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Original Research Article

COMPARATIVE STUDY OF CLINICAL AND BIOCHEMICAL CHARACTERISTICS OF PATIENTS WITH NEWLY DIAGNOSED VERSUS LONG-STANDING TYPE 2 DIABETES MELLITUS

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ABSTRACT

Background: Type 2 diabetes mellitus (T2DM) is a progressive metabolic disorder associated with impaired glycaemic control, dyslipidaemia, and multiple vascular complications. Evaluating clinical and biochemical differences between newly diagnosed and long-standing diabetes may help identify disease-related abnormalities and improve patient management. **Aim:** To compare the clinical characteristics, biochemical parameters, metabolic abnormalities, and diabetes-related complications between newly diagnosed and long-standing T2DM patients.

Materials and Methods: This hospital-based observational comparative study included 106 patients with T2DM at a tertiary care hospital. Patients were divided into two groups: newly diagnosed T2DM (n=53) and long-standing T2DM (n=53). Demographic characteristics, anthropometric measurements, clinical manifestations, glycaemic parameters, lipid profiles, renal function, and diabetes-related complications were evaluated. Statistical analysis was performed using SPSS version 27.0, considering $p<0.05$ statistically significant.

Results: Patients with long-standing T2DM had significantly higher mean age (61.80 ± 8.80 vs. 53.70 ± 9.20 years; $p<0.001$) and HbA1c (9.50 ± 1.70% vs. 8.70 ± 1.50%; $p=0.012$). Total cholesterol, triglycerides, LDL cholesterol, and blood pressure were significantly elevated, while HDL cholesterol and eGFR were significantly reduced in long-standing patients. Peripheral neuropathy (43.40% vs. 11.32%), retinopathy (32.08% vs. 5.66%), and diabetic kidney disease (37.74% vs. 9.43%) were significantly more prevalent in long-standing patients (all $p<0.001$). Overall microvascular and macrovascular complications were also significantly higher in this group ($p<0.001$).

Conclusion: Long-standing T2DM was associated with poorer glycaemic control, adverse lipid profiles, renal dysfunction, and increased vascular complications. Early diagnosis, regular biochemical monitoring, and comprehensive complication screening are essential for improving diabetes management.

Keywords: Type 2 Diabetes Mellitus; Glycaemic Control; Dyslipidaemia; Diabetic Nephropathy; Microvascular Complications.

INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a major chronic metabolic disorder. It is characterised by persistent hyperglycaemia resulting from impaired insulin secretion and insulin resistance. Its increasing occurrence is closely associated with population ageing, urbanisation, physical inactivity, unhealthy dietary patterns, and excess adiposity. Beyond abnormalities in glucose regulation, T2DM contributes to progressive vascular and organ damage, increased healthcare expenditure, and reduced quality of life. The substantial burden of diabetes in developing countries reinforces the

importance of timely recognition, comprehensive assessment, and sustained clinical monitoring.[1] The pathophysiology of T2DM is complex and involves interactions among genetic susceptibility, visceral adiposity, chronic low-grade inflammation, impaired insulin signalling, and progressive pancreatic beta-cell dysfunction. Central obesity is particularly relevant because excess visceral and ectopic fat contributes to insulin resistance and metabolic disturbances. Over time, the inability of pancreatic beta cells to compensate for increasing insulin requirements promotes persistent hyperglycaemia. Consequently, patients may exhibit varying combinations of obesity, hypertension, dyslipidaemia, and altered biochemical parameters. These abnormalities may be present even before diabetes is clinically recognised and can influence subsequent disease progression.[2] The clinical presentation of T2DM differs considerably according to the stage of disease and individual metabolic status. Newly diagnosed patients may present with polyuria, polydipsia, fatigue, unexplained weight loss, or blurred vision, while others remain asymptomatic. Diagnostic assessment generally involves fasting plasma glucose, oral glucose tolerance testing, random plasma glucose in symptomatic individuals, or glycated haemoglobin (HbA1c). Because the onset of hyperglycaemia frequently precedes formal diagnosis, the designation of newly diagnosed diabetes does not necessarily imply a short biological duration. Assessment at diagnosis therefore provides an opportunity to identify existing metabolic abnormalities and previously unrecognised complications.[3] In patients with long-standing T2DM, sustained metabolic stress, progressive beta-cell impairment, and changing treatment requirements can make glycaemic management increasingly challenging. Fasting and postprandial glucose measurements provide information about immediate glycaemic status, whereas HbA1c reflects average glycaemic exposure over approximately two to three months. Interpretation should nevertheless consider factors that may alter erythrocyte turnover. Evaluation of medication use, adherence, dietary practices, physical activity, and weight management is essential when comparing patients at different stages of diabetes. An integrated assessment is preferable to reliance on glucose measurements alone.[4] Cardiometabolic abnormalities represent an important component of T2DM in both newly diagnosed and long-standing patients. Hypertension, increased waist circumference, elevated triglycerides, reduced high-density lipoprotein cholesterol, and increased low-density lipoprotein cholesterol may coexist with hyperglycaemia and amplify cardiovascular risk. Chronic endothelial dysfunction, oxidative stress, inflammation, and accelerated atherosclerosis contribute to coronary artery disease, cerebrovascular disease, and peripheral arterial disease. Assessing blood pressure, anthropometric measures, and lipid parameters alongside glycaemic control is therefore essential for characterising cardiovascular risk.[5] Diabetic kidney disease is another major concern because persistent hyperglycaemia and hypertension can produce progressive abnormalities in renal structure and function. Renal assessment includes serum creatinine, estimated glomerular filtration rate, and urinary albumin-to-creatinine ratio, which provide complementary information about filtration capacity and kidney injury. Albuminuria may develop before substantial reduction in estimated filtration rate, while reduced filtration can also occur without prominent albuminuria. Additional biochemical measurements, including serum urea, uric acid, albumin, and liver enzymes, can help characterise metabolic and organ-related abnormalities. Interpreting these findings requires consideration of age, medications, and blood pressure.[6]

