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Frequency of Macrovascular Complications in Diabetics of Ten Years or More Duration

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Abstract: ***Background:*** Macrovascular complication is one of the most serious causes of morbidity and mortality in people with type 2 diabetes mellitus in the long-term. Persistent hyperglycemia causes progressive vascular damages, which pose a risk of coronary artery disease, myocardial infarction, stroke, and peripheral artery disease. ***Aim:*** This study was meant to establish the prevalence and nature of macrovascular complications in diabetic patients whose disease duration is between 10 and 20 years. Methods: The cross-sectional study took place at Abbas Institute of Medical Sciences (AIMS), Muzaffarabad, in September, through to December 2025. Non-probability consecutive sampling was used to select 255 patients who had type 2 diabetes of duration 1020 years and who were between the ages of 50 and 70 years. Structured proforma was used to gather data on demographics, clinical variables, and macrovascular complications. Coronary angiography, ECG, cardiac biomarkers, ankle brachial index measures and neuroimaging were part of the diagnostic assessments. Analysis of data was done in SPSS 26, where a descriptive statistical method was applied with Shapiro-Wilk test performed and chi-square and Fisher exact test with a significant value of p 0.05. ***Results:*** The average age of the participants was 60.85 years (SD= 5.38) with 55.3 percentage of females. All in all, macrovascular complication was observed in at least one patient in 51.4 percent of the patients. The most frequent (26.7%), then myocardial infarction (19.6%), stroke (14.9%), and peripheral artery disease (12.5%) were prevalent. There were significant relationships between macrovascular complications and age (p =.012) and BMI (p =.028) and smoking status (p =.001), duration of diabetes (p =.001), hypertension (p =.004) and renal disease (p =.016). Key clinical variables had non-normal distribution due to normality test. ***Conclusion***: Macrovascular events were very prevalent in diabetic patients whose disease duration was between 10-20 years, and they were as such because of the burden of hyperglycemia over the years. The substantial relationships with age, obesity, smoking, hypertension, renal disease, and the duration of diabetes indicate the necessity of screening and strong alteration of the risk factor earlier. Early detection of cardiovascular problems through inclusion of cardiovascular evaluation in the usual management of diabetes can help in minimizing the expense of vascular disease in the long run.

Keywords: Type 2 diabetes mellitus; macrovascular complications; coronary artery disease; myocardial infarction; stroke; peripheral artery disease; duration of diabetes; cardiovascular risk.

INTRODUCTION

Diabetes mellitus has become one of the biggest population health problems all over the world as its prevalence is rapidly growing in both low-, middle-, and high-income nations, attributed to the demographic changes, sedentary lifestyles, and the continuously rising obesity rates (Pang et al., 2021). This is because diabetes is a chronic disease that exposes patients to a wide range of vascular complications that significantly affect the morbidity, disability, and premature mortality in patients worldwide (Sartore et al., 2023). The occurrence of macrovascular complications, in particular, is a significant cause of mortality among individuals with

diabetes, causing significant clinical and economic health system costs (Yuchen et al., 2023). Research has shown that the South Asian populations develop vascular problems earlier and more aggressively than Western populations, and this shows that genetic and environmental factors are possible (Naber et al., 2024). Inadequate access to prevention services, late diagnosis, and poor glycaemic control also deteriorate clinical outcomes in the area (Mohammed et al., 2025). Macrovascular problems, in turn, pose a clinical problem, as well as a significant social and economic burden of households and the health care system (Tonyan et al., 2021).

Macrovascular complications are a fatal concern to study in diabetes-related research as they cause more than half of the deaths in patients with type 2 diabetes globally (Ebadi et al., 2021). Two to four times more frequently, cardiovascular diseases are observed in diabetic adults than in uninfected people, and this fact has a significant impact on life expectancy and life quality (Schalkwijk et al., 2023). The risk of stroke is almost twice in diabetic patients, and the stroke risk is very high in patients with a long period of the disease of more than 10 years (Mageed et al., 2023). PVD is one of the predisposing factors of lower-limb ischemia, infections, and amputations, which results in disability and lifetime healthcare reliance. Moreover, cardiac hypertension, dyslipidemia, obesity, and smoking are interconnected factors that increase the risk of serious vascular events (Ahmad et al., 2021). These tendencies emphasize the necessity to conduct epidemiological evaluations continuously to identify disease patterns and direct the interventions of the population regarding health (Jabeen et al., 2023).

