

## **An Observational Descriptive Assessment of Lipid Profile of Diabetic Patients in Tertiary Care in Bihar**

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**Conflict of interest: Nil**

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### **Abstract**

**Aim:** The aim of this study was the assessment of lipid profiles mainly triglycerides in diabetic patients from Bihar region.

**Methods:** This was a cross-sectional study was done in the Department of General medicine, ICARE Institute of Medical Sciences and Research and. Dr. Bidhan Chandra Roy Hospital, Haldia, West Bengal, India for nine months. A total of 80 newly diagnosed type 2 diabetes mellitus within the last 3 months using the ADA (American Diabetes Association) criteria and both males and females were include in this study for determine the lipid profile levels.

**Results:** According to ATP III classification 34(42.5%) participants had normal serum triglycerides levels which is <150 mg/dl whereas 56(57.5%) participants had an abnormal level of serum triglycerides. Among the 56(57.5) participants with abnormal triglycerides, 32.5% had borderline high levels (150-199mg/dl), 25% had high levels (200-499 mg/dl). In our study, 52.5% participants had low HDL and 47.5% participants had normal HDL. The Gender distribution showed that 16 male participants and 26 female participants had low HDL. In our study, among the 80 participants, 55(68.75%) participants had desirable total Cholesterol levels of <200mg/dl, 20(25%) had borderline high levels of 200- 239mg/dl and 5 (6.25%) had high total cholesterol levels of  $\geq 240$ mg/dl. 10(12.5%) had high levels of LDL of which 3 were males and 7 were females. 2 (2.5%) participants had very high levels of LDL of which 1 was male and 1 was female.

**Conclusions:** Hyperlipidemia is the commonest complication of the diabetes mellitus and it can predispose patients to premature atherosclerosis and microvascular complications. Good glycemic control can prevent the development and progression of common lipid abnormalities in diabetes like raised triglycerides, LDL, serum cholesterol and low HDL.

**Keywords:** Cardiovascular Disease, Hypertriglyceridemia, Type 2 Diabetes, Lipid Profile.

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### **Introduction**

Diabetes mellitus is a common metabolic disorder characterized by absolute or relative deficiencies in insulin secretion and/or insulin action associated with chronic hyperglycemia and disturbances of carbohydrate, lipid and protein

metabolism. [1] Several previous studies have attempted to correlate blood glucose levels with serum lipid profile parameters. Research findings show that mainly body fat is responsible for increase in prevalence of this disease among the body

composition components. [2,3] India, a developing Asian country with fast industrialization and a modern lifestyle is facing a great problem in having the largest number of people with diabetes. [4] The literature on Indian studies showed a threefold rise in the diabetic prevalence in rural as well as urban areas. [5,6]

One of the important cardiovascular risk factors in type 2 diabetes is dyslipidemia. The composition of lipids in diabetic dyslipidemia is more atherogenic than in dyslipidemia in general. [7] The term diabetic dyslipidemia comprises a triad of raised triglycerides, reduced high density lipoprotein (HDL) and excess of small, dense low density lipoprotein. [8] Every one of these dyslipidemic features are associated with an increased risk of cardiovascular disease. Increased hepatic secretion of large triglyceride-rich VLDL and impaired clearance of VLDL is central to the pathophysiology of this dyslipidemia. [9] The contribution of triglycerides to CVD risk has been much debated in the past, with many important prospective studies observing an association. between elevated triglycerides levels and CVD risk. [10] This independent association with long term all-cause mortality supports the idea that serum triglycerides could play a role in type 2 diabetic patients mortality risk. [11] In the present study, we have aimed to study the lipid profile abnormalities in newly diagnosed type 2 diabetics; as such an assessment will enable earlier detection and treatment of these lipid profile derangements thereby minimizing the cardiovascular morbidity and mortality that these can ensue.

### Material and methods

This was a cross-sectional study was done in the Department of General medicine, ICARE Institute of Medical Sciences and Research and. Dr. Bidhan Chandra Roy Hospital, Haldia, West Bengal, India for nine months after taking the approval of the protocol review committee and institutional ethics committee. After taking informed consent detailed history was taken from the patient.

### Methodology

A total of 80 newly diagnosed type 2 diabetes mellitus within the last 3 months using the ADA (American Diabetes Association) criteria and both males and females were include in this study for determine the lipid profile levels. Patients with type 1 diabetics, Patients on antipsychotic medications, Patients with active hypothyroidism and Patients with Cushing's syndrome were excluded from the study.

All procedures and interventions have been established only after obtaining adequate/ appropriate consent in a prescribed form. After inclusion in the study in each case a thorough history was taken followed by a detailed examination and the observations were recorded.

### Results

The Table 1 shows the gender distribution of the participants of our study. Among the total participants, 30(37.5%) were males, and 50(62.5%) were females. Table 2 shows the age distribution of the participants in the study. The maximum number of patients belonged to the age group of 40-50 years (55%) and the least number belonged to the age group 20-30 years (2.5%).

**Table 1: Gender distribution among the participants**

Gender	No.=80	Percentage
Male	30	37.5
Female	50	62.5

**Table 2: Age distribution among the participants**

Age	No. of patients n=80	Percentage
Below 30	2	2.5
30-40	15	18.75
40-50	44	55
Above 50	19	23.75

According to ATP III classification 34(42.5%) participants had normal serum triglycerides levels which is <150 mg/dl whereas 56(57.5%) participants had an abnormal level of serum triglycerides. Among the 56(57.5%) participants with abnormal triglycerides, 32.5% had borderline high levels (150-199mg/dl), 25% had high levels (200-499 mg/dl). Among the participants in the study, 23.33% male and 26% female participants had above normal triglyceride levels. The above stacked bar chart shows that most

participants had normal triglyceride levels. The total number of female participants who had abnormal triglycerides are higher than the male participants. According to the NCEP ATP III criteria, HDL levels  $\leq 40$  is considered low for males and  $\leq 50$  is considered low for females. Based on this criterion, in our study, 52.5% participants had low HDL and 47.5% participants had normal HDL. The Gender distribution showed that 16 male participants and 26 female participants had low HDL.