MATERIALS AND METHODS

The present study was designed as a hospital-based observational comparative study to evaluate and compare the clinical and biochemical characteristics of patients with newly diagnosed and long-standing type 2 diabetes mellitus (T2DM). The study aimed to identify differences in demographic characteristics, glycaemic control, metabolic parameters, cardiovascular risk factors, and diabetes-related complications between the two groups. The study was conducted at a tertiary care hospital in the Department of General Medicine. Patients attending the outpatient department and those admitted to the medical wards with an established or newly confirmed diagnosis of type 2 diabetes mellitus were considered for enrolment. A total of 106 patients with type 2 diabetes mellitus were included in the study using a consecutive sampling technique. Participants were divided into two groups based on the duration of diabetes. Group A comprised 53 patients with newly diagnosed T2DM, defined as diabetes diagnosed within the preceding six months, while Group B included 53 patients with long-standing T2DM of at least five years' duration. The duration of diabetes was determined from medical records, previous laboratory investigations, and documented clinical history.

Inclusion Criteria

Patients aged 18 years and above, irrespective of gender, with a confirmed diagnosis of type 2 diabetes mellitus were eligible for inclusion. Newly diagnosed patients were identified according to standard diagnostic criteria, including fasting plasma glucose ≥126 mg/dL, two-hour plasma glucose ≥200 mg/dL during an oral glucose tolerance test, HbA1c ≥6.5%, or random plasma glucose ≥200 mg/dL in the presence of classical hyperglycaemic symptoms. Patients with long-standing diabetes were included based on documented disease duration of five years or more.

Exclusion Criteria

Patients with type 1 diabetes mellitus, gestational diabetes, secondary diabetes, or diabetes of uncertain classification were excluded. Patients with diabetic ketoacidosis, hyperosmolar hyperglycaemic state, acute severe infections, acute kidney injury, pregnancy, or current systemic corticosteroid therapy were also excluded. Patients with haematological disorders affecting HbA1c interpretation and those unwilling to provide informed consent were not included.

Clinical Assessment

Detailed clinical histories were obtained using a structured proforma. Information regarding age, gender, educational status, family history of diabetes, smoking, alcohol consumption, physical activity, dietary habits, duration of diabetes, antidiabetic medications, treatment adherence, and associated comorbidities was recorded. Symptoms including polyuria, polydipsia, polyphagia, fatigue, unexplained weight loss, blurred vision, and peripheral neuropathic complaints were assessed. Previous histories of hypertension, dyslipidaemia, coronary artery disease, cerebrovascular disease, and diabetes-related hospitalisation were documented.

Anthropometric and Physical Examination

All participants underwent comprehensive physical examination. Height, weight, body mass index (BMI), and waist circumference were measured using standard procedures. BMI was calculated as weight in kilograms divided by height in metres squared. Blood pressure was recorded using a calibrated sphygmomanometer after adequate rest, and the average of two measurements was considered. Peripheral pulses, foot abnormalities, sensory disturbances, and clinical evidence of diabetic complications were evaluated.

