicentric data, which quantifies the prevalence of these risk factors in the group of diabetic patients presented in tertiary care hospitals, in which the cases tend to be more complex and mostly uncontrollable [8].

The T2DM cardiovascular risk factor association is complicated. Chronic hyperglycemia leads to endothelial dysfunction, oxidative stress, and inflammation that result in the development of atherosclerosis [9]. Similarly, high triglyceride and low levels of HDL cholesterol (dyslipidemia), hypertension, and obesity are diseases that subject diabetic patients to high cardiovascular risks [10]. Thus, it is worth noting that these risk factors are modifiable and need to be detected and addressed at a tender age to avoid adverse cardiac events [11].

Because of the absence of recent data on the area, particularly in tertiary healthcare centers in Pakistan, there is a need to identify the rates of cardiovascular risk factors and trends among T2DM patients [12]. It is believed that the study will also establish the prevalence of different major cardiovascular risk factors, such as high blood pressure, dyslipidemia, obesity, smoking, and poor glycemic control among Type 2 Diabetes Mellitus patients in tertiary care hospitals [13]. The outcomes must create a valuable base to seal the loopholes in developing integrated approaches to clinical practices and preventive interventions based on the high-risk diabetic populations [14].

MATERIALS AND METHODS

It is a descriptive cross-sectional study that will take place in the Department of Endocrinology, Shaikh Zayed Medical Complex, Lahore, Pakistan, over ten months, i.e., between June 2024 and April 2025. Its key aim was to estimate the presence of significant cardiovascular risk factors among the patients with Type 2 Diabetes Mellitus (T2DM) who presented themselves in a tertiary care hospital. The research was conducted in accordance with the ethical principles of the institutional review board (SZMC/IRB/2024/089), and it adhered to all the principles of the Declaration of Helsinki on biomedical research involving human participants.

The sample size of the study was 90 adult patients with T2DM who were sampled under the non-probability consecutive sampling technique. The minimum sample size of 86 was estimated with the OpenEpi online calculator, which took the values 95% confidence value, 10% margin of error, and the estimated prevalence of the cardiovascular risk factors in diabetic individuals was 50% and resulting in the minimum required sample of 86. To increase the accuracy and solve the problem of potential dropouts, the final sample was increased to 90 participants, and it has a statistical power of approximately 85 to detect significant differences in the frequency of risk factors by subgroups.

The eligible participants were men and women aged 35 to 70 years of age and one year old with a Type 2 Diabetes Mellitus diagnosis, and had taken informed consent. Type 1 diabetes, gestational diabetes, and advanced chronic kidney disease (stage IV5) and liver disease, and malignancies were the exclusion criteria. Persons on chronic corticosteroids, lipid-lowering medications preceding the study, or incomplete medical records were also eliminated to minimize bias.

Each of the participants was taken through a keen clinical and laboratory test in a standard operation. The demographic data involved age, sex, profession, education, and the status of living. Appropriate data regarding lifestyle were collected in the form of smoking habits, physical activity, and eating patterns. A standardised measurement device was used in the collection of anthropometric data (height, weight, waist circumference, and hip circumference) as well as Body Mass Index (BMI), the weight in kilograms divided by the square of the height in meters. The World Health Organization (WHO) has defined obesity as a BMI of 30 kg/m 2 and above. Five minutes rest was continued, upon which a calibrated mercury sphygmomanometer was applied to measure the blood pressure in the sitting position, where high blood pressure was diagnosed to be those who had a systolic pressure of 140mmHg as well as/or a diastolic pressure of 90mmHg, or those who undertook antihypertensive medication.