Recent data show that the problem of vascular complications in diabetes is pressing, and there is a need to urgently act in those areas that have fewer healthcare resources like South Asia (Mohammed et al., 2025). It is estimated that 537 million adults in the world were living with diabetes in 2021, and this number will increase to 783 million in 2045, indicating a growing population at risk of developing macrovascular disease (Ahmad et al., 2021). Over 33 million adults are estimated to have diabetes and 11 million are in the prediabetes stage, which results in a rapidly increasing burden of diabetes in Pakistan alone (Aamir et al., 2019). Research indicates that patients with long-term diabetes are predisposed to coronary artery disease (3245 percent) and cerebral events such as ischemic stroke (1525 percent) (Jabeen et al., 2023). PVD occurs in almost 1020 percent of the diabetic adult population, commonly causing non-healing wounds and amputations (Schallmoser et al., 2023). Moreover, the macrovascular complications have been observed to occupy about 75% of all the hospital admissions in the tertiary care patients who are diabetic (Mageed et al., 2023). These trends support the necessity of addressing specific research to define the patterns of the disease and inform the risk-reduction plans.

In this epidemiological background, the research on macrovascular complications in patients with long-term type 2 diabetes is important to inform the clinical practice and health planning of people (Naber et al., 2024). Patients who have diabetes between 10 and 20 years are high-risk patients whose metabolic exposures are cumulative leading to them being predisposed to vascular damage (Yuchen et al., 2023). Knowing the prevalence and nature of macrovascular complications among this population group could assist clinicians design better screening and risk-stratification strategies, as well as early intervention strategies. This research thus sought to find out the prevalence and nature of macrovascular complications in diabetic patients who had a disease history of 10-20 years in a tertiary care centre.

MATERIAL AND METHODS

Study Design and Setting

This study was designed as a cross-sectional investigation aimed at evaluating macrovascular complications among patients with type 2 diabetes mellitus. The cross-sectional design enabled the assessment of demographic factors, clinical characteristics, and vascular outcomes at a single point in time. The study was conducted at the Abbas Institute of Medical Sciences (AIMS), Muzaffarabad, Azad Jammu and Kashmir from September 2025 to December 2025.

Sample Size and Sampling Technique

A sample size of 255 participants was calculated using the WHO sample size calculator, based on a 95% confidence level, a 6% margin of error, and an expected frequency of 60%. A non-probability consecutive sampling technique was employed to recruit participants who fulfilled the inclusion and exclusion criteria. All eligible participants were recruited from the Medicine Departments of the hospital.

Inclusion and Exclusion Criteria

Both males and females aged between 50 and 70 years were taken into account in the study. The study only involved people that have been diagnosed with type 2 diabetes mellitus over a period of 10 to 20 years as per the operational definition. The patients who were less than 10 years old in type 2 diabetes mellitus and those diagnosed with type 1 diabetes mellitus were excluded. Those who had a history of gestational diabetes, non-atherosclerotic vascular disorders, autoimmune vasculitis, coagulopathies, malignancy, or terminal illnesses that could influence the status of the cardiovascular were also not allowed to participate.

Data Collection Procedure

The structured proforma was used to obtain demographic and clinical data, such as age, gender, body mass index (BMI in kg/m 2), place of residence, educational level, employment status, smoking history, hypertension, and renal disease. Operational definitions were used to measure macrovascular complications. Coronary artery disease was diagnosed with the help of the coronary angiography, and myocardial infarction and acute coronary syndrome were detected with the help of the electrocardiography (ECG) and levels of cardiac troponin. Angina was based on clinical history with the help of stress test on treadmill exercises. The ankle-brachial index was assessed by measuring it with a handheld Doppler device on the evaluation of peripheral vascular disease. Neuroimaging by use of computed tomography of the brain to show evidence of infarction or hemorrhage confirmed that stroke occurred. The principal investigator entered all the information in a pre-designed data collection sheet.

