

## Original Research Article

# Comparison of lipid profile in diabetic patients presenting with cardiac diseases

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## ABSTRACT

**Background:** Diabetes mellitus (T2DM) is the most common metabolic disorder in human beings. It is a group of metabolic disorders which causes a decrease in the insulin secretion and /or resistance in its functions and/ or actions. It is the commonest prevalent metabolic disorder which is rapidly increasing all over the world. The purpose of this study was to evaluate the serum lipid levels in diabetic patients who presented to the OPD or the IPD with cardiac diseases.

**Methods:** It was a cross sectional observational study conducted for period of 18 months (June 2018-December 2019). Study was done in 111 patients diagnosed with T2 DM (diagnosed according to ADA criteria) attending OPD and in admitted in the Rohilkhand Medical College and Hospital (RMCH), Bareilly, Uttar Pradesh.

**Results:** A total of 111 patients were taken for this study and in the present study we found that 47.7% patients had Coronary artery disease (CAD), 21.6% had myocardial ischemia (SMI), 36% diastolic dysfunction (DF) and 28.8% had systolic dysfunction (SDF). About half of the patients were above 50 years (50.5%) followed by 40-50 (47.7%) and <40 years were in a small number (1.8%). More than half of the males (56.6%) and 28.6% of females were in 40-50 years of age.

**Conclusions:** We found in our study a significant association of high triglyceride levels with the silent myocardial ischemia (SMI) in diabetic patients but no significant relation with the high levels of cholesterol.

**Keywords:** Dyslipidemia, Diabetic, Cardiac disease

## INTRODUCTION

Diabetes mellitus (T2DM) is the most common metabolic disorder in human beings. It is a group of metabolic disorders which causes a decrease in the insulin secretion and /or resistance in its functions and/ or actions. It is the commonest prevalent metabolic disorder which is rapidly increasing all over the world. According to the International Diabetes Federation in 2003, the number of diabetic patients in the world was 194 million and it is

estimated that the number of people with diabetes will increase to 366 million by 2030.<sup>1</sup>

According to the studies of Framingham Research Institute, it has been suggested that the people with diabetes are susceptible to cardiovascular disease 2-3 times more than the other people at risk.<sup>2</sup> The study of lipid levels and antioxidant enzymes activities is important in patients of cardiovascular disease affected with diabetes and it is essential to have further

investigations. T2DM often co-exists with the obesity, hypertension, and dyslipidaemia. Dyslipidaemia is common in T2DM, as both insulin deficiency and resistance affect enzymes and pathways of lipid metabolism.<sup>3</sup>

Characteristic abnormalities in lipids in T2DM include elevated triglyceride levels (TG), decreased athero-protective high-density lipoprotein cholesterol (HDL-C) levels, and increased levels of small dense low-density lipoprotein-cholesterol (LDL-C).<sup>4</sup>

The reduction of mortality in the patients of cardiovascular diseases amongst diabetics depend on other factors such as weight loss, increase in physical activities, control of high levels of blood pressure, blood glucose, serum lipids and cholesterol.<sup>5</sup> The serum lipids are one the most important indicators for the control and assessment of diabetes treatment. The purpose of this study was to evaluate the serum lipid levels in diabetic patients who presented to the OPD or the IPD with cardiac diseases such as coronary artery disease (CAD), silent myocardial infraction/ischemia (SMI), diastolic dysfunction (DF), and systolic dysfunction (SDF).

Objectives were to assess the lipid profile amongst diabetic patients and to study the association of the cardiac risk factors amongst diabetic patients with deranged lipid profile.

**METHODS**

It was a cross sectional observational study conducted for period of 18 months (June 2018- December 2019). Study was done in 111 patients diagnosed with T2 DM (diagnosed according to ADA criteria) attending OPD and admitted in the Rohilkhand Medical College and Hospital (RMCH), Bareilly, Uttar Pradesh. Ethical committee approval was taken and there is no conflict of interest.

**Inclusion criteria**

Patients diagnosed with T2DM within 5 year and age between 18 and 55 years were included in the study.

**Exclusion criteria**

Prior history of any cardiovascular disease before the diagnosis of T2DM were excluded from the study.