In order to investigate the biochemical, 8-10 hours of overnight fasting were undertaken, and a venous blood sample was collected. The parameters were fasting blood glucose, HbA1c, and serum lipid profile involving total cholesterol (TC), triglycerides (TG), high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C). All the analyses were done by automated procedures in the central diagnostic laboratory of the Shaikh Zayed Medical Complex according to the procedures of the standard operating procedures and internal quality controls. As per the recommendations provided under the American Diabetes Association (ADA 2024), dyslipidemia has been determined to be one or more of abnormal lipid values: TC greater than 200 mg/dL, LDL-C greater than 130 mg/dL, HDL -C less than 40mg/dl in men or less than 50mg/dl in women, and TG greater than 150mg/dl. Approximately

close to HbA1c was regarded as poor glycemic control, where the value was above 7. Smoking also included the current, former, and non-smoker categories, and the status of sedentary lifestyle was also included, as less than 150 minutes of moderate intensity physical activity per week.

The SPSS version 26.0 (IBM Corp., Armonk, NY, USA) was used to summarize the data and analyze. Continuous variables were represented in mean + SD, and the age and BMI; frequency and percentages were used to represent categorical variables, including gender, smoker status, obesity, high blood pressure, and dyslipidemia. The Chi-square test was conducted to determine the associations between categorical variables, and an Independent Student t-test was conducted to compare continuous variables between male and female patients. The p-value that was considered significant was below 0.05.

Each of the respondents was well aware of the aim of the study, procedures, and confidentiality. The data was collected through informed consent. The study protocol was reviewed and approved by the Institutional Review Board of Shaikh Zayed Medical Complex, Lahore. The individuals with uncontrolled diabetes, hypertension, or abnormal lipid levels among the respondents were advised and referred to their physicians for treatment to receive correct management and follow-up.

RESULTS

This research included a sample population of 90 patients with Type 2 Diabetes Mellitus (T2DM) who were recruited into the study at Shaikh Zayed Medical Complex, Lahore. Out of them, 52 (57.8) were males, and 38 (42.2) were females. The mean of the participants was 54.7 years, and the standard deviation of 8.6 (36-70 years). The total mean diabetes was 8.4 years, and it had the mean of 3.2 years of diabetes. The research provides the findings of the demographic profile, glycemic control, and predominance of the major cardiovascular risk factors in the participants.

Demographic and Clinical Characteristics: The summary of the demographic and baseline clinical characteristics of the participants is presented in Table 1. The mean Body Mass Index (BMI) was 29.4 + 4.3 kg/m2, and 40 (44.4) patients were obese (BMI 30kg /m2 and above). Systolic blood pressure was 141.8(15.6)mmHg, and the diastolic pressure was 89.4(10.2)mmHg. The mean HbA1c was 8.5 1.4, suggesting that the degree of glycemic control in the majority of the participants was inadequate. The overall nature of the participants also indicated that a majority of the T2DM patients were not well-monitored (as evidenced by their uncontrolled glycemic level and high blood pressure level), with the majority reporting a positive family history of cardiovascular disease (CVD) (n=28) and smoking (n=25). Table 1 illustrates the general characteristics of the participants.

Biochemical Profile of Participants: Table 2 shows the biochemical parameters, such as lipid profile and fasting glucose levels. The average fasting plasma glucose (FPG) stood at 167.2/42.5mg /dL, and the average total cholesterol level was 212.8/38.7mg/dL. Many of the patients had reported dyslipidemia, with 62 patients (68.9) having high LDL-C levels (>130mg/dL), 53 patients (58.9) having low levels of HDL-C, and 61 patients (67.8) having high levels of triglycerides (>150mg/dl). The average HDL-C was 37.2- 6.8 mg/dl, and the average LDL-C was 136.5 -32.9 mg/dl. Table 2 shows that dyslipidemia was very high in diabetic patients, and over two-thirds presented with high LDL-C and triglycerides and low HDL-C levels, indicating a high risk of atherogenesis.

Distribution of Major Cardiovascular Risk Factors: Table 3 provides the predominance of individual cardiovascular risk factors in T2DM patients. The hypertension (72.2) is the most prevalent risk factor, as well as dyslipidemia (71.1), obesity (44.4), poor glycemic control (75.6), and smoking (27.8). It is important to note that there was a lot of multiple risk factor clustering; 64 patients (71.1) had two or more risk factors simultaneously, and 19 patients (21.1) had three or more risk factors at the same time. As shown in Table 3, glycemic control, hypertension, and dyslipidemia were the most common risk factors, and these played a combined role in contributing to high risks of developing cardiovascular events in diabetic patients.