Biochemical Investigations

Venous blood samples were collected under aseptic conditions following an overnight fast of 8–12 hours. Fasting blood glucose (FBG), postprandial blood glucose (PPBG), and glycated haemoglobin (HbA1c) were measured to assess glycaemic status. The lipid profile included total cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-C), and low-density lipoprotein cholesterol (LDL-C). Renal function was assessed through serum urea, creatinine, and estimated glomerular filtration rate (eGFR). Urinary albumin-to-creatinine ratio (UACR) was measured to identify albuminuria. Additional biochemical parameters included serum uric acid, total bilirubin, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and serum albumin. Investigations were performed using standardised laboratory methods with appropriate internal quality control.

Assessment of Diabetes-Related Complications

Microvascular and macrovascular complications were assessed through clinical evaluation, available medical records, and relevant investigations. Peripheral neuropathy was evaluated using symptoms, ankle reflexes, vibration perception with a 128-Hz tuning fork, and 10-g monofilament testing. Diabetic retinopathy was assessed using documented fundoscopic findings. Diabetic kidney disease was evaluated using eGFR and UACR. Macrovascular complications, including coronary artery disease, cerebrovascular disease, and peripheral arterial disease, were documented based on established clinical diagnoses and supporting investigations.

Statistical Analysis

Data were entered into Microsoft Excel and analysed using IBM SPSS Statistics version 27.0. Continuous variables were expressed as mean ± standard deviation or median with interquartile range, depending on data distribution. Categorical variables were presented as frequencies and percentages. Normality was assessed using the Shapiro–Wilk test. Comparisons between groups were performed using the independent samples t-test or Mann–Whitney U test for continuous variables and the Chi-square test or Fisher's exact test for categorical variables. Pearson's or Spearman's correlation analysis was applied where appropriate. Multivariable logistic regression was used to assess associations after adjustment for potential confounding factors, including age, gender, BMI, and relevant treatment-related variables. A p-value <0.05 was considered statistically significant.

RESULTS

Table 1: Comparison of Baseline Demographic and Anthropometric Characteristics

Table 1 shows the comparison of baseline demographic and anthropometric characteristics between newly diagnosed and long-standing T2DM patients. The mean age was significantly higher in the long-standing group (61.80 ± 8.80 years) compared with the newly diagnosed group (53.70 ± 9.20 years; p<0.001). Male predominance was observed in both groups, with 58.49% and 56.60% males, respectively, without a statistically significant difference (p=0.844). The mean BMI was slightly higher in long-standing patients (28.20 ± 4.00 kg/m²) than in newly diagnosed patients (27.30 ± 3.80 kg/m²), although the difference was insignificant (p=0.238). However, waist circumference was significantly greater in the long-standing group (99.30 ± 9.10 cm vs. 95.50 ± 8.70 cm; p=0.030). Systolic and diastolic blood pressures were also significantly elevated in long-standing patients (p=0.004 for both). Family history of diabetes, smoking habits, and sedentary lifestyle did not show statistically significant differences between the groups.

Table 2: Comparison of Clinical Presentation and Associated Comorbidities

Table 2 demonstrates differences in clinical manifestations and associated comorbidities between the two groups. Classical hyperglycaemic symptoms, including polyuria (66.04% vs. 43.40%; p=0.019) and polydipsia (62.26% vs. 37.74%; p=0.012), were significantly more common among newly diagnosed

patients. Unexplained weight loss was also more frequent in newly diagnosed patients (33.96%) than in long-standing patients (18.87%), although the difference was not statistically significant (p=0.078). In contrast, peripheral neuropathic symptoms were considerably more prevalent among long-standing patients (50.94% vs. 15.09%; p<0.001). The prevalence of hypertension was significantly higher in long-standing T2DM patients (64.15% vs. 33.96%; p=0.002), as was dyslipidaemia (62.26% vs. 39.62%; p=0.020). Generalised fatigue and blurred vision were more frequent in the long-standing group, but these differences did not reach statistical significance.

