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Research

Current Practices in Dyslipidemia Management Among Diabetologists in India: A Cross-Sectional Survey

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Abstract

Dyslipidemia remains a major contributor to cardiovascular risk among individuals with diabetes, yet real-world insights into its management are limited. This cross-sectional, questionnaire-based survey was conducted among 337 diabetologists across India between August and October 2024 to evaluate clinical practices in dyslipidemia management. The validated 20-item questionnaire explored four key domains: patient profile, diagnostic parameters, treatment preferences, and monitoring practices. Findings revealed a high prevalence of dyslipidemia and suboptimal achievement of lipid targets. Statins remained the cornerstone of therapy; however, variability was observed in risk stratification approaches, treatment goals, and monitoring frequency. Despite awareness of guideline recommendations, delayed intervention and treatment gaps persisted. The survey highlights the need for more consistent adherence to evidence-based guidelines and supports targeted educational interventions to optimize lipid management and reduce cardiovascular risk in the diabetic population in India.

Keywords: Dyslipidemia, Diabetes Mellitus, Lipid Management, Statin Therapy, Real-World Survey.

INTRODUCTION

Dyslipidemia is a well-established contributor to cardiovascular disease (CVD), particularly among individuals with both type 1 and type 2 diabetes mellitus (T1DM and T2DM). In Indian populations, this burden is especially pronounced due to a characteristic dyslipidemic pattern marked by elevated low-density lipoprotein cholesterol (LDL-C) and reduced high-density lipoprotein cholesterol (HDL-C), consistent with global observations. Poor glycemic control in diabetes further exacerbates these lipid abnormalities by significantly lowering HDL-C and raising triglyceride levels. [1]

The burden of T2DM is rising at an alarming rate, particularly in South Asian countries such as India. According to the International Diabetes Federation, approximately 74.2 million individuals in India currently live

with T2DM, a number projected to reach 124.9 million by 2045. [2] Long before overt hyperglycemia appears, many individuals with prediabetes or early-stage diabetes present with a cluster of metabolic abnormalities including insulin resistance, obesity, hypertension, and dyslipidemia collectively described as metabolic syndrome. [3]

Given that individuals with T2DM are considered to be at extreme risk for developing atherosclerotic cardiovascular disease (ASCVD), comprehensive metabolic risk assessment, including lipid profiling, becomes essential. Lipid investigations such as HDL-C, LDL-C, triglycerides, and emerging markers like Apo-B are critical for early identification of risk. Recent evidence shows that low HDL-C is not only a marker of cardiovascular risk but may also independently predict the onset of T2DM. [4] Moreover, various mechanisms including impaired glucose regulation, obesity, and chronic inflammation contribute to the complex dyslipidemic profile observed in diabetic individuals. [5]

Despite the availability of effective lipid-lowering therapies (LLTs), achieving lipid targets remains a clinical challenge. Statins are the cornerstone of pharmacologic therapy for both primary and secondary CVD prevention. However, many patients either fail to achieve LDL-C targets or are statin-intolerant, necessitating adjunctive use of ezetimibe, PCSK9 inhibitors, bempedoic acid, or inclisiran. [6] Real-world data from India regarding the consistent prescription of LLT, patient adherence, and clinician preferences for non-statin agents remain sparse.

An equally important yet often overlooked aspect is monitoring patients during statin therapy. Regular lipid profile assessment is critical not only for evaluating treatment efficacy but also for minimizing adverse effects. Understanding patterns of lipid monitoring frequency, the preferred lipid markers used (e.g., LDL-C vs non-HDL-C or Apo-B), and cardiovascular risk stratification practices are crucial to improving long-term outcomes in diabetic patients.

In light of these challenges, a cross-sectional, questionnaire-based survey was conducted among Indian diabetologists. This study aimed to evaluate real-world practices related to the prevalence, phenotypes, risk factors, diagnostic approaches, treatment strategies, and monitoring patterns in the management of dyslipidemia among patients with diabetes mellitus.