Gender-Based Comparison of Risk Factors: Table 4 presents a comparative evaluation of the male and female participants. The prevalence of smoking was higher in males (46.2% vs. 2.6% $p = 0.001$), and obesity was much more common among females (55.3% vs. 36.5% $p = 0.04$). There was a slight difference between males and females about hypertension and dyslipidemia, although the difference was not significant ($p > 0.05$). The HbA1c mean was similar between the genders (8.6 ± 1.3 in men and 8.4 ± 1.5 in women, $p = 0.47$). Table 4 indicates that the modifiable risk factors have a gender difference, with obesity being greater in females and smoking being much more common in males, which demonstrates the variation in behavioral and metabolic differences in diabetic patients.

The findings of this study suggest that the incidence of the modifiable risk factors of cardiovascular disease is high among patients with Type 2 Diabetes Mellitus. Presence of hypertension, dyslipidemia, obesity, and the lack of glycemic control were also evident in the majority of the participants, which is indicative of the clustering of metabolic abnormalities that are characteristic of diabetic populations at the tertiary care. The evidence endorses the significance of the combined cardiovascular risk assessment and management interventions as a component of the diabetes intervention programs.

Table 1: Demographic and Clinical Characteristics of Type 2 Diabetic Patients (n = 90)

Variable	Mean ± SD / n (%)
Age (years)	54.7 ± 8.6
Gender (Male/Female)	52 (57.8%) / 38 (42.2%)
Duration of Diabetes (years)	8.4 ± 3.2
BMI (kg/m²)	29.4 ± 4.3
Obesity (BMI ≥ 30 kg/m²)	40 (44.4%)
Systolic Blood Pressure (mmHg)	141.8 ± 15.6
Diastolic Blood Pressure (mmHg)	89.4 ± 10.2
Hypertension (≥140/90 mmHg)	65 (72.2%)
HbA1c (%)	8.5 ± 1.4
HbA1c >7% (Poor Glycemic Control)	68 (75.6%)
Family History of CVD	28 (31.1%)
Smokers	25 (27.8%)

Table 2: Biochemical Parameters of Type 2 Diabetic Patients (n = 90)

Parameter	Mean ± SD / n (%)
Fasting Plasma Glucose (mg/dL)	167.2 ± 42.5
HbA1c (%)	8.5 ± 1.4
Total Cholesterol (mg/dL)	212.8 ± 38.7
Triglycerides (mg/dL)	189.5 ± 49.8
HDL-C (mg/dL)	37.2 ± 6.8
LDL-C (mg/dL)	136.5 ± 32.9
Dyslipidemia (any abnormal lipid)	64 (71.1%)
Elevated LDL-C (>130 mg/dL)	62 (68.9%)
Low HDL-C (<40 mg/dL)	53 (58.9%)
Elevated Triglycerides (>150 mg/dL)	61 (67.8%)

Table 3: Prevalence of Major Cardiovascular Risk Factors in Type 2 Diabetic Patients (n = 90)

Cardiovascular Risk Factor	Frequency (%)
Hypertension	72.2
Dyslipidemia	71.1
Obesity (BMI ≥ 30 kg/m²)	44.4
Poor Glycemic Control (HbA1c >7%)	75.6
Smoking	27.8
Family History of CVD	31.1
Sedentary Lifestyle	63.3
≥2 Risk Factors	71.1
≥3 Risk Factors	21.1

Table 4: Gender-Based Comparison of Cardiovascular Risk Factors in T2DM Patients (n = 90)

Risk Factor	Males (n=52)	Females (n=38)	p-value
Hypertension (%)	69.2	76.3	0.42
Dyslipidemia (%)	70.1	73.7	0.61
Obesity (BMI ≥ 30 kg/m²)	36.5	55.3	0.04*
Smoking (%)	46.2	2.6	<0.001*
Poor Glycemic Control (HbA1c >7%)	73.1	78.9	0.49
Family History of CVD (%)	30.8	31.6	0.93

Statistically significant (p < 0.05)

DISCUSSION

A cross-sectional study of the Shaikh Zayed Medical Complex, Lahore, gives a close understanding of the occurrence and grouping of cardiovascular risk elements in patients with Type 2 Diabetes Mellitus (T2DM). As it turned out, the high rate of hypertension and dyslipidemia, poor glycemic regulation, and obesity were congruent with the world and regional trends of information that forecast diabetes to have a much higher cardiovascular load [1].