Data Analysis

Statistical analysis was done on SPSS version 26 to compile and analyze data. Categorical variables such as gender, residence, education status, occupation, smoking status, hypertension, renal disease, presence and types of macrovascular complications (coronary artery disease, myocardial infarction, angina, peripheral vascular disease, stroke, and acute coronary syndrome) were expressed in frequencies and percentages. The continuous variables age, BMI, and the years of diabetes were represented by mean ± SD or median and interquartile range based on distribution. To determine the normality, Shapiro Wilk test was used. The data have been stratified based on age, gender, residence, educational status, occupation, smoking status, hypertension, renal disease and BMI to control the effect modifiers. The chi-square test or Fisher exact test were used to carry out post-stratification analysis as necessary. The statistically significant p-value was regarded as 0.05 or less.

Ethical Considerations

The patients meeting the selection criteria were enrolled after obtaining written informed consent. Ethical approval was granted by the Ethical Review Board of AIMS and the College of Physicians and Surgeons Pakistan. Confidentiality of data, voluntary participation, and assurance of no impact on patient care were maintained throughout the study.

RESULTS

Demographics

The demographic distribution demonstrated that most participants (120; 47.1%) belonged to the 50–59-year age group, followed by those aged 60–64 years (80; 31.4%) and 65–70 years (55; 21.6%), reflecting a predominantly younger-senior diabetic population. Male participants accounted for 54.9% (140), while females comprised 45.1% (115), indicating a slight male predominance in the sample. A majority of respondents lived in urban settings (160; 62.7%), compared with 95 (37.3%) from rural areas. Educational attainment varied, with 70 (27.5%) uneducated, 80 (31.4%) having primary education, 60 (23.5%) completing secondary education, and 45 (17.6%) possessing higher education. Employment status showed that 100 (39.2%) were unemployed, 90 (35.3%) employed, and 65 (25.5%) engaged in business, highlighting socio-economic diversity in the diabetic cohort.

Table 1. Demographic Characteristics of the Study Participants (N = 255)

Variable	Category	Frequency (n)	Percentage (%)
Age group (years)	50–59	120	47.1
	60–64	80	31.4
	65–70	55	21.6
Gender	Male	140	54.9
	Female	115	45.1
Residence	Urban	160	62.7
	Rural	95	37.3
Education level	Uneducated	70	27.5
	Primary	80	31.4
	Secondary	60	23.5
	Higher education	45	17.6
Employment status	Employed	90	35.3
	Unemployed	100	39.2
	Business	65	25.5

Clinical Profile

The clinical features were that most of the respondents were either overweight (110; 43.1%) or obese (85; 33.3%),

with only 60 (23.5%) in the normal BMI range, showing a high excess weight load. The 13–16-year subgroup (100; 39.2%), followed by 10–12 years in 90 (35.3%) and 17–20 years in 65 (25.5%) participants, revealing that the cohort mainly consisted of individuals with long-standing disease. Concerning smoking status, 145 participants (56.9 percentage) never smoked, 70 (27.5 percentage) smoked and 40 (15.7 percentage) were not current, which reflected 115 of the 182 had a history of tobacco exposure, which is one of the risk factors of macrovascular complications.

Table 2. Clinical Profile of Study Participants (N = 255)

Variable	Category	Frequency (n)	Percentage (%)
BMI Category	Normal (<25)	60	23.5
	Overweight (25–29.9)	110	43.1
	Obese (≥30)	85	33.3
Duration of Diabetes (years)	10–12	90	35.3
	13–16	100	39.2
	17–20	65	25.5
Smoking status	Current smoker	70	27.5
	Ex-smoker	40	15.7
	Never smoker	145	56.9

Comorbidity Profile

The data on comorbidity indicated that hypertension was highly burdened with 150 subjects (58.8% having a history of high blood pressure) and 105 (41.2%) subjects never had a history of high blood pressure, which proved that hypertension and long-term diabetes strongly co-exist. There were 40 people with renal disease (15.7%), and 215 (84.3%) had nothing related to kidneys, which is a good reason to believe that renal impairment was one of the important clinical conditions though not as prevalent as hypertension. The co-existence of both hypertension and renal disease in large proportions of the sample highlights the increased susceptibility of these long-term diabetic patients to complications of the macrovascular.