Cross sectional study was designed on 100 eligible patients from the OPD and IPDs. Patients were evaluated by history examination and various investigations which helped to early recognition of cardiovascular risks in diabetic patients. However, this cross-sectional study was finally done on 111 eligible diabetic patients from the OPD and the IPDs.

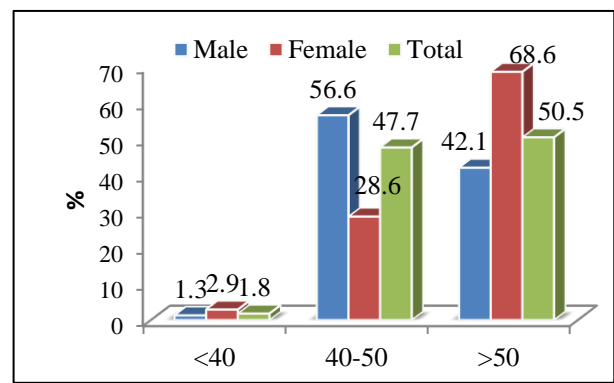
Ethical clearance was obtained from the Ethical Committee of the RMCH, Bareilly. An informed and written consent was obtained from the patients.

A detailed clinical history specially related to the cardiovascular symptoms was taken and relevant investigations were done.

**RESULTS**

Present study was conducted in Rohilkhand Medical College and Hospital] Bareilly which included 76 males and 35 females.

About half of the patients were above 50 years (50.5%) followed by 40-50-year age group (47.7%) and <40 years were in less number (1.8%) (Figure 1).s



**Figure 1: The distribution of patients according to age and gender.**

Figure 1 shows the distribution of patients according to age and gender about half of the patients were above 50 years (50.5%) followed by 40-50 years (47.7%) and <40 years were in small number (1.8%). More than half of the males (56.6%) and about a quarter (28.6%) of females were in 40-50 years of age. More than half of the males (56.6%) and 28.6% of females were in the 40-50 years of age. Majority of male patients (84.2%) and of females (71.4%) had total cholesterol level ≤250 mg/dl. About one third of male patients (34.2%) and female patients (37.1%) had TG level ≤150 mg/dL. Majority of male patients (77.6%) and of female patient (85.7%) had serum HDL level ≤40 mg/dL.

Approximately two third of male patients (61.8%) and around three fourth of female patients (71.4%) had serum LDL level >130 mg/dL.

In the present study we found that 47.7% patients had coronary artery disease (CAD), 21.6% had silent myocardial ischemia (SMI), 36% had diastolic dysfunction (DF) and 28.8% had systolic dysfunction (SDF) (Table 2).

**Table 2: Comparison of total cholesterol with CAD, SMI, DF, SDF.**

Cholesterol	No. of patients	CAD		SMI		DF		SDF	
		No.	%	No.	%	No.	%	No.	%
≤250	89	41	46.1	20	22.5	30	33.7	24	27.0
>250	22	12	54.5	4	18.2	10	45.5	8	36.4
<b>p-value<sup>1</sup></b>		0.47	54.5	0.66		0.30		0.38	

<sup>1</sup>Chi-square test

**Table 3: Comparison of TG with CAD, SMI, DF, SDF.**

TG	No. of patients	CAD		SMI		DF		SDF	
		No.	%	No.	%	No.	%	No.	%
≤150	39	18	46.2	13	33.3	12	30.8	7	17.9
>150	72	35	48.6	11	15.3	28	38.9	25	34.7
<b>p-value<sup>1</sup></b>		0.80		0.02*		0.39		0.06	

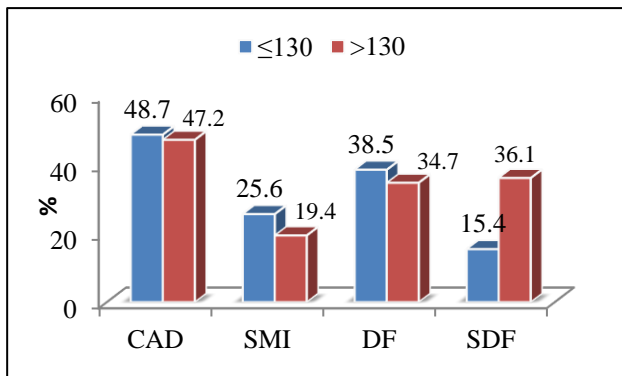
<sup>1</sup>Chi-square test, \*Significant