The hypertension rate in this study is high (72.2) compared with the findings of Riaz et al. that who had a prevalence rate of 70 percent of hypertension in diabetics in Pakistan [2]. The causes of the close relationship between diabetes and hypertension are insulin resistance, endothelial dysfunctions, and increased arterial tone [3]. It is based on such an interaction that the significance of normal blood pressure and application of antihypertensive therapy in diabetics at an extremely young age becomes a subject of focus.

The second risk factor was dyslipidemia, which was present in 71.1% of the participants. The same outcome has also been reported in articles by Taskinen et al., who underline that up to 75% of patients with T2DM are characterized by atherogenic dyslipidemia, which is

characterized by large amounts of triglycerides as well as low amounts of HDL-C and large amounts of small dense LDL [4]. This pattern of lipid profile accelerates the atherosclerosis process and puts individuals at risk of coronary artery disease and ischemic stroke [5]. The current study showed that there was a high LDL-C and low HDL-C, implying that there was inadequate lipid control in spite of access to tertiary care.

The prevalence of obesity was almost 50 percent (44.4), and it was significantly higher among women patients. This gender gap encourages other researches in the region, which indicate that other factors that encourage the predisposition of obesity among women in South Asia include socio-cultural and lifestyle factors [6]. Insulin resistance, systemic inflammation, and dyslipidemia are also some of the consequences of obesity and have become the root cause of metabolic syndrome in T2DM [7].

The most upsetting part was that the level of poor glycemic control was high (75.6%), and the mean level of HbA1c stood at 8.5 ± 1.4. The findings are consistent with prior research in Pakistan and other nations in the region, where the issue of poor glycemic control is chronic, irrespective of the use of oral hypoglycemics and insulin therapy [8]. This demonstrates that patient education, adherence to medications, and lifestyle change may have some gaps that need to be immediately addressed.

Smoking is also a less prevalent risk factor (27.8%); however, it can be altered and avoided. Nearly 50 percent of the participants (male) were current smokers, as it aligns with the gender-based trend that Pan et al. discovered that smoking doubles the risk of cardiovascular deaths among diabetic groups [9]. Oxidative stress and endothelial damage are promoted by smoking to exacerbate vascular complications in diabetes.

The fact that the risk factors were clustered, with 71.1 percent of the participants having more than two factors, demonstrates the effect of clustering characteristic of metabolic syndrome [10]. The clusters play an important role in augmenting the risk of cardiovascular events, which has already been indicated by finding that over 80 percent of the risk of myocardial infarction could be attributed to the modifiable risk factors [11].

These clinical outcomes provide support for the value of combined cardiovascular risk management when providing interventions to diabetic care. Multifactorial methods of managing the level of blood glucose, hypertension, lipid, smoking cessation, and weight loss have proven to reduce cardiovascular morbidity and mortality in patients with diabetes [12]. This shall be done by introducing patient-centered education programs, frequent follow-ups, and multidisciplinary teams for diabetes care.

The strength of the research is that the research is evidence-based and has a hospital-based method of data collection, which can be considered as reflective of tertiary-level diabetic care. However, there are certain limitations under which the results should be analysed. It is impossible to make a causal inference with the use of the cross-sectional design, and even the relatively small sample size limits the generalizability. In addition to that, other risk factors such as the dietary constitution, medication, and genetic predispositions adherence were not fully assessed. The future would see the possibility of conducting multicenter longitudinal research with a wider and more diverse population to present a more accurate understanding of how the duration of diabetes affects the risk development of cardiovascular diseases.

