

# Assessment of Lipid Profile Level and CRP Level in Offspring of DM Patients

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## ABSTRACT

**Background:** Diabetes mellitus with its complication has become the most important and challenging contemporary health problem. The present study assessed lipid profile and CRP level in offspring of diabetes mellitus patients. **Methods:** This study was conducted on 45 offspring of T2DM patients (Group I) and 45 healthy controls (Group II). Anthropometric measurements, such as body weight (kg), height (m), waist circumference (cm), and hip circumference (cm), were recorded. Body mass index and waist:hip ratios were calculated. 12 hour fasting venous blood samples were collected from all participants in fluoride and plain bulbs. Serum was tested for plasma glucose level, serum hs-CRP, serum cholesterol serum TGs, and high-density lipoprotein (HDL) levels. **Results:** Mean age in group I was 35.2 years and in group II was 36.5 years, there were 25 males and 20 females in group I and 28 males and 17 females in group II, mean weight was 61.2 kg in group I and 59.4 kg in group II, height was 1.72 meters in group I and 1.68 meters in group II, BMI was 22.87 Kg/m<sup>2</sup> in group I and 22.41 Kg/m<sup>2</sup> in group II. Waist circumference was 78.2 cm in group I and 73.5 cm in group II, hip circumference was 97.3 in group I and 96.5 in group II, W/H ratio was 0.82 in group I and 0.76 in group II. The mean random blood glucose level in group I was 93.2 mg/dl and in group II was 92.4 mg/dl, hs-CRP was 2.5 mg/dl in group I and 1.3 mg/dl in group II, TG (mg%) was 168.2 and 125.3 in group I and group II, TC (mg%) was 178.4 and 148.2 in group I and group II, HDL (mg%) was 38.2 and 52.3 in group I and group II, LDL (mg%) was 104.2 and 72.4 in group I and group II and VLDL was 34.5 mg% in group I and 26.1 mg% in group II. The difference was significant (P < 0.05). **Conclusion:** Authors found that there was increased level of high-sensitivity C-reactive protein and alteration of lipid profile in offsprings of type II diabetes parents as compared to control.

**Keywords:** C-reactive protein, Diabetes, Lipid.

## INTRODUCTION

Diabetes mellitus (DM) with its complication has become the most important and challenging contemporary health problem.<sup>[1]</sup> Globally, the estimated number of adults with diabetes in 2007 was 246 million and 380 million adults worldwide will have diabetes by 2025. India has 41 million diabetics and this number is expected to increase to 70 million by 2025.<sup>[2]</sup> Over the past 30 years, the status of diabetes has changed from being considered as a mild disorder of the elderly to one of the major causes of morbidity and mortality affecting the youth and middle-aged people. Onset of type 2 diabetes mellitus (T2DM) at early age heralds many years of disease and an increased risk that the full range of both microvascular and macrovascular complications will occur when affected individuals are still relatively young.<sup>[3]</sup>

The rise in C-reactive protein (CRP) as a response to the increase in the secretion of cytokines of adipose origin detected in obese individuals has been used as a marker of cardiovascular risk and diabetes in adults. When measured with new high-sensitivity

assays, the levels of CRP have proven to predict future cardiovascular risk. Among apparently healthy men and women, the levels of high-sensitivity-CRP (hs-CRP) <1, 1-3 of and >3 mg/l distinguish between those at low, moderate and high risk of future cardiovascular disease.<sup>[4]</sup>

Diabetic dyslipidemia is a complex cluster of potentially atherogenic lipid and lipoprotein changes.<sup>[5]</sup> Increased plasma triglycerides (TGs), especially very high-density lipoprotein (VLDL), TG, and low concentration of high-density lipoprotein cholesterol (HDL-C), preponderance of small, dense low-density lipoprotein (LDL) and excessive postprandial lipemia are the main components of diabetic dyslipidemia.<sup>[6]</sup> The present study assessed lipid profile and CRP level in offspring of diabetes mellitus patients.

## MATERIALS AND METHODS

This study was conducted in the department of internal medicine. It comprised of 45 offspring of T2DM patients (Group I) and 45 healthy controls (Group II). Approval from institutional ethical committee was obtained and informed consent was taken.

Detailed history of participants including age, sex, and marital status, history of any medications, addictions, dietary habits, and lifestyle was recorded. Anthropometric measurements, such as body weight

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(kg), height (m), waist circumference (cm), and hip circumference (cm), were recorded. Body mass index and waist:hip ratios were calculated. 12 hour fasting venous blood samples were collected from all participants in fluoride and plain bulbs. Serum was separated after 1 hour by centrifugation at 3,000 rpm for 10 minutes and was tested for plasma glucose level, serum hs-CRP, serum cholesterol serum TGs, and high-density lipoprotein (HDL) levels. Results were tabulated and subjected to statistical analysis. P-value less than 0.05 was considered significant.

## RESULTS

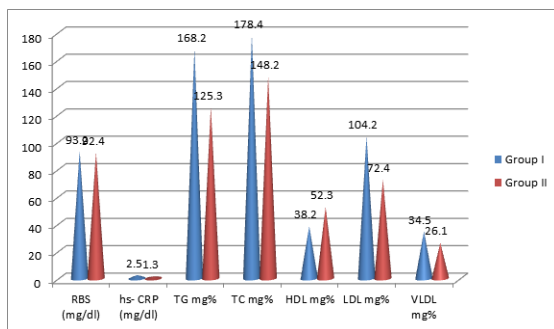