METHODS

This was a cross-sectional, questionnaire-based, real-world survey conducted among 337 diabetologists across India between August and October 2024 using a validated 20-question tool. The primary objective was to identify the actual prevalence of dyslipidemia in the diabetic population and associated risk factors in routine clinical practice. It also aimed to understand diabetologists' treatment preferences and goals for dyslipidemia in diabetic patients. The questionnaire explored prevalence, phenotypic characteristics, clinical practices, diagnostic measures, risk assessment, treatment targets, risk stratification, and statin prescribing practices, including intolerance and preferences. To structure the discussion of our findings, we have categorized key aspects of dyslipidemia management into four domains-patient profile, diagnostic parameters, treatment preferences and patient monitoring (Figure 1). Participants from both academic and clinical settings responded anonymously to ensure unbiased reporting. Responses were collected and analyzed using Microsoft Excel 365 (Version 22502, March 11). Frequencies were used for analysis, as some items allowed multiple responses. Excel-generated graphs and charts were used to present the data. Key elements influencing therapeutic decisions, formulation preferences, and clinical practice trends were interpreted using these graphic summaries.

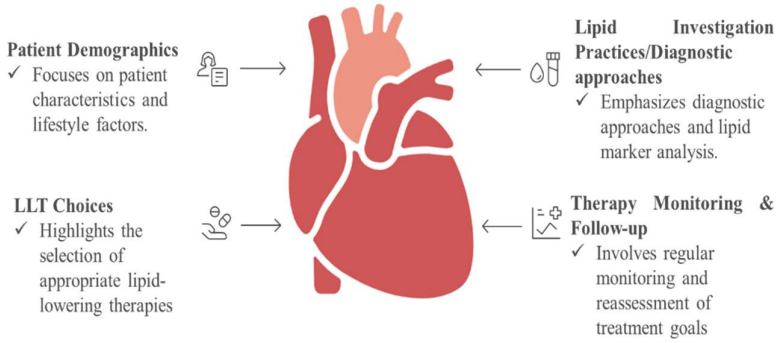

Fig 1: Domains of dyslipidemia management evaluated in the current survey among diabetologists in India.

RESULTS

The survey questions are summarised in Table 1.

Table 1: Survey Questionnaire

Q No	Questions
1	In your clinical practice, what percentage of diabetes patient also have dyslipidemia?
	a) 1-25% b)26-50% c) 51-75% d)>75%
2	Based on your clinical experience, which of the following phenotypes is frequently described among Indian diabetic patients with dyslipidemia?
	a) Glycemic impairment b) Elevated body fat mass c) More visceral fat d) Lower insulin sensitivity e) All of the above
3	How frequently do you inquire about patients' use of oil and diet when they come in for a consultation at your clinic?
	a) Frequently asked to almost all patients b) Asked to certain patients those have high cardiovascular risk c) Few patients depend upon obesity d) Not asked routinely
4	In your clinical practice, which of the following is a common characteristic of diabetic dyslipidemia?
	a) High LDL-C & High TG b) High LDL-C & Low HDL-C c) High TG & Low HDL-C d) All of the above
5	Which of the following is risk commonly reported among diabetes patients with dyslipidaemia?
	a) Family history of dyslipidaemia or diabetes b) Increasing age c) High fat and carbohydrate diet d) Smoking e) Sedentary Lifestyle
6	Which of the following lipid measures should be used in routine laboratory examinations given the diabetic population in India?
	a) Only LDL-C b) Both LDL-C and Non-HDL-C c) LDL-C, Non-HDL-C and Apo-B d) Only Non-HDL-C is enough e) Non-HDL-C and Apo-B
7	In your clinical practice, do you think Apo-B testing is important among diabetes patients with dyslipidemia to estimate future cardiovascular events?
	a) Yes b) No c) Among patients with family history only d) Not sure
8	What additional tests do you perform to evaluate cardiovascular risk in diabetes patients with high LDL?
	a) Coronary artery calcium scoring b) Carotid intima-media thickness c) High-sensitivity C-reactive protein (hs-CRP) d) All of the above
9	How does obesity influence dyslipidemia in diabetes patients?
	a) Increases HDL cholesterol b) Decreases triglyceride levels c) Enhances LDL cholesterol clearance d) Increases VLDL production and decreases HDL
10	In your clinical practice, for primary prevention, which of the following LDL-C targets would you choose in individuals with diabetes and abnormal lipid profiles?
	a) LDL-C <150 mg/dl b) LDL-C <100 mg/dl c) LDL-C <70 mg/dl d) LDL-C <50 mg/dl
11	In your clinical practice, for diabetic dyslipidaemia & with established ASCVD, which of the following LDL-C targets would you choose?
	a) LDL-C Goal <100 mg/dl b) LDL-C Goal <70 mg/dl c) LDL-C Goal <50 mg/dl d) LDL-C Goal <30 mg/dl
12	Which of the following cardiovascular risk estimation tools do you consider in patients with diabetes and dyslipidemia?
	a) Framingham Risk Score b) Atherosclerotic Cardiovascular Disease (ASCVD) risk calculator c) QRISK3 Score d) Stratify patients in different risk categories based on clinical assessment e) Any other risk score, please specify
13	Will you keep taking statins in diabetic patients (among high CV risk) who do not have dyslipidemia?
	a) Yes b) No c) Only with established ASCVD risk d) Not sure
14	Which of the following age group you generally initiate statin in Individuals with diabetes, irrespective to total/LDL cholesterol?
	a) 21-30 years b) 31-40 years c) 41-50 years d) 51-60 years e) Above 60 years