CONCLUSION

The present study reveals that the modifiable cardiovascular risk factors are very high among the patients with Type 2 Diabetes Mellitus who are admitted to the tertiary care hospitals in Lahore. Hypertension, dyslipidemia, obesity, and poor glycemic control have been the most prevalent risk determinants that are comorbid in the same patients and hence add up to the overall cardiovascular risks. Existing gender differences were also significant, with women having obesity as a more prevalent characteristic and men having smoking as a more prevalent characteristic. The findings of these studies show the great prevalence of blood pressure, lipid levels, weight, and glycemic control issues that demand a combined intervention methodology. As a part of the diabetes management, regular screening of the cardiovascular system should be involved, as well as systematic patient education and counseling. Improving the prevention of cardiometabolic programs at the tertiary care and integrating lifestyle modification into normal clinical care can facilitate the level of cardiovascular complications among diabetic patients in Pakistan.

Conflict of Interest: The authors report no conflicts of interest.

Funding: No external funding was received for this study.

Acknowledgments: We gratefully acknowledge our colleagues and all study participants for their valuable contributions.

Authors' contributions: ZI: Concept & supervision; MA: Data collection & drafting; MZ: Literature review & revision.

Data Availability Statement: The data used in this study are available upon reasonable request from the corresponding author, subject to ethical and institutional guidelines.

REFERENCES

1. Cardoso H, Tavares Bello C, Andrade L, Sobral do Rosário F, Louro J, Nogueira C, et al. High prevalence of cardiovascular disease and risk factors among type 2 diabetes patients followed in a hospital setting in Portugal: the PICT2RE observational study. *Rev Port Cardiol.* 2023;42(4):319–330. doi:10.1016/j.repc.2022.04.011.
2. Regassa LD, Tola A, Ayele Y. Prevalence of cardiovascular disease and associated factors among type 2 diabetes patients in selected

