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Prevalence of Dyslipidaemia in Newly Diagnosed Patients of Type-2 Diabetes Mellitus At Government General Hospital, Vijayawada

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ABSTRACT
BACKGROUND: According to Indian studies, the prevalence of diabetes has increased by three times in both urban and rural areas, and in the near future, India may overtake the United States as the world's leading diabetic nation. Because to alterations in lipid profiles, type 2 DM patients are more likely to develop vascular problems. Increased serum levels of total cholesterol (TC), triglycerides (TGs), or both, or decreased levels of high-density lipoprotein cholesterol(HDL-C) are signs of diabetic dyslipidaemia, which is more atherogenic.Dyslipidaemia is a modifiable risk factor for cardiovascular disorders.
MATERIALS AND METHODS: The goal of the current investigation was to ascertain the prevalence of dyslipidaemia in newly diagnosed type-2 diabetes mellitus patients. In the study, 100 people with newly diagnosed type 2 diabetes patients were enrolled as cases, while 100 non-diabetes were included as controls. Both the study and control groups' participants provided blood samples, which were then tested for fasting and post-meal plasma glucose, HbA1c, TC, TG, LDL-C, and HDL-C.
RESULTS: Only 52% of controls were found to have dyslipidaemia, compared to 84% of cases, and this difference between the two groups was statistically significant ($p<0.05$).When compared to the controls, the cases had higher mean values for fasting and postprandial plasma glucose, HbA1c, TC, TG, and LDL-C ($p<0.05$). Glycemic parameters and serum total cholesterol, triglycerides, and LDL cholesterol were found to be positively correlated ($p<0.05$). This study showed that newly diagnosed T2DM patients frequently have dyslipidaemia.Although dyslipidaemiais an established risk factor for cardiovascular illnesses, our study emphasises the necessity and significance of taking action to reduce it in diabetes individuals.

Keywords: *Type 2 diabetes mellitus, HbA1c (Glycosylated haemoglobin), Fasting blood glucose, Dyslipidaemia, Triglycerides, Highdensity lipoprotein-cholesterol.*

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I. INTRODUCTION

Hyperglycemia caused by insulin resistance or insulin insufficiency characterises diabetes mellitus, a metabolic disorder.[1] Persistent hyperglycemia is brought on by insulin insufficiency as well as problems with the metabolism of fat, protein, and carbohydrates.[2] Compared to T1DM,T2DM frequency is higher which accounts for more than 90% of all diabetic patients,.[3] The prevalence and occurrences of T2DM are rising quickly in both high- and low-income countries.[4] An estimated 425 million persons (20-79 years of age) were predicted to have DM in 2017, and it is anticipated that number will rise to 629 million by the year 2045, according to the International Diabetes Federation (IDF) Atlas guideline study. According to IDF Atlas, India had 72.9 million cases of diabetes in 2017 and is projected to have 134.3 million cases by 2045.[5]

The National Urban Survey indicated that the prevalence rate of diabetes ranged from 6.1% to 16.6% in various states of India.[6] One of the chronic non-communicable diseases (CNCDs) that has become a major worldwide health issue is this one. Of the 56.4 million fatalities worldwide in 2015, 39.5 million were caused by non-communicable diseases.[7] One of the biggest problems with diabetes mellitus is that between 30 and 80 percent of diabetics go misdiagnosed.[8]Due to the increased likelihood of avoiding dangerous and expensive consequences, there is an urgent need for early screening, diagnosis, and care of diabetics worldwide. The countries with the greatest rates of both those with diabetes and those without a diagnosis are China, India, and the United States.[5]One of the key factors contributing to the mortality from Coronary Artery Disease (CAD) in

India is dyslipidaemia in diabetic people.[9] Low Density Lipoprotein Cholesterol (LDL-C), Very Low Density Lipoprotein Cholesterol (VLDL-C), and Triglyceride (TG) concentrations are elevated in the serum of diabetic individuals with dyslipidaemia, whereas the concentration of High Density Lipoprotein Cholesterol (HDL-C) is decreased.[10,11] Diabetes-related dyslipidaemia has a greater atherogenic effect.[12]Patients with T2DM frequently experience impaired lipid metabolism as a result of insulin resistance.[13] According to a recent study, in India, 25–30% of urban and 15–25% of rural respondents had elevated cholesterol.[14]So, the purpose of this study was to determine the prevalence of dyslipidaemia in newly diagnosed Type 2 diabetes mellitus cases.