15	How frequently do you check lipid profile once the diabetes patient initiated by lipid lowering medication?
	a) Every month if uncontrolled; if under control then every 6 months b) Every 3 months; if uncontrolled; if under control then every 6 months c) Check at every 6 months, irrespective of lipid level d) Every 12 months
16	Among patients with pre-diabetes and dyslipidemia, do you think it increases the chances of diabetes?
	a) In certain patient population those have high risk of Insulin resistance b) No c) Yes
17	In patient with diabetes and dyslipidemia, do you have any preference of statin which have minimal effect on onset of diabetes?
	a) Rosuvastatin b) Atorvastatin c) Pitavastatin d) Simvastatin e) No f) Not sure
18	Which of the following is most preferred explanation for onset of diabetes among patients on statin therapy?
	a) Any of the following can lead to onset of diabetes. b) Impair insulin secretion by changes in the calcium channel system in pancreatic beta-cells c) Reduce the translocation of glucose transporter type 4 (GLUT-4) in target cells d) Decrease the downstream products of cholesterol
19	In your clinical practice, what is the percentage of patients do you consider as statin intolerant?
	a) <10% b) 11-20% c) 21-30% d) 31-40% e) >40%
20	What do you prefer, if patient not able to tolerate high intensity statins?
	a) Shift to non-statin drugs b) Add ezetimibe c) Give statin on alternate day d) Shift to lower dose

Among the 337 diabetologists surveyed, representing both academic and clinical settings a clear pattern emerged in how patients with diabetes and dyslipidemia are categorized in real-world practice. Reflecting the growing cardiovascular burden, a majority of respondents (54.3%) reported that between 26-50% of their diabetes patients also present with dyslipidemia. Notably, a significant proportion (32.8%) encountered this condition in 51-75% of their diabetic population, with 6.0% reporting prevalence rates exceeding 75%. (Figure 2).

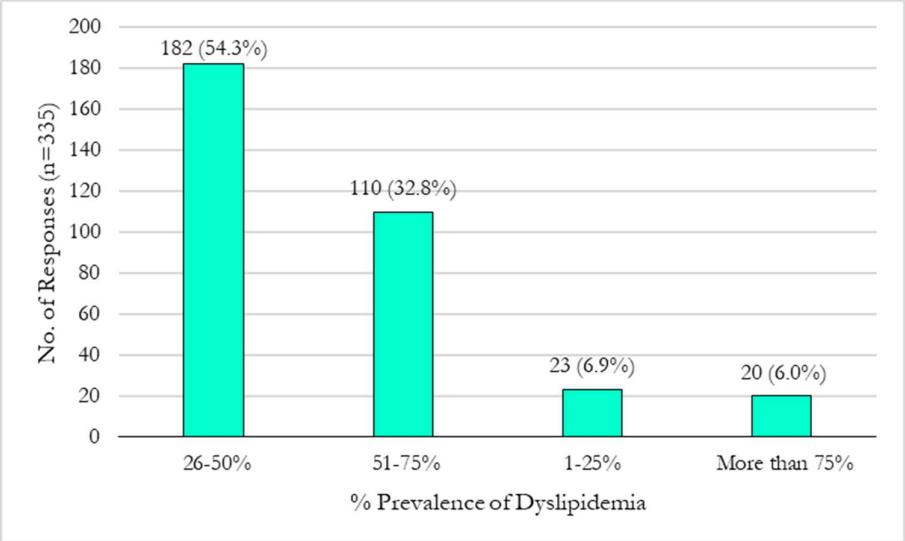

Fig 2: Prevalence of Dyslipidemia Among Diabetes Patients

Exploring deeper into patient phenotypes, respondents most commonly identified elevated body fat mass (26.4%) as a defining feature among Indian diabetic patients with dyslipidemia. This was closely followed by glycemic impairment and reduced insulin sensitivity, each observed by 24.8% of respondents. (Figure 3).