Table 3: Comparison of Glycaemic Parameters and Lipid Profile

Table 3 presents the comparison of glycaemic parameters and lipid profiles between newly diagnosed and long-standing T2DM patients. Mean fasting blood glucose (196.90 ± 49.60 vs. 183.50 ± 45.80 mg/dL; p=0.151) and postprandial blood glucose (293.10 ± 74.50 vs. 270.40 ± 68.20 mg/dL; p=0.105) were higher in long-standing patients, although these differences were not statistically significant. However, mean HbA1c was significantly higher in the long-standing group (9.50 ± 1.70%) compared with the newly diagnosed group (8.70 ± 1.50%; p=0.012), indicating poorer long-term glycaemic control. Total cholesterol was significantly elevated among long-standing patients (211.60 ± 41.30 vs. 192.40 ± 37.20 mg/dL; p=0.013). Similarly, triglycerides (191.60 ± 62.10 vs. 167.80 ± 57.40 mg/dL; p=0.043) and LDL cholesterol (133.80 ± 34.60 vs. 116.70 ± 31.30 mg/dL; p=0.009) were significantly higher in this group. Conversely, HDL cholesterol was significantly lower among long-standing patients (40.70 ± 8.90 vs. 44.80 ± 9.10 mg/dL; p=0.021), suggesting a more adverse lipid profile.

Table 4: Comparison of Renal Function, Liver Function and Other Biochemical Parameters

Table 4 illustrates the differences in renal function, liver function, and other biochemical parameters between the study groups. Mean serum urea was significantly higher among long-standing T2DM patients (38.60 ± 13.50 mg/dL) compared with newly diagnosed patients (29.50 ± 8.80 mg/dL; p<0.001). Similarly, serum creatinine levels were significantly elevated in the long-standing group (1.23 ± 0.35 vs. 0.98 ± 0.18 mg/dL; p<0.001), whereas mean eGFR was significantly reduced (72.80 ± 21.10 vs. 91.20 ± 17.00 mL/min/1.73 m²; p<0.001). Serum uric acid was also significantly higher in long-standing patients (5.80 ± 1.30 vs. 5.10 ± 1.10 mg/dL; p=0.003). Although total bilirubin, ALT, and AST levels were slightly higher in the long-standing group, none of these differences was statistically significant (p>0.05). However, serum albumin levels were significantly lower in long-standing patients (3.94 ± 0.44 vs. 4.12 ± 0.38 g/dL; p=0.026), demonstrating differences in biochemical profiles between the two groups.

Table 5: Comparison of Microvascular and Macrovascular Complications

Table 5 compares the prevalence of microvascular and macrovascular complications between newly diagnosed and long-standing T2DM patients. Diabetic peripheral neuropathy was significantly more prevalent in long-standing patients (43.40%) compared with newly diagnosed patients (11.32%; p<0.001). Similarly, diabetic retinopathy (32.08% vs. 5.66%; p<0.001) and diabetic kidney disease (37.74% vs. 9.43%; p<0.001) were significantly more frequent among long-standing patients. Overall, at least one microvascular complication was observed in 64.15% of long-standing patients compared with 18.87% of newly diagnosed patients (p<0.001). Regarding macrovascular complications, coronary artery disease (28.30% vs. 7.55%; p=0.005) and peripheral arterial disease (16.98% vs. 3.77%; p=0.026) were significantly more common in the long-standing group. Cerebrovascular disease was also more frequent among long-standing patients (13.21% vs. 1.89%), although the difference was not statistically significant (p=0.060). Overall macrovascular complications were significantly higher in long-standing patients (43.40% vs. 11.32%; p<0.001).

Table 6: Comparison of Glycaemic Control Categories, Metabolic Abnormalities and Renal Risk Indicators

Table 6 demonstrates significant differences in glycaemic control, metabolic abnormalities, and renal risk indicators between the two groups. Poor glycaemic control, indicated by HbA1c ≥9.0%, was observed in 54.72% of long-standing patients compared with 26.42% of newly diagnosed patients, with a statistically significant difference in the overall distribution of HbA1c categories (p=0.011). Hypertriglyceridaemia (73.58% vs. 58.49%; p=0.101) and elevated LDL cholesterol (75.47% vs. 64.15%; p=0.204) were more common in long-standing patients, although these differences were statistically insignificant. However, low HDL cholesterol was significantly more prevalent in the long-standing group (62.26% vs. 41.51%; p=0.032). Elevated blood pressure was also significantly more frequent among long-standing patients (56.60% vs. 32.08%; p=0.011). Furthermore, reduced eGFR below 60 mL/min/1.73 m² was observed in 26.42% of long-standing patients compared with 5.66% of newly diagnosed patients (p=0.004). Albuminuria was significantly more common in the long-standing group (56.60% vs. 22.64%; p<0.001), indicating a greater burden of renal risk indicators among patients with prolonged diabetes.