**Table 3: Serum Triglycerides**

Serum Triglycerides	Male =30	Female=50	Total	Percentage
Normal (<150mg/dl)	15	19	34	42.5
Borderline high (150-199 mg/dl)	8	18	26	32.5
High (200- 499mg/dl)	7	13	20	25

**Table 4: Serum HDL – distribution**

Serum HDL	Male =30	Female=50	Total	Percentage
Normal	14	24	38	47.5
Low HDL	16	26	42	52.5

**Table 6: Serum cholesterol levels distribution**

Serum cholesterol levels	Male =30	Female=50	Total	Percentage
Normal	19	36	55	68.75
Border line	9	11	20	25
High	2	3	5	6.25

In our study, among the 80 participants, 55(68.75%) participants had desirable total Cholesterol levels of <200mg/dl, 20(25%) had borderline high levels of 200-239mg/dl and 5 (6.25%) had high total cholesterol levels of  $\geq 240$ mg/dl. Among the participants who had elevated cholesterol levels, a female predominance was noted with 22% of participants who had borderline high cholesterol levels being female. Among the total participants, according to the NCEP- ATP III criteria, 23 (28.75%) participants had an optimal

level of LDL of which 8 participants were males and 15 were females. 28(35%) had near optimal levels of LDL and 12 participants were males and 16 were females. 17(21.25%) had borderline high levels of LDL out of which 6 participants were males and 11 were females. 10(12.5%) had high levels of LDL of which 3 were males and 7 were females. 2 (2.5%) participants had very high levels of LDL of which 1 was male and 1 was female.

**Table 7: LDL levels- distribution**

LDL levels	Male =30	Female=50	Total	Percentage
optimal levels	8	15	23	28.75
Near optimal levels	12	16	28	35
borderline high	6	11	17	21.25
High	3	7	10	12.5
Very high	1	1	2	2.5

## Discussion

Out of the 80 participants of our study, all were type 2 diabetics diagnosed in the past 3 months. Overall gender distribution of the study population revealed that 37.5% were males and 62.5% were females. The higher proportion of females in this study may be due to the nature of the population seeking admission to our hospital. A similar female predominance was noted in a study done by Deepa et al. [12]

The maximum number of patients belonged to the age group of 40-50 years (55%) and the least number belonged to the age group 20-30 years (2.5%).

A similar study done by Nahar et al involving 200 participants also showed majority of participants in the between 40-50 years. [13] According to ATP III classification 34(42.5%) participants had normal serum triglycerides levels which is <150 mg/dl whereas 56(57.5%) participants had an abnormal level of serum triglycerides. Among the 56(57.5) participants with abnormal triglycerides, 32.5% had borderline high levels (150-199mg/dl), 25% had high levels (200-499 mg/dl). A study done by Bharadwaj et al, in North India showed that hypertriglyceridemia was present in 42.7% of subjects who were diabetics. [14] In our study, Among the participants in the study, 23.33% male and 26% female participants had above normal triglyceride levels. The above stacked bar chart shows that most participants had normal triglyceride levels. The total number of female participants who had abnormal triglycerides are higher than the male participants. A study done in four selected regions of India showed that

29.5% had hypertriglyceridemia with the highest prevalence in Chandigarh and the common risk factors being obesity, diabetes and dysglycemia. [15]

In our study, 52.5% participants had low HDL and 47.5% participants had normal HDL. The Gender distribution showed that 16 male participants and 26 female participants had low HDL. In a study done by Karadag et al to assess prevalence of metabolic syndrome in cardiac patients and it was found that the most prevalent parameter was found to be low HDL (69%). The result quite similar to our study shows that low HDL is one of the important risk factors for cardiovascular diseases. [16]

In our study, 23(28.75%) had optimal levels of LDL (<100mg/dl) and 71.25% had elevated LDL levels. A study by Ogbera showed that elevated LDL levels was the most commonly documented lipid abnormality in patients with metabolic syndrome. [17]

High LDL levels is one of the risk factors for developing cardiovascular complications and such elevated levels are seen even in newly detected type 2 diabetics as seen in our study. [18]

In our study, among the 80 participants, 55(68.75%) participants had desirable total Cholesterol levels of <200mg/dl, 20(25%) had borderline high levels of 200-239mg/dl and 5 (6.25%) had high total cholesterol levels of  $\geq$ 240mg/dl. Among the participants who had elevated cholesterol levels, a female predominance was noted with 22% of participants who had borderline high cholesterol levels

being female. A study done by Joshi et al in India regarding the prevalence of dyslipidemia has shown 13.9% of their subjects had hypercholesterolemia and Tamil Nadu has the highest rates of hypercholesterolemia. [15]

### Conclusion

The present study concluded that the hyperlipidemia is the commonest complication of the diabetes mellitus and it can predispose patients to premature atherosclerosis and microvascular complications. Good glycemic control can prevent the development and progression of common lipid abnormalities in diabetes like raised triglycerides, LDL, serum cholesterol and low HDL.

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