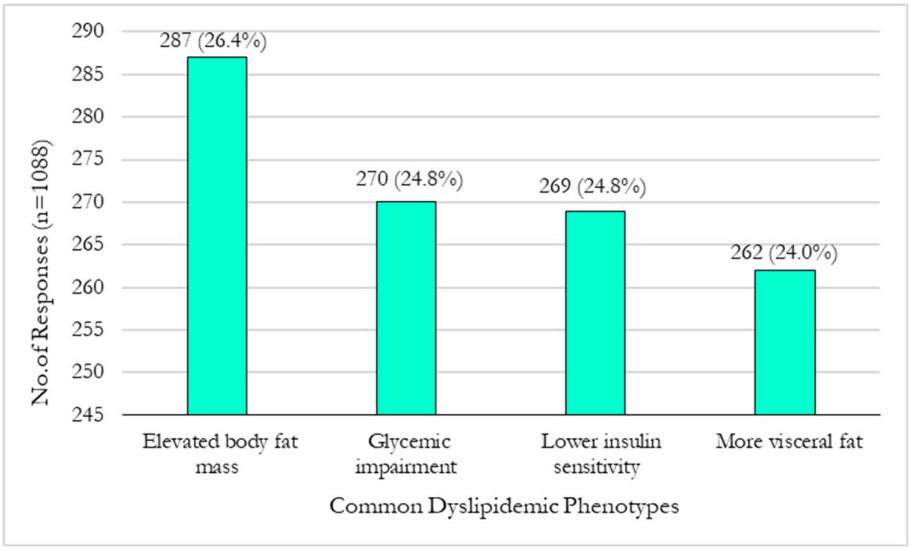

Fig 3: Phenotypes of Dyslipidemia in Indian Diabetic Patients

In routine consultations, over half of the diabetologists (50.6%) consistently assessed dietary fat and oil intake in all patients, while 30.0% restricted this to high cardiovascular risk patients, and 15.8% based it on obesity. Only 3.6% reported not routinely assessing dietary intake While identifying key risk factors, clinicians most often cited a family history of dyslipidemia or diabetes (25.4%), followed by high-fat, high-carb diets (21.9%), sedentary lifestyle (20.4%), smoking (17.6%), and advancing age (14.6%) (Table 2).

Table 2: Common Risks of Dyslipidemia in Diabetes Patients

Risk Factors	Study Observations	Indian Perspective
Family history of dyslipidemia or diabetes	272 (25.4%)	• According to Iyengar SS, most of the patients previously had a family history of diabetes mellitus followed by hypertension and dyslipidemia. [7]
High fat and carbohydrate diet	235 (21.9%)	
Sedentary Lifestyle	219 (20.4%)	
Smoking	189 (17.6%)	• South Asians are genetically predisposed to dyslipidemia, further exacerbated by higher leptin and fatty acid levels, lower adiponectin, and lifestyle changes linked to urbanization such as unhealthy diets and reduced physical activity. This interplay likely contributes to their distinct and elevated dyslipidemia burden. [8]
Increasing age	157 (14.6%)	

When evaluating how obesity influences lipid abnormalities in diabetes, 40.1% of clinicians reported increased VLDL and decreased HDL production, followed by enhanced LDL clearance (30.4%), reduced triglycerides (14.9%), or elevated HDL (14.6%). To estimate overall cardiovascular risk, most clinicians relied on the ASCVD risk calculator (68.0%) or clinical assessment (17.6%). A smaller portion used the Framingham Risk Score (7.8%) or QRISK3 (6.6%)

Notably, 77.3% of diabetologists acknowledged that pre-diabetes and dyslipidemia substantially raise diabetes risk, reinforcing the role of both metabolic markers and predictive tools in identifying high-risk subgroups. In contrast, 19.7% highlighted this association mainly in high-risk insulin-resistant populations, and 3.0% denied an association.