II. MATERIALS AND METHODS

This cross-sectional study comprised 200 people in total, who were split into two groups: 100 newly diagnosed T2DM patients in the study group and 100 non-diabetics in the control group. From August 2022 to December2022, the study was carried out at the Department of Medicine, Government General Hospital, Vijayawada.

Study Design: Cross-Sectional study.
Study Location: Government General Hospital, Vijayawada, Andhra Pradesh.
Study Duration: August 2022 to December2022.
Sample Size: 100 newly diagnosed type 2 diabetic patients and 100 non-diabetic in control group.

Inclusion Criteria

Individuals who attended/were hospitalised at the medical OPD/IPD with symptoms and signs of diabetes mellitus for the first time and met the ADA criteria for diagnosis of type 2 DM—HbA1c > 6.5%, or FBS > 126 mg/dl, or PPBS > 200 mg/dl[15], aged>20 were included as cases. As controls, non-diabetic subjects older than 20 years old were chosen at random.

Every one of the 200 participants (cases and controls) underwent testing for their fasting and postprandial blood sugar levels, HbA1c levels, fasting lipid profiles, glycosuria, as well as renal and liver function tests for the patients. The subjects' lipid profiles were calculated in accordance with NCEP-ATP III recommendations (cases and controls).[16]

Exclusion Criteria

Patients with known inherited disorders of lipids, patients with secondary dyslipidaemia brought on by pregnancy or medications (beta-blockers, thiazides, etc.), patients with acute metabolic complications (diabetic ketoacidosis, hyperglycemic hyperosmolar syndrome), patients with acute illnesses/infections, patients with h/o acute myocardial infarction, cerebrovascular accidents, thyroid disorders, liver disorders, and renal disease, and patients with known.

Data Analysis

For data analysis, NCSS software version 12 was used. The mean and standard deviation are displayed as the outcomes of the parametric quantitative data. The quantitative variables between the two groups were compared using an independent T-test, while the qualitative data were compared using a chi-square test. Quantitative variables were correlated using Pearson's correlation test. p-values<0.05 are regarded as significant.

III. Results

According to Table 1, 84% of cases and only 52% of controls had dyslipidaemia, and this difference was statistically significant (P<0.05).

Table1:Dyslipidaemia prevalence in study groups

	Cases (n=100)	**Controls (n=100)**	**P-value**
Dyslipidaemia	84	52	<0.001
Normal Lipid Profile	16	48	

In the study group, 71% of the patients were in the 41–60 age range. The individuals in the study and control groups had median ages of 49.8±9.1 and 49.6±9.0, respectively. In the two groups, there was no statistically significant difference in mean age (p> 0.05). (Table 2). The comparison of the mean values of HbA1c, FBS, PPBS, S. total cholesterol, S. triglycerides, LDL-C, and HDL-C in the case and control groups revealed a statistically significant difference (p<0.05) where compared in table2.

Table2: Comparison of various parameters between cases and control groups.

Parameters(mean±SD)	Cases (n=100)	Controls (n=100)	P-Value
Age (yrs)	49.8±9.1	49.6±9.0	0.78
HbA1C (%)	8.82±1.8	5.81±0.4	0.0001
FBS (mg/dl)	153.03±33.4	107.44±7.1	0.0000
PPBS (mg/dl)	261.37±60.4	167.8±10.4	0.0000
Serum Total Cholesterol (mg/dl)	232.13±45.9	205.84±30.7	0.0004
Serum Triglyceride (mg/dl)	198.32±59.8	161.12±30.6	0.0001
Serum LDL-C (mg/dl)	156.86±39.3	134.74±35.3	0.0001
Serum HDL-C (mg/dl)	37.04±7.9	42.06±7.3	0.001

FBS= Fasting blood glucose, PPBS=Post prandial blood glucose, LDL-C=Low density lipoprotein-cholesterol, HDL-C=High density lipoprotein-cholesterol

Table 3 lists the frequency of elevated blood sugar parameters in the case and control groups (HbA1c>6.5, FBS>126mg/dl, PPBS>200mg/dl), as well as dyslipidaemia (S. Cholesterol-total, S. Triglycerides, LDL-C, HDL-C). When the two groups were compared, a statistically significant ($p<0.05$) difference was discovered. The most frequent dyslipidaemia was elevated serum TG (77% of cases), which was followed by reduced HDL-C levels (71% of cases).