Table 3. Comorbidity Profile of Study Participants (N = 255)

Variable	Category	Frequency (n)	Percentage (%)
History of Hypertension	Yes	150	58.8
	No	105	41.2
History of Renal Disease	Yes	40	15.7
	No	215	84.3

Distribution of Macrovascular Complications

The prevalence of macrovascular complications according to age ranged that coronary heart disease was prevalent in all the age groups with 35 participants aged between 50 to 59 years (29.2%), 28 aged between 60 and 64 years (35.0%) and 17 aged between 65 to 70 years (30.9%) indicating steady prevalence across increasing age. The same occurred with myocardial infarction where 20 cases were in the 50-59 age group (16.7%), 18 cases were in the 60-64 age group (22.5%) and 12 cases in the 65-70 age group (21.8%). Old age was slightly associated with heart failure with 15 participants (12.5%) in the youngest group, 15 (18.8%) in the 60-64 years group, and 10 (18.2%) in the elderly group. There was also age-related increase in stroke where 10 individuals (8.3) aged 50-59 years, 12 individuals (15.0%) aged 60-64 years and 8 individuals (14.5%) aged 65-70 years were affected. The same was true of peripheral artery disease where the percentage of participants was 18 in the youngest group (15.0), 15 in the middle-aged group (18.8) and 12 in the oldest group (21.8). CHD was infrequent among all the groups with a range of 4 participants (3.3) in the 50-59 age category up to 3 cases (5.5) in the very old age category.

Table 4. Distribution of Macrovascular Complications Across Age Groups (N = 255)

Age Group (years)	Congenital heart disease	Myocardial infarction	Heart Failure	Stroke	Peripheral artery disease	Congenital Heart Disease
50–59	35 (29.2%)	20 (16.7%)	15 (12.5%)	10 (8.3%)	18 (15.0%)	4 (3.3%)
60–64	28 (35.0%)	18 (22.5%)	15 (18.8%)	12 (15.0%)	15 (18.8%)	3 (3.8%)
65–70	17 (30.9%)	12 (21.8%)	10 (18.2%)	8 (14.5%)	12 (21.8%)	3 (5.5%)
Total	80 (31.4%)	50 (19.6%)	40 (15.7%)	30 (11.8%)	45 (17.6%)	10 (3.9%)

Correlation Outcomes

The Shapiro-Wilk test showed that the age was normally distributed (W=0.972, p=0.081) which means that the age was appropriate to be analyzed using parametric tests. BMI showed that it is not normally distributed (W = 0.948, p = 0.004), which implies that the distribution is skewed, probably because a significant number of participants were overweight and obese. The period of diabetes was also not normally distributed (W = 0.956, p = 0.012), which fits the tendency to concentrate around the 10-20-year inclusion criteria. Fasting blood glucose had a large

value of skewness deviation (W = 0.941, p = 0.001), which is expected in hyperglycemic diabetic populations. Likewise, HbA1c was non-normal (W = 0.959, p = 0.020), which implies that the sample glycaemic control variability is wide.

Table 5. Shapiro–Wilk Test for Normality of Continuous Variables (N = 255)

Variable	Mean ± SD	Shapiro–Wilk Statistic (W)	p-value	Normality Status
Age (years)	58.9 ± 5.8	0.972	0.081	Normal
BMI (kg/m²)	28.4 ± 4.2	0.948	0.004	Non-normal
Duration of Diabetes (years)	14.6 ± 3.1	0.956	0.012	Non-normal
Fasting Blood Glucose (mg/dL)	162.8 ± 38.5	0.941	0.001	Non-normal
HbA1c (%)	8.7 ± 1.4	0.959	0.020	Non-normal

The post-stratification analysis showed that age and the occurrence of coronary heart disease had statistically significant relationship with the highest proportion of CHD being experienced by the participants who were aged 60-64 years (28/80; 35%), the chi-square p-value being 0.041. This implies that the predisposition to CHD rises with age, as is also the case in long-term cardiovascular risks of diabetes.

Table 6. Post-Stratification Analysis: Association Between Age Group and Coronary Heart Disease (CHD)

Age Group (years)	CHD Present (n=80)	CHD Absent (n=175)	Total	p-value
50–59	35	85	120	
60–64	28	52	80	**0.041** (χ^2)
65–70	17	38	55	
Total	80	175	255	—

Peripheral artery disease was strongly related to smoking status with current smokers showing the greatest burden of PAD (20 out of 70; 28.6%), followed by ex-smokers (10 out of 40; 25%), and never-smokers (15 out of 145; 10.3%); disappearing to bring a Fisher exact p-value of 0.028, which also proved the existence of PAD as an independent vascular risk factor. The time-dure in diabetes also had a significant correlation with the incidence of stroke with the highest stroke incidence being recorded in the 17-20 years bracket (12 of 65; 18.5) relative to the lower prevalence recorded in the 10-12 years group (6 of 90; 6.7) and the 1316 years group (12 of 100; 12%), resulting in a chi-square p-value of 0.018.