The most commonly observed dyslipidemic pattern among diabetologists was a combination of high LDL-C and high triglycerides (40.6%), followed by high LDL-C with low HDL-C (32.9%) and high triglycerides with low HDL-C (26.4%). To monitor these patterns, most clinicians routinely measured both LDL-C and non-HDL-C (54.6%), followed by a combination of LDL-C, non-HDL-C, and Apo-B (32.8%). Fewer Diabetologists relied solely on LDL-C (9.9%), non-HDL-C (1.5%), or non-HDL-C and Apo-B (1.2%) (Figure 4).

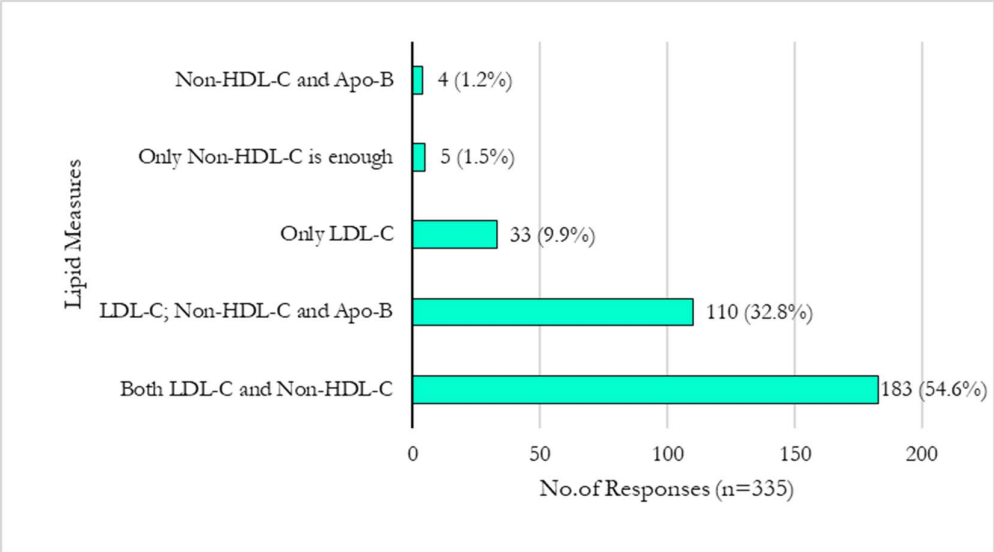

Fig 1: Lipid Measures for Laboratory Examinations in Diabetic Population

For CV risk assessment, Apo-B testing was considered essential by 43.9% of respondents for all dyslipidemic patients, and by 43.6% for those with a family history with 9.5% being uncertain and 3.0% not favoring its use. Additional tools like hs-CRP (40.9%), CAC scoring (30.2%), and CIMT (28.9%) were also used.

Extending this approach into ongoing care, lipid profile monitoring was typically performed every 3 months when levels were uncontrolled and every 6 months once controlled (59.4%). Some clinicians preferred biannual checks (18.8%) or more frequent monthly testing during uncontrolled phases (18.5%) and annual monitoring (3.3%).

Building on risk assessment using lab markers and prediction tools, diabetologists also showed clear preferences for LDL-C targets and when to start treatment. For diabetic patients with hyperlipidemia, LDL-C targets were most commonly set at <100 mg/dL (40.3%) or <70 mg/dL (36.1%), with more aggressive targets (<50 mg/dL) preferred by 15.5%. In patients with established ASCVD, these targets shifted lower, with 45.1% aiming for <70 mg/dL and 37.6% for <50 mg/dL. A small minority preferred even stricter thresholds (<30 mg/dL, 3.9%) or moderate ones (<100 mg/dL, 13.4%)

Treatment choices aligned with this risk-based approach where 61.2% of clinicians reported prescribing statins for high-risk diabetic patients even in the absence of dyslipidemia, while 32.2% restricted use to those with diagnosed ASCVD, 5.1% were uncertain, and 1.5% did not prescribe statins in these cases. Statin initiation was most common in the 41–50 age group (50.7%), followed by ages 31–40 (32.2%), 51–60 (11.0%), 21–30 (4.2%), and above 60 years (1.8%), reflecting early intervention strategies tailored to long-term cardiovascular risk.