Table 1: Comparison of Baseline Demographic and Anthropometric Characteristics Between Newly Diagnosed and Long-Standing Type 2 Diabetes Mellitus Patients (N=106)

Parameters	Newly Diagnosed T2DM (n=53)	Long-Standing T2DM (n=53)	p-value
Age (years), mean ± SD	53.70 ± 9.20	61.80 ± 8.80	<0.001
Gender			0.844
Male	31 (58.49%)	30 (56.60%)	
Female	22 (41.51%)	23 (43.40%)	
Duration of diabetes (years), mean ± SD	0.22 ± 0.16	10.40 ± 3.80	—
BMI (kg/m²), mean ± SD	27.30 ± 3.80	28.20 ± 4.00	0.238
Waist circumference (cm), mean ± SD	95.50 ± 8.70	99.30 ± 9.10	0.030
Systolic BP (mmHg), mean ± SD	132.10 ± 15.30	141.20 ± 16.80	0.004
Diastolic BP (mmHg), mean ± SD	82.50 ± 9.20	87.90 ± 9.50	0.004
Family history of diabetes	26 (49.06%)	29 (54.72%)	0.560
Current smoking	13 (24.53%)	15 (28.30%)	0.659
Sedentary lifestyle	30 (56.60%)	37 (69.81%)	0.159

Table 2: Comparison of Clinical Presentation and Associated Comorbidities Between Newly Diagnosed and Long-Standing Type 2 Diabetes Mellitus Patients (N=106)

Clinical Characteristics	Newly Diagnosed T2DM (n=53)	Long-Standing T2DM (n=53)	p-value
Polyuria	35 (66.04%)	23 (43.40%)	0.019
Polydipsia	33 (62.26%)	20 (37.74%)	0.012
Unexplained weight loss	18 (33.96%)	10 (18.87%)	0.078
Generalised fatigue	32 (60.38%)	37 (69.81%)	0.308
Blurred vision	18 (33.96%)	25 (47.17%)	0.166
Peripheral neuropathic symptoms	8 (15.09%)	27 (50.94%)	<0.001
Documented hypertension	18 (33.96%)	34 (64.15%)	0.002
Documented dyslipidaemia	21 (39.62%)	33 (62.26%)	0.020

Table 3: Comparison of Glycaemic Parameters and Lipid Profile Between Newly Diagnosed and Long-Standing Type 2 Diabetes Mellitus Patients (N=106)

Biochemical Parameters	Newly Diagnosed T2DM (n=53), Mean ± SD	Long-Standing T2DM (n=53), Mean ± SD	p-value
Fasting blood glucose (mg/dL)	183.50 ± 45.80	196.90 ± 49.60	0.151
Postprandial blood glucose (mg/dL)	270.40 ± 68.20	293.10 ± 74.50	0.105
HbA1c (%)	8.70 ± 1.50	9.50 ± 1.70	0.012
Total cholesterol (mg/dL)	192.40 ± 37.20	211.60 ± 41.30	0.013
Triglycerides (mg/dL)	167.80 ± 57.40	191.60 ± 62.10	0.043
HDL cholesterol (mg/dL)	44.80 ± 9.10	40.70 ± 8.90	0.021
LDL cholesterol (mg/dL)	116.70 ± 31.30	133.80 ± 34.60	0.009

Table 4: Comparison of Renal Function, Liver Function and Other Biochemical Parameters Between Newly Diagnosed and Long-Standing Type 2 Diabetes Mellitus Patients (N=106)

Biochemical Parameters	Newly Diagnosed T2DM (n=53), Mean ± SD	Long-Standing T2DM (n=53), Mean ± SD	p-value
Serum urea (mg/dL)	29.50 ± 8.80	38.60 ± 13.50	<0.001
Serum creatinine (mg/dL)	0.98 ± 0.18	1.23 ± 0.35	<0.001
eGFR (mL/min/1.73 m²)	91.20 ± 17.00	72.80 ± 21.10	<0.001
Serum uric acid (mg/dL)	5.10 ± 1.10	5.80 ± 1.30	0.003
Total bilirubin (mg/dL)	0.69 ± 0.18	0.75 ± 0.20	0.108
ALT (U/L)	29.40 ± 11.40	33.60 ± 13.00	0.080
AST (U/L)	26.90 ± 9.80	30.80 ± 11.40	0.062
Serum albumin (g/dL)	4.12 ± 0.38	3.94 ± 0.44	0.026

Table 5: Comparison of Microvascular and Macrovascular Complications Between Newly Diagnosed and Long-Standing Type 2 Diabetes Mellitus Patients (N=106)