hospitals of Harari Region, Eastern Ethiopia. *Front Public Health.* 2020;8:532719. doi:10.3389/fpubh.2020.532719.
3. Khanal MK, Bhandari P, Dhungana RR, Gurung Y, Rawal LB, et al. Poor glycemic control, cardiovascular disease risk factors and their clustering among patients with type 2 diabetes mellitus: a cross-sectional study from Nepal. *PLoS One.* 2022;17(7):e0271888. doi:10.1371/journal.pone.0271888.
4. Joshi R, Subedi P, Yadav GK, et al. Prevalence and risk factors of chronic kidney disease among patients with type 2 diabetes mellitus at a tertiary care hospital in Nepal: a cross-sectional study. *BMJ Open.* 2023;13:e067238. doi:10.1136/bmjopen-2022-067238.
5. Alduraywish SA, Aldakheel FM, Azizalrahman LA, Alzaid LT, Alqahtani SS, Alhussein SH, et al. Knowledge about the risk of cardiovascular disease among adults with type 2 diabetes visiting outpatient clinics at a tertiary hospital in Riyadh, Saudi Arabia: a cross-sectional study. *Int J Environ Res Public Health.* 2022;19:4996. doi:10.3390/ijerph19094996.
6. Sahoo J, Mohanty S, Kundu A, et al. Medication adherence among patients with type II diabetes mellitus and its associated risk factors: a cross-sectional study in a tertiary care hospital of Eastern India. *Cureus.* 2022;14(12):e33074. doi:10.7759/cureus.33074.
7. Basil B, Mohammed JA, Mba IN, et al. High-sensitivity C-reactive protein and cardiovascular disease risk assessment in a population of type 2 diabetes mellitus patients. *BMC Cardiovasc Disord.* 2025;25:498. doi:10.1186/s12872-025-04975-3.
8. Alsaadon H, Afroz A, Karim A, et al. Hypertension and related factors among patients with type 2 diabetes mellitus: a multi-hospital study in Bangladesh. *BMC Public Health.* 2022;22:198. doi:10.1186/s12889-022-12509-1.
9. Dulyapach K, Ngamchaliew P, Vichitkunakorn P, Sornsenee P, Choomalee K. Prevalence and associated factors of delayed diagnosis of type 2 diabetes mellitus in a tertiary hospital: a retrospective cohort study. *Int J Public Health.* 2022;67:1605039. doi:10.3389/ijph.2022.1605039.
10. Bawah AT, Darko R, Abaka-Yawson A, et al. Dyslipidemia and its associated factors in patients with type 2 diabetes mellitus. *J Public Health (Berl).* 2021;29:985–991. doi:10.1007/s10389-020-01205-2.
11. Ahmed MA, Ferede YM, Takele WW. Incidence and predictors of chronic kidney disease in type II diabetes mellitus patients attending Amhara region referral hospitals, Ethiopia: a follow-up study. *PLoS One.* 2022;17(1):e0263138. doi:10.1371/journal.pone.0263138.
12. Bideberi AT, Mutagaywa R. Statin prescription patterns and associated factors among patients with type 2 diabetes mellitus attending diabetic clinic at Muhimbili National Hospital, Dar es Salaam, Tanzania. *Diabetes Metab Syndr Obes.* 2022;15:633–646. doi:10.2147/DMSO.S347765.
13. Shuvo SD, Hossen MT, Riazuddin M, et al. Prevalence of comorbidities and associated factors among type 2 diabetes patients: a hospital-based study in Jashore District, Bangladesh. *BMJ Open.* 2023;13:e076261. doi:10.1136/bmjopen-2023-076261.
14. Pitso L, Mofokeng TR, Nel R. Dyslipidaemia pattern and prevalence among type 2 diabetes mellitus patients on lipid-lowering therapy at a tertiary hospital in central South Africa. *BMC Endocr Disord.* 2021;21:159. doi:10.1186/s12902-021-00813-7.
15. Mehta RK, Koirala P, Mallick RL, Parajuli S, Jha R. Dyslipidemia in patients with type 2 diabetes mellitus in a tertiary care centre: a descriptive cross-sectional study. *JNMA J Nepal Med Assoc.* 2021;59(236):305–309. doi:10.31729/jnma.6278.
16. Haque A, Hasan MJ, Ahmed TU, Ali MY. Prevalence of type 2 diabetes mellitus among hypertensive patients attending a tertiary-level hospital in Bangladesh. *Community Based Med J.* 2025;14(2):121–125. doi:10.3329/cbmj.v14i2.83279.
17. Namdeo MK, Verma S, Das Gupta R, et al. Depression and health-related quality of life of patients with type 2 diabetes attending tertiary level hospitals in Dhaka, Bangladesh. *Glob Health Res Policy.* 2023;8:43. doi:10.1186/s41256-023-00328-9.
18. Shillah WB, Yahaya JJ, Morgan ED, et al. Predictors of microvascular complications in patients with type 2 diabetes mellitus at regional referral hospitals in the central zone, Tanzania: a cross-sectional study. *Sci Rep.* 2024;14:5035. doi:10.1038/s41598-024-55556-x.
19. Tamene FB, Zeleke TK, Desalew AF, et al. Polypharmacy and associated factors among patients with type 2 diabetes mellitus with comorbidity: a multicenter cross-sectional study in Northwest Ethiopia. *BMC Endocr Disord.* 2025;25:188. doi:10.1186/s12902-025-02011-1.
20. Rupasinghe S, Jayasinghe IK. Prevalence and associated factors of anaemia in patients with type 2 diabetes mellitus: a cross-sectional study in a tertiary care medical unit, Sri Lanka. *BMC Endocr Disord.* 2024;24:156. doi:10.1186/s12902-024-01681-7.

This Article May be cited As: *Irfan Z, Aalishan M, Zain M. Prevalence of cardiovascular risk factors in patients with type 2 diabetes mellitus attending tertiary care hospitals: Prevalence of Cardiovascular Risk Factors in Type 2 Diabetes Patients. Dev Med Life Sci. 2025;2(10):7-22. doi:10.69750/dmls.02.010.0159*