Following clear preferences for LDL-C targets and early statin initiation, diabetologists also emphasized close monitoring of statin therapy. Rosuvastatin emerged as the preferred choice for 91.6% of respondents, followed by Atorvastatin (5.4%), Pitavastatin and Simvastatin (1.2% each), with 0.3% remaining uncertain (Table 3).

Table 3: Statin Preferences for Minimum Effects on Diabetes

Statin Preferences	Observations	Indian Perspective
Rosuvastatin	91.6%	• According to Kalra S, Rosuvastatin medication was chosen above other statins because of its superior pleiotropic effects and ability to decrease LDL-C. [9]
Atorvastatin	5.4%	
Pitavastatin	1.2%	
Simvastatin	1.2%	• A meta-analysis stated that when compared to a placebo, some statins, such as atorvastatin, simvastatin, pravastatin, and rosuvastatin, were found to lower the risk of cardiovascular disease by 8–44%. [10]
No	0.3%	
Not Sure	0.3%	

Multiple mechanisms were cited for the diabetogenic effects of statins. While 44.2% believed multiple factors contribute, 29.0% emphasized impaired insulin secretion, 16.4% noted reduced GLUT-4 translocation, and 10.4% pointed to decreased cholesterol intermediates.

Statin intolerance was reported in <10% of patients by 46.6% of diabetologists. Others estimated 11–20% (28.9%), 21–30% (14.3%), 31–40% (7.2%), and >40% (3.0%) of their patients were intolerant. In managing intolerance, 46.8% of diabetologists preferred reducing the statin dose, 33.7% opted to add ezetimibe, 14.3% shifted to non-statin alternatives, and 5.1% used alternate-day statin regimens

DISCUSSIONS

The escalating burden of dyslipidemia among patients with diabetes mellitus (DM) reflects the deepening intersection of metabolic and cardiovascular risks in India. Since 1990, the incidence of diabetes in India has been gradually rising; however, following 2000, the rate picked up speed, and between 2009 and 2019, the prevalence increased from 7.1% to 8.9%. A projected 70 million persons with prediabetes may also have dyslipidemia, and almost above 90% of India's 74 million adult diabetic patients are projected to have atherogenic dyslipidemia. [11]

In our nationwide survey of 337 diabetologists from both academic and clinical settings, a striking observation emerged where results highlighted a significant burden of disease with 26–50%, which was in line with the similar epidemiological study conducted by Puri which highlighted the prevalence of 27% in the studied population. [11]

Among phenotypic markers, increased body fat mass, glycemic impairment, and insulin resistance were commonly noted as defining characteristics, aligning with the typical pattern of diabetic dyslipidemia of elevated triglycerides (TG), low HDL-C. [12]

A study by Izumi have demonstrated longitudinal associations between family history of T2DM and its prevalence among family members. Moreover, Bekele have reported there is a link between risk factors such as gender, age, length of diabetes, greater body mass index, and high blood pressure and high incidence of dyslipidemia among diabetic patients. [13,14] In line with the current literature our survey identified family history of diabetes or dyslipidemia as the most frequently cited risk factor, followed by high-fat/high-carbohydrate diets and sedentary lifestyle. These findings highlight the connection between genetic predisposition and lifestyle in the development of dyslipidemia among diabetic patients.

Risk stratification practices revealed wide use of clinical tools, with the ASCVD risk calculator being the most frequently used, in alignment with ACC/AHA recommendations to guide preventive therapy in diabetic patients. Furthermore, a strong majority (77.3%) of diabetologists acknowledged the increased diabetes risk posed by dyslipidemia in prediabetic populations. [15] Additionally, over 43.9% of clinicians supported Apo-B measurement in all dyslipidemic patients, acknowledging its role in identifying residual cardiovascular risk beyond LDL-C levels, a perspective supported by growing indication that Apo-B, predominantly in insulin-resistant situations, is a better predictor of atherosclerosis than LDL-C alone. [16] Interestingly, newer markers such as hs-CRP, CAC scoring, and CIMT were also used to complement traditional lipid measurements.