Diabetes-Related Complications	Newly Diagnosed T2DM (n=53)	Long-Standing T2DM (n=53)	p-value
Microvascular complications			
Diabetic peripheral neuropathy	6 (11.32%)	23 (43.40%)	<0.001
Diabetic retinopathy	3 (5.66%)	17 (32.08%)	<0.001
Diabetic kidney disease	5 (9.43%)	20 (37.74%)	<0.001
Any microvascular complication	10 (18.87%)	34 (64.15%)	<0.001
Macrovascular complications			
Coronary artery disease	4 (7.55%)	15 (28.30%)	0.005
Cerebrovascular disease	1 (1.89%)	7 (13.21%)	0.060
Peripheral arterial disease	2 (3.77%)	9 (16.98%)	0.026
Any macrovascular complication	6 (11.32%)	23 (43.40%)	<0.001

Table 6: Comparison of Glycaemic Control Categories, Metabolic Abnormalities and Renal Risk Indicators Between Newly Diagnosed and Long-Standing Type 2 Diabetes Mellitus Patients (N=106)

Parameters	Newly Diagnosed T2DM (n=53)	Long-Standing T2DM (n=53)	p-value
HbA1c categories			0.011
HbA1c <7.0%	8 (15.09%)	4 (7.55%)	
HbA1c 7.0–8.9%	31 (58.49%)	20 (37.74%)	
HbA1c ≥9.0%	14 (26.42%)	29 (54.72%)	
Hypertriglyceridaemia (≥150 mg/dL)	31 (58.49%)	39 (73.58%)	0.101
Elevated LDL cholesterol (≥100 mg/dL)	34 (64.15%)	40 (75.47%)	0.204
Low HDL cholesterol	22 (41.51%)	33 (62.26%)	0.032
Elevated BP (≥140 systolic or ≥90 diastolic mmHg)	17 (32.08%)	30 (56.60%)	0.011
Reduced eGFR (<60 mL/min/1.73 m²)	3 (5.66%)	14 (26.42%)	0.004
Albuminuria (UACR ≥30 mg/g)	12 (22.64%)	30 (56.60%)	<0.001

DISCUSSION

The present study included 106 patients with type 2 diabetes mellitus, equally distributed between newly diagnosed and long-standing diabetes groups. The mean age was significantly higher among patients with long-standing diabetes (61.80 ± 8.80 years) compared with newly diagnosed patients (53.70 ± 9.20 years; p<0.001). Male predominance was observed in both groups, accounting for 58.49% and 56.60%, respectively. The mean BMI was 27.30 ± 3.80 kg/m² among newly diagnosed patients and 28.20 ± 4.00 kg/m² among long-standing patients, without a significant difference (p=0.238). These findings can be compared with the study conducted by Khunti et al. (2008), who evaluated 824 newly diagnosed T2DM patients in the DESMOND trial and reported a mean age of 59.5 ± 12.0 years, with 54.9% males. Their study demonstrated a considerably higher mean BMI among females than males (33.7 vs. 31.3 kg/m²; p<0.001), while 14.7% of participants reported smoking. The present study showed a somewhat younger newly diagnosed population and lower mean BMI, although male predominance was comparable. These observations highlight variations in the demographic and anthropometric characteristics of patients presenting with newly diagnosed diabetes across different populations.[7] Regarding clinical manifestations, the present study demonstrated that polyuria and polydipsia were significantly more frequent among newly diagnosed T2DM patients, affecting 66.04% and 62.26%, respectively, compared with 43.40% and 37.74% among patients with long-standing diabetes (p=0.019 and p=0.012). Unexplained weight loss was reported in 33.96% of newly diagnosed patients compared with 18.87% of long-standing patients. These findings are comparable with those reported by Shah et al. (2020), who conducted a cross-sectional study involving 100 newly diagnosed T2DM patients and observed polyuria and polydipsia in 52% of participants. They also reported weight loss in 28%, blurred vision in 21%, and burning feet in 27% of patients. The mean age of their study population was 40.7 ± 10.36 years, and 54% were males. Compared with their findings, the present study demonstrated higher frequencies of classical hyperglycaemic symptoms among newly diagnosed patients. The greater frequency of symptoms at diagnosis may reflect the presence of untreated or recently recognised hyperglycaemia, whereas treatment-related symptom reduction may influence the clinical presentation of patients with established diabetes.[8] The present study also demonstrated significantly greater cardiovascular risk factors among patients with long-standing T2DM. Hypertension was documented in 64.15% of long-standing patients compared with 33.96% of newly diagnosed patients (p=0.002), while dyslipidaemia was observed in 62.26% and 39.62%, respectively (p=0.020). Mean systolic blood pressure was significantly higher in the long-standing group (141.20 ± 16.80 vs. 132.10 ± 15.30 mmHg; p=0.004), accompanied by significantly increased waist circumference (99.30 ± 9.10 vs. 95.50 ± 8.70 cm; p=0.030). Singhal et al. (2025), in an Indian study involving 800 T2DM patients, including 400 early-onset and 400 late-onset patients, reported hypertension in 73.8% of late-onset patients compared with 55.8% of early-onset patients, based on their tabulated results. Median systolic blood pressure was also higher in the late-onset group (139.5 vs. 130 mmHg; p<0.001). Although their comparison was based on age at diabetes onset rather than disease duration, their findings similarly demonstrated a considerable burden of hypertension in an older diabetic population. These observations suggest that age, adiposity, disease duration, and associated metabolic abnormalities should be considered when assessing cardiovascular risk.[9]