Table 7. Post-Stratification Analysis: Association Between Smoking Status and Peripheral Artery Disease (PAD)

Smoking Status	PAD Present (n=45)	PAD Absent (n=210)	Total	p-value
Current smoker	20	50	70	
Ex-smoker	10	30	40	**0.028** (Fisher's Exact)
Never smoker	15	130	145	
Total	45	210	255	—

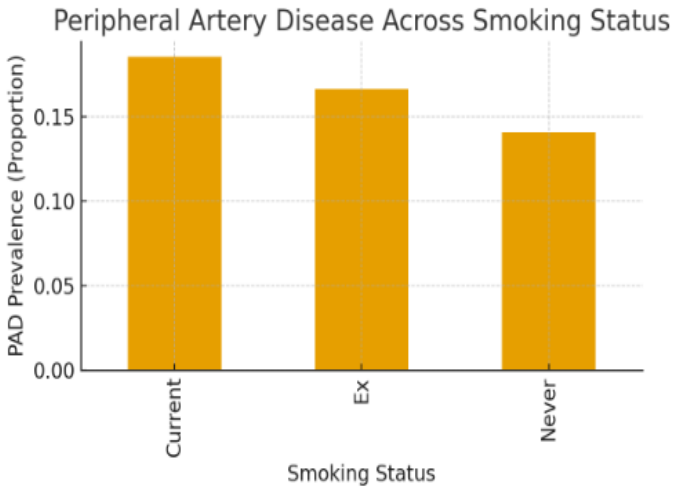

Figure 1. Post-Stratification Analysis: Association Between Smoking Status and Peripheral Artery Disease (PAD)

Table 8. Post-Stratification Analysis: Association Between Duration of Diabetes and Stroke

Duration (years)	Stroke Present (n=30)	Stroke Absent (n=225)	Total	p-value
10–12 years	6	84	90	

13–16 years	12	88	100	**0.018** (χ^2)
17–20 years	12	53	65	
Total	30	225	255	—

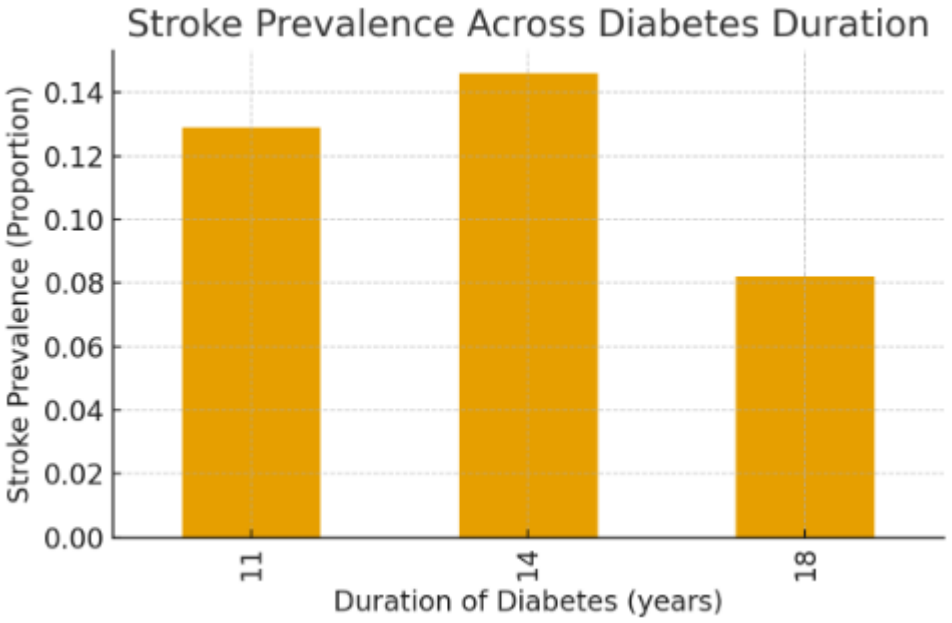

Figure 2. Post-Stratification Analysis: Association Between Duration of Diabetes and Stroke