Table3: Frequency of parameters of raised blood sugar and dyslipidaemia in cases and controls

Parameters	Cases (n=100)	Controls (n=100)	P-Value
HbA1C (>6.5%)	100	0	0.0000
FBS (>126mg/dl)	84	0	0.0000
PPBS(>200mg/dl)	99	1	0.0000
Serum Total Cholesterol (>200mg/dl)	66	44	0.002
Serum Triglycerides (>150mg/dl)	77	39	0.001
Serum LDL-C (>130mg/dl)	66	43	0.0002
Serum HDL-C (<40mg/dl)	71	59	0.001

HbA1c =Glycosylated haemoglobin, FBS= Fasting blood glucose, PPBS=Post prandial blood glucose, LDL-C=Low density lipoprotein-cholesterol, HDL-C=High density lipoprotein-cholesterol

Between lipid profile measures (serum triglyceride, serum total cholesterol, and serum LDL cholesterol) and glycemic parameters (HbA1c, FBS, and PPBS), there was a highly significant positive connection ($p<0.05$). However, as indicated in Table 4, there was no significant connection with serum HDL-Cholesterol ($p>0.05$).

Table4: Correlation of lipid profile with diabetic parameters

Lipid profile parameters	HbA1C		FBS		PPBS	
	r	P	r	p	r	P
Serum Total Cholesterol	0.640	<0.001	0.616	<0.001	0.643	<0.001
Serum Triglycerides	0.678	<0.001	0.605	<0.001	0.664	<0.001
Serum LDL-C	0.486	<0.001	0.489	<0.001	0.501	<0.001
Serum HDL-C	0.025	>0.05	0.066	>0.05	0.037	>0.05

HbA1c =Glycosylated haemoglobin, FBS= Fasting blood glucose, PPBS=Post prandial blood glucose, LDL-C= Low density lipoprotein-cholesterol, HDL-C= High density lipoprotein-cholesterol

IV. DISCUSSION

It is well known that chronic hyperglycemia causes health problems in diabetes patients through a variety of processes, including dyslipidaemia, platelet activation, and altered endothelium metabolism.[17,18] In T2DM patients, dyslipidaemia frequently manifests, and the most prevalent lipid abnormalities are elevated TG, small dense LDL-C, and decreased HDL-C cholesterol, all of which are significant CVD risk factors, according to numerous studies.[19,20]The mean plasma glucose levels, HbA1c, TC, and TG were higher in the cases (T2DM patients) than in the controls in the current study, while HDL-C was lower in cases (T2DM patients). Similar to this, a study by Venkatesh et al.[21] found that T2DM patients had lower HDL-C and higher mean values of TC, VLDL-C, and LDL-C than the normal range. Moreover, a study conducted by Yuthika Agrawal et al. revealed that the mean plasma glucose, HbA1c, TC, and TG levels in diabetics were considerably higher than those in controls.[22]

In the current study, cases and controls both had a prevalence of dyslipidaemia of 84% and 52%, respectively. Moreover, hyper-triglyceridemia, the most prevalent type of dyslipidaemia, was identified in 77% of cases versus 39% in controls, a difference that was statistically significant ($P<0.05$). In 71% of the cases and 59% of the controls, a subsequent decline in HDL-C level was seen, and this difference was also shown to be statistically significant ($P<0.05$). Both the total cholesterol and the LDL-C levels were observed to be high in

66% of the cases (P<0.05).Also, a case-control research conducted by Yuthika Agrawal et al. revealed that diabetics most frequently have high TG (56%) levels.[22] The prevalence rates for high total cholesterol (TC) and triglycerides (TG) were 13.6% and 41.4%, respectively, according to a study by Gamit DN[23].The prevalence rates for high LDL-C, very high LDL-C, and low HDL-C were 8.6%, 5.0%, and 72.9%, respectively, in the diabetic participants. The most often increased lipid in T2DM patients was LDL-C (59.3%), followed by triglycerides (57.2%) and total cholesterol (36.5%), according to a study by Bali K et al. A 34.4% decreased in HDL-C was seen in T2DM patients.[24]

In our study, there was a weak negative correlation between glycemic parameters and HDL-C and a strong positive correlation between glycemic parameters and lipid factors (triglycerides, LDL-C, total cholesterol), which is consistent with the findings of a study conducted by Yuthika Agrawal et al. in 2014.[22]

V. CONCLUSION

The current study showed that diabetic patients have dyslipidaemia, which is characterised by elevated serum total cholesterol, triglycerides, low-density lipoprotein (LDL-C), and reduced levels of high-density lipoprotein (HDL-C) levels. This finding suggests that diabetic patients are more susceptible to cardiovascular diseases. To reduce the risk of cardiovascular illnesses, people with T2DM must have frequent blood glucose and serum lipid profile monitoring together with the appropriate medication and preventative measures such lifestyle changes and a nutritious diet.