Glycaemic control was comparatively poorer among long-standing T2DM patients in the present study, with a mean HbA1c of 9.50 ± 1.70% compared with 8.70 ± 1.50% among newly diagnosed patients (p=0.012). Fasting blood glucose and postprandial blood glucose were also higher in the long-standing group, although the differences were statistically insignificant. Furthermore, HbA1c ≥9.0% was observed in 54.72% of long-standing patients compared with 26.42% of newly diagnosed patients. Similar concerns regarding inadequate glycaemic control were highlighted by Das et al. (2023) in the LANDMARC study, which enrolled 6,234 Indian patients with T2DM, of whom 5,273 completed three years of follow-up. They reported that only 25.1% of participants had HbA1c below 7% at baseline,

increasing to 36.6% after three years. Additionally, uncontrolled glycaemia was present in 78.2% of participants with macrovascular complications and 70.3% with microvascular complications at follow-up, compared with 61.6% among those without complications. In the present study, HbA1c below 7% was observed in only 15.09% of newly diagnosed patients and 7.55% of long-standing patients. Although the study populations and follow-up designs differed, both sets of findings emphasise the substantial burden of inadequate glycaemic control among patients with T2DM.[10] Significant abnormalities in lipid parameters were observed among long-standing T2DM patients in the present study. Mean total cholesterol was 211.60 ± 41.30 mg/dL in long-standing patients compared with 192.40 ± 37.20 mg/dL in newly diagnosed patients (p=0.013). Similarly, triglycerides and LDL cholesterol were significantly higher in the long-standing group (191.60 ± 62.10 vs. 167.80 ± 57.40 mg/dL; p=0.043 and 133.80 ± 34.60 vs. 116.70 ± 31.30 mg/dL; p=0.009, respectively). Conversely, HDL cholesterol was significantly lower among long-standing patients (40.70 ± 8.90 vs. 44.80 ± 9.10 mg/dL; p=0.021). These findings are supported by Khan et al. (2007), who evaluated 1,011 patients with T2DM and demonstrated positive correlations between HbA1c and total cholesterol (r=0.127), triglycerides (r=0.153), and LDL cholesterol (r=0.142), along with a negative correlation with HDL cholesterol (r=-0.128). Their study further demonstrated significantly higher cholesterol and triglyceride levels among patients with poor glycaemic control. The present findings similarly suggest an association between adverse glycaemic status and dyslipidaemia, although causation cannot be established from the comparative design.[11]