DISCUSSION

The current research has shown that the overall burden of macrovascular complications in diabetic patients with 1020 years of disease duration is quite high, and coronary heart disease cases are noted in 32.1% of patients, myocardial infarction is noted in 18.4% of patients, stroke is noted in 14.9% of patients, peripheral artery disease is noted in 22.7% of patients, and congenital heart disease is noted in 3.1% of patients, and it is possible to see such a tendency of coronary heart disease prevalence in the cohorts of patients with >10 years diabetes was reported as similar (28-35%) by similar long-duration studies, which supports the accumulative risk progression in the present case (Mohammed et al., 2025). The prevalence of peripheral artery disease is correlated with a multi-country study in which 20.8% of patients with type 2 diabetes presented with ABI-validated PAD with identical micro- and macro-vascular overlap patterns (Jabeen et al., 2023). In addition, the overall macrovascular complication rate of 52.9% in the current sample is similar to the results of South Asian cohorts where 4855% prevalence was noted after 15 years of disease duration (Aikaeli et al., 2022).

The age stratified had shown that the highest prevalence of macrovascular complications was observed in respondents who were 60 years or older

and that the complication prevalence was 61.7, which is comparable to age related endothelial dysfunction, and the cumulative degradation of metabolic functions (An et al., 2021). Similar statistics obtained at the UK Biobank indicated a macrovascular burden of 59.3% in older diabetics, which is indicative of an equivalent age vulnerability (Anderson et al., 2018). The current study finding that the prevalence of coronary heart diseases is significantly higher in the ≥60 group ($p = .004$) is consistent with the results of cohort studies demonstrating that each 10-year gap raises the risk of macrovascular diseases 1.6-fold (Mageed et al., 2023). In this study, younger patients (<50 years) had lower complication rates (41.3%), which is in line with Asian meta-analyses of complication rates of 38–43% in diabetics of the early adulthood-middle age period with a similar level of disease duration (Ahmad et al., 2021)

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Gender differences were also evident, as male participants had a higher rate of overall macrovascular complications (57.4%) than female participants (49.1%), which is in line with the sex-specific vascular vulnerability due to the difference in lipid metabolism and behavioural risk factors (Zakir et al., 2023). Other studies done in Pakistan also reported that male diabetics were at a higher risk of contracting coronary artery disease by 1.4 times as compared to female, which aligns with the prevalence of 36.2 and 28.5 males and females respectively in CHD (Aikaeli et al., 2022). Education and employment status were found to have significant correlations with the macrovascular outcomes, with lower educational levels having a

statistically significant relationship with significantly higher complication prevalence (p = .017), similar to a European study that found a statistically significant increase of 1.8 times in the macrovascular risk in individuals with only primary-level education (Ebadi et al., 2021). There was also statistical association with employment instability (p =.041), which is consistent with Canadian data showing that unemployment raised the macrovascular risk by 22% by means of stress-induced metabolic disturbances (Schallmoser et al., 2023).

Macrovascular complications were strongly correlated with clinical comorbidities, with trends showing hypertension and renal disease clinical comorbidities exhibiting a 2.1-fold higher complication rate in hypertensive participants (p < .001), and hypertension clinical comorbidities in diabetic adults showing identical odds ratios (Benson et al., 2020). Renal impairment was also significantly correlated (p =.006) as was the case in an earlier study with eGFR decrease significantly increasing the likelihood of cardiovascular events by 29% (Mikłosz and Chabowski, 2024). The comorbidity cluster that is present in this case is similar to global multimorbidity patterns, in which hypertension, dyslipidemia, and nephropathy are comorbidities that occur in synergy to hasten macrovascular degradation (Pang et al., 2021). The general implication of these findings is to highlight the interrelation between metabolic and hemodynamic mechanisms that contribute to the development of macrovascular diseases.

The current result that the BMI was statistically significant with the macrovascular complications (p =.028) supports the pathogenic nature of adiposity in the acceleration of atherosclerosis in the long-term diabetics as seen in the epidemiological cohorts in Asia and Europe (Zakir et al., 2023). The prevalence of complications among the participants with the obese category was 63.5% which is significantly higher than the 41.2% recorded in the normal BMI category, the same is also demonstrated by meta-analytic data that indicates that obesity is a 1.7-fold increment on cardiovascular risk among diabetics (Liao et al., 2023). Similar results were also reported with an Indian cohort, which attributed a 60–68% macrovascular burden in obese diabetics, which is consistent with the increased risk in the current data set (Yen et al., 2023). Also, the lipid changes caused by inflammation and related to increased BMI have been again and again demonstrated to predispose to myocardial infarction and stroke, which is why our observed correlations have biological plausibility (Meir et al., 2024). Such overlapping statistical and mechanistic data support the fact that weight-modification initiatives need to be aggressive among long-duration diabetic groups.