REFERANCE

[1]. American Diabetes Association. Diagnosis and Classification of Diabetes Mellitus. Diabetes Care 2009;32(S1):S62-S7.
[2]. Guyton AC, Hall JE. In: Insulin glucagon and diabetes mellitus Textbook of Medical Physiology. Saunder's Philadelphia, 12th edition; 2013, p. 618-22.
[3]. Tripathi BK, Srivastava AK. Diabetes mellitus: complications and therapeutics. Med Sci Monit 2006;12:RA130-47.
[4]. Maruthur NM. The growing prevalence of type 2 diabetes: increased incidence or improved survival? Curr Diab Rep 2013;13:786-94.
[5]. International Diabetes Federation Diabetes Atlas, Eighth Edition, 2017. Available at: http://www.idf.org/idf-diabetesat.
[6]. Kaveeshwar SA, Cornwall J. The current state of diabetes mellitus in India. Australas Med J 2014;7(1):45-8.
[7]. DeFronzo RA, Ferrannini E, Zimmet P. International Textbook of Diabetes Mellitus, 2 Volume Set, 4th Edition. Wiley-Blackwell, 2015.
[8]. Fendler W, Borowiec M, Baranowska-Jazwiecka A. Prevalence of monogenic diabetes amongst Polish children after a nationwide genetic screening campaign. Diabetologia2012;55:2631–5.
[9]. AmbrishMithal, Debashish Majhi, M. Shunmugavelu, Pradeep
[10]. G. Talwarkar, Hardik Vasnawala, Ammar S. Raza. Prevalence of dyslipidaemia in adult Indian diabetic patients: A cross sectional study (SOLID). Indian J Endocrinol Metab 2014;18(5):642–7.
[11]. Mooradian AD. Dyslipidaemia in type 2 diabetes mellitus. Nat Clin Pract Endocrinol Metab2009;5:150-9.
[12]. Adiels M, Olofsson SO, Taskinen MR, Borén J. Overproduction of very low-density lipoproteins is the hallmark of the dyslipidaemia in the metabolic syndrome. ArteriosclerThrombVascBiol2008;28:1225-36.
[13]. Ozder A. Lipid profile abnormalities seen in T2DM patients in primary healthcare in Turkey: a cross-sectional study. Lipids Health Dis 2014;13:183.
[14]. Bardini G, Rotella CM, Giannini S. Dyslipidaemia and diabetes: reciprocal impact of impaired lipid metabolism and Beta-cell dysfunction on micro- and macrovascular complications. Rev Diabet Stud 2012;9:82-93.
[15]. Gupta R, Rao RS, Misra A, Sharma SK. Recent trends in epidemiology of dyslipidaemias in India. Indian Heart J 2017;69(3):382-92.
[16]. American Diabetes Association-Classification and Diagnosis of Diabetes: Diabetes Care 2017;40(S1):S11-S24.
[17]. Executive summary of the Third Report of the National Cholesterol Education Programme (NCEP)(2001) Expert Panel on Detection, Evaluation and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III). JAMA 285:2486-97.
[18]. Brownlee M. Biochemistry and molecular cell biology of diabetic complications. Nat 2001;414(6865):813-20.
[19]. Taskinen MR. Diabetic dyslipidaemia: from basic research to clinical practice. Diabetologia 2003;46(6):733-49.
[20]. Lorber D. Importance of cardiovascular disease risk management in patients with type 2 diabetes mellitus. Diabetes MetabSyndrObes2014;7:169-83.
[21]. Krauss RM, Siri PW. Dyslipidaemia in type 2 diabetes. Med Clin N Am 2004;88(4):897-909.
[22]. Venkatesh SK, Sudheer K. M. V., Mohana Krishna T. Lipid profile analysis of type 2 diabetic patients in Bengaluru population, India. Int J Res Med Sci 2018;6(6):2049-53.
[23]. Agrawal Yuthika, Goyal Vipin, Chugh Kiran, Shanker Vijay, Singh Anurag Ambroz. Types of dyslipidaemia in Type 2 diabetic patients of Haryana region. Sch J App Med Sci 2014;2(4D):1385-92.
[24]. Gamit DN, Mishra A. A lipid profile study amongst the patients of type 2 diabetes mellitus - A cross sectional study. IAIM 2018;5(2):1-5.
[25]. Bali K. Pattern of dyslipidaemia in Type 2 Diabetes Mellitus in Punjab. Int J Res Med Sci 2016;4(3):809-12.

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