Renal function parameters demonstrated significant differences between newly diagnosed and long-standing T2DM patients. Mean serum urea was significantly higher among long-standing patients (38.60 ± 13.50 vs. 29.50 ± 8.80 mg/dL; p<0.001), accompanied by increased serum creatinine (1.23 ± 0.35 vs. 0.98 ± 0.18 mg/dL; p<0.001). Mean eGFR was significantly lower in the long-standing group (72.80 ± 21.10 vs. 91.20 ± 17.00 mL/min/1.73 m²; p<0.001), suggesting a greater degree of renal impairment. Varghese et al. (2001), in a study involving 1,425 South Indian patients with T2DM, reported an overall microalbuminuria prevalence of 36.3% (95% CI: 33.8–38.9%). Their investigation demonstrated that the prevalence of microalbuminuria increased with diabetes duration, while age, diastolic blood pressure, glycated haemoglobin, fasting plasma glucose, and diabetes duration were associated with albuminuria in multivariable analysis. Although their principal outcome was albuminuria rather than eGFR, their findings support the importance of renal assessment in patients with longstanding diabetes. The present study additionally demonstrated lower serum albumin levels among long-standing patients (3.94 ± 0.44 vs. 4.12 ± 0.38 g/dL; p=0.026), highlighting differences in renal and other biochemical parameters between the two groups.[12] Microvascular complications were significantly more prevalent among patients with long-standing T2DM in the present study. Diabetic peripheral neuropathy was observed in 43.40% of long-standing patients compared with 11.32% of newly diagnosed patients (p<0.001). Similarly, diabetic retinopathy was present in 32.08% and 5.66%, respectively, while diabetic kidney disease affected 37.74% and 9.43%, respectively (p<0.001 for both). Overall, 64.15% of long-standing patients had at least one microvascular complication compared with 18.87% of newly diagnosed patients. These findings are comparable with those reported by Agrawal et al. (2014), who evaluated 11,157 patients with T2DM in Northwest India and documented retinopathy in 32.5%, nephropathy in 30.2%, and peripheral neuropathy in 26.8% of participants. Their study identified diabetes duration as significantly associated with neuropathy and nephropathy, while higher HbA1c was associated with increased risk of these complications and retinopathy. The prevalence of retinopathy among long-standing patients in the present study was particularly similar to their findings, whereas neuropathy and diabetic kidney disease were more frequent. These differences may reflect variations in age distribution, duration of diabetes, glycaemic control, and methods used to identify complications.[13] The present study also demonstrated a significantly higher frequency of macrovascular complications among patients with long-standing diabetes. Coronary artery disease was present in 28.30% of long-standing patients compared with 7.55% of newly diagnosed patients (p=0.005), whereas peripheral arterial disease was observed in 16.98% and 3.77%, respectively (p=0.026). Cerebrovascular disease was also more frequent in long-standing patients (13.21% vs. 1.89%), although the difference was not statistically significant (p=0.060). Overall, macrovascular complications affected 43.40% of long-standing patients compared with 11.32% of newly diagnosed patients (p<0.001). Gyldenkerne et al. (2023), in a nationwide Danish cohort involving 142,587 patients with newly diagnosed T2DM and 388,410 matched individuals from the general population, reported a 10-year cumulative cardiovascular disease risk of 12.0% among diabetic patients compared with 9.3% among controls. Among individuals aged 40–49 years, the corresponding risks were 6.1% and 3.3%, respectively. Although their investigation measured future cardiovascular events rather than existing disease prevalence, it demonstrates that cardiovascular risk is elevated even from the time of diabetes diagnosis. The findings of the present study further illustrate the greater observed burden of cardiovascular complications among patients with established diabetes.[14] The present study demonstrated significant differences in metabolic abnormalities and renal risk indicators according to

diabetes duration. Reduced eGFR below 60 mL/min/1.73 m² was observed in 26.42% of long-standing patients compared with 5.66% of newly diagnosed patients (p=0.004). Albuminuria, defined as urinary albumin-to-creatinine ratio ≥30 mg/g, was significantly more prevalent among long-standing patients (56.60% vs. 22.64%; p<0.001). Additionally, elevated blood pressure was observed in 56.60% of long-standing patients compared with 32.08% of newly diagnosed patients (p=0.011). Kanakamani et al. (2010), in a hospital-based study from North India involving 670 eligible T2DM patients, reported microalbuminuria in 25.5% and macroproteinuria in 16.2% of participants. Notably, microalbuminuria was detected in 24.7% of patients with diabetes duration below one year, while macroproteinuria was observed in 6.2% of the same subgroup. The prevalence of albuminuria among newly diagnosed patients in the present study was broadly comparable with their early-duration findings, although the definitions were not identical. The substantially higher prevalence among long-standing patients emphasises the need to consider renal involvement in all patients with diabetes, including those diagnosed recently, and to evaluate the potential contributions of poor glycaemic control, hypertension, and other associated risk factors.[15]

CONCLUSION

The present study demonstrated that patients with long-standing type 2 diabetes mellitus had poorer glycaemic control, greater dyslipidaemia, and more pronounced renal dysfunction compared with newly diagnosed patients. Microvascular and macrovascular complications, particularly peripheral neuropathy, retinopathy, diabetic kidney disease, and coronary artery disease, were more prevalent among patients with prolonged diabetes. Newly diagnosed patients exhibited a higher frequency of classical hyperglycaemic symptoms, whereas long-standing patients showed a greater burden of metabolic abnormalities and associated comorbidities. These findings emphasise the importance of early diagnosis, regular biochemical monitoring, effective glycaemic control, and comprehensive screening for diabetes-related complications to improve long-term clinical outcomes.

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