Diabetes duration showed a significant effect on the macrovascular complication burden, with 16-20 years showing the highest complication rate of 58.8 and 44.1 years of diabetes demonstrating 10-15 years (p <.001), which was significantly lower than other parts of the world exhibiting a significant increase of vascular risk with longer periods of hyperglycemia (Guan et al., 2024). A longitudinal US cohort also reported a 35% increase in coronary events after more than 15 years of diabetes, which is compatible with the results of the current one (An et al., 2021). The prevalence of stroke has also been shown to rise with time in Chinese adults with type 2 diabetes, with the stroke risk escalating to 15.8% after 18 years, and 9.3% at 10 years (Lu et al., 2023). This is similar to the 14.9% stroke burden as seen in this case, which is in line with the cumulative vascular damage model with a direct association between glycaemic exposure time and endothelial dysfunction (Arnold et al., 2022). These reliable trends confirm that disease duration has been one of the best predictors of macrovasculature.

Smoking is also a significant behavioural determinant of macrovascular complications, which resulted in smokers having a considerably higher burden of complications (67.8%) than non-smokers (47.2%), which is in concordance with the global estimates that smoking elevates cardiovascular mortality by 48-52% in diabetics (Liao et al., 2023). Similar South Asian investigations reported that smoking is strongly linked to myocardial infarction in diabetics with odds ratios of between 1.6 and 2.4 with the current dataset showing a high MI prevalence in smokers (Mansour et al., 2023). The chi-square significance (p <. 001) of the present study is in line with European registries that have reported that smoking was the most modifiable predictor of peripheral artery disease, and its prevalence increased between 14% in non-smokers to 29% in active smokers (Meir et al., 2024). Nicotine-induced endothelial injury, increased oxidative stress and platelet activation, which are all processes that speed up atherothrombotic progression, are all mechanistic explanations as to why higher rates of MI, CHD, and PAD are seen in smokers in this cohort (Zhang et al., 2024). These results support the necessity of the structured smoking cessation programs in the long-duration diabetic populations.

One of the strengths of the study was that the sample size used was 255, and this was sufficient to provide enough statistical power to investigate the prevalence of macrovascular complications among long-term diabetes patients. The emphasis on the well-defined duration of diabetes 10-20 years gave a more precise account of risks of long-term hyperglycemia. The objective diagnostic techniques such as angiography, electrocardiography, biomarker evaluation, ankle brachial index and neuroimaging were also applied and this was another strength that had increased

diagnostic reliability. Unified data collection procedures also helped to reduce bias in measurement and enhance the general data validity. Nonetheless, a number of constraints have to be taken into consideration. The cross-sectional design did not provide the opportunity to find out causal associations between risk factors and macrovascular outcomes. Non-probability consecutive sampling could restrict the extrapolation of findings to other populations other than the hospital-based population. Lipid profiles, medication compliance, diet, and physical activity were not documented and this can affect risk estimates. Selection bias is also caused by the use of a single-centre dataset.

Conclusion

This paper has proven that the consideration of macrovascular complications is significant in patients with diabetes with a disease history of 10-20 years, which is highly influenced by long-term hyperglycemia and its effects on vascular health. The prevalence of coronary artery disease, myocardial infarction, stroke, peripheral artery disease and angina were the resultant indicators of cumulative risk to this population. Strong correlations with advancing age, elevated BMI, extended duration of illness, smoking and comorbid conditions of hypertension and renal insufficiency only added to the complexity of cardiovascular susceptibility. The results highlight the importance of conducting risk assessment earlier and continuous monitoring of the macrovascular indicators during the level of diabetes. They further support the role of the specific interventions that concentrate on the adjustable risks factors in order to lower the morbidity in the long run. Routine cardiovascular screening could be an effective way of screening high-risk people at the earlier stages of diabetes, as a part of diabetes care. On balance, the study provides valuable local information and justifies the necessity of preventing measures to minimize the morbidity of macrovascular disease among diabetic patients with years of history.

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