**Table 4: Comparison of HDL with CAD, SMI, DF, SDF.**

TG	No. of patients	CAD		SMI		DF		SDF	
		No.	%	No.	%	No.	%	No.	%
≤40	89	45	50.6	20	22.5	33	37.1	31	34.8
>40	22	8	36.4	4	18.2	7	31.8	1	4.5
<b>p-value<sup>1</sup></b>		0.23		0.66		0.39		0.005*	

<sup>1</sup>Chi-square test, \*Significant

Table 2 show the comparison of total cholesterol with CAD parameters. There was no significant ( $p>0.05$ ) association of total cholesterol levels with CAD, SMI, DF and SDF. Table 3 shows the comparison of total TG with Comparison of TG with CAD, SMI, DF, SDF parameters. There were no significant ( $p>0.05$ ) association TG levels with CAD, SMI, DF and SDF. Table 4 show the comparison of HDL with CAD parameters. There was no significant ( $p>0.05$ ) association of HDL with CAD, DF and SMI. However, SDF was found to be significantly ( $p\leq 0.005$ ) associated with HDL. Figure 2 show the comparison of LDL with CAD parameters. There was no significant ( $p>0.05$ ) association of LDL with CAD, DF and SMI. However, systolic dysfunction (SDF) was found to be significantly ( $p\leq 0.02$ ) associated with LDL.



**Figure 2: Comparison of LDL with CAD, SMI, DF, SDF.**

**DISCUSSION**

Present study was an observational n cross sectional type conducted in the Department of Medicine of Rohilkhand Medical College and Hospital Bareilly, Uttar Pradesh.

A total of 111 patients were taken for this study and in the present study we found that 47.7% patients had Coronary artery disease (CAD), 21.6% had myocardial ischemia (SMI), 36% diastolic dysfunction (DF) and 28.8% had systolic dysfunction (SDF). About half of the patients were above 50 years (50.5%) followed by 40-50 (47.7%) and <40 years were in a small number (1.8%). More than half of the males (56.6%) and 28.6% of females were in 40-50 years of age.

We found in our study a significant association of high triglyceride levels with the silent myocardial ischemia (SMI) in diabetic patients but no significant relation with the high levels of cholesterol.

However, these findings are contradictory with the previous findings where hypercholesterolemia and hypertriglyceridemia had been shown to be related to an increased occurrence of coronary artery diseases in diabetic patients in other prospective studies.

In the WHO Multinational Study<sup>8</sup> and in the Paris Prospective Study, hypertriglyceridemia was the only factor that correlated closely with the occurrence of coronary artery diseases in diabetic patients.<sup>9</sup> These findings are contradictory with our study where levels of

cholesterol were statistically not significant with coronary artery disease whereas, there was significant association of triglyceride level with SMI.

Comparing the high HDL and LDL levels in diabetic patients both the above-mentioned investigations gave an earlier marker for the systolic dysfunction and had statistically significant relation which our findings also correlate as that of the findings of Wang et al.<sup>10</sup>

### **Limitation**

Study is single centered. Uneven distribution of population hence results could not be generalized. Uneven distribution of patients on gender.

### **CONCLUSION**

In cases of type 2 DM, the patients are susceptible for cardiovascular disease 2 -3 times more the other people at risk and hence, the study of lipid levels are important in patients of cardiovascular diseases having T2DMs. Several studies of untreated people with T2DM have shown that LDL-C does not differ significantly between those with and without CVD. Despite the fact that LDL-C is routinely referred to as the 'bad cholesterol', it has been shown in our study that high LDL-C level appear to be unrelated to the risk of CVD, both in T2 DM individuals and in general population and that the benefit from the use of cholesterol-lowering drugs is questionable. Therefore, a systematic search for other cardiovascular risk factors is an important topic for the future research.

Our study concluded that most of the parameters were not significantly associated with the cardiac risk factors whereas LDL and HDL were associated with systolic dysfunction.

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