A thorough approach to assessing CV risk is indicated by the fact that most diabetologists reported routinely employing both LDL-C and non-HDL-C as indicators for lipid monitoring. Additionally, they prefer lipid profile monitoring every 3 months if uncontrolled and every 6 months if controlled after starting lipid-lowering therapy which indicates a preference for condition-based monitoring, which is in line with the recommendations by American College of Cardiology/American Heart Association Task Force on Clinical Practice Guidelines, suggesting monitoring to be done by 4 to 12 weeks after starting a statin or adjusting the dosage, and then every 3 to 12 months following that, depending on the need to evaluate safety or adherence. [15] Regular lipid monitoring gives physicians the chance to objectively examine adherence to lipid-lowering medicine, determine whether goal LDL-C levels have been reached, and measure each patient's response to the treatment. [17]

An LDL-C target of 1.8 mmol/L (<70 mg/dL) and an LDL-C decrease of at least 50% are advised for T2DM patients at high CV risk. [18] The results of our study support this advice, since most diabetologists recommend an LDL-C target of less than 70 mg/dl for patients with diabetic dyslipidemia who have been diagnosed with ASCVD. Despite improvements in diagnostics and risk stratification, our findings highlight significant unmet needs in lipid-lowering therapy (LLT). While statin use was high, especially for primary prevention in high-risk diabetics, many patients are still started on therapy relatively late often in the 41–50 age range despite data indicating that earlier intervention (in the 30s or even younger) may yield better long-term cardiovascular outcomes. [19] Furthermore, although LDL-C targets of <100 mg/dL and <70 mg/dL were commonly used, only a minority aimed for <50 mg/dL, even in secondary prevention settings, despite guideline support for aggressive targets in patients with established ASCVD. [20]

Our survey suggested Rosuvastatin as the most commonly selected treatment. Numerous studies provide strong evidence that the benefits of statin medication in preventing CVD, which balances any potential risks associated with an elevated risk of T2DM. Therefore, diabetes risk does not justify stopping statin therapy. [21] However, statin intolerance remains a challenge, with around 46.6% of clinicians reporting it in 10% or more of their patients. Dose reduction and combination therapy with ezetimibe were the preferred management strategies

approaches that are in line with current recommendations for managing statin-associated side effects without compromising efficacy. [22]

Our survey emphasized multiple contributing factors, including impaired insulin secretion, reduced GLUT-4 translocation and decreased downstream cholesterol products as potential mechanisms of statin-induced diabetes, which is consistent with the historical publications. In patients at risk for ASCVD, stopping statins is linked to a higher risk of significant adverse cardiovascular events and death. It can be challenging to persuade patients who experience negative side effects from statin use particularly muscle symptoms to continue taking them, even if they are well tolerated in clinical practice. Useful strategies include reintroducing the statin at a lower dose, alternating between statins, or intermittent dosing, rather than discontinuing treatment after one failed attempt at a maximum dose. [23]

Taken together, these results indicate strong awareness among Indian diabetologists of the need to individualize lipid-lowering strategies while balancing efficacy with safety and tolerability.

CONCLUSION

Our current survey provides valuable real-world clinical insights into the medical management of diabetic dyslipidemia in India, emphasizing its high prevalence, phenotypic patterns, and associated risk factors. Consistent with national and global data, our findings reaffirm the substantial burden of atherogenic dyslipidemia among Indian adults with T2DM, characterized primarily by elevated LDL-C and triglyceride levels, which are closely linked to central adiposity, insulin resistance, and poor glycemic control - hallmarks of the diabetic phenotype.

Additionally, our data emphasises the multifactorial etiology of dyslipidemia, highlighting a strong association with family history, unhealthy dietary practices, sedentary lifestyle, and other metabolic comorbidities such as hypertension and obesity. Most participating diabetologists reported following a patient-centric approach, tailoring dietary assessments and treatment plans based on individual risk profiles. Lipid monitoring practices appear largely aligned with international guidelines, with LDL-C and non-HDL-C frequently used as key markers. Rosuvastatin emerged as the preferred statin due to its favorable glycemic profile, although concerns regarding statin-associated glycemic effects remain.

Overall, these findings highlight the urgent need for integrated, individualized dyslipidemia management strategies in T2DM patients, informed by both genetic predispositions and modifiable lifestyle factors. They also support the continuous education of clinicians on statin safety, adherence strategies, and risk-benefit considerations, thereby improving long-term outcomes in this high-risk population.

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Declarations
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Conflict of interest: Dr. Kunal Khobragade and Dr. Pratibha Karande are the employees of Mankind Pharma Ltd.
Ethical approval: Ethical approval was not sought for this survey as it was conducted among qualified healthcare professionals, involved no patient data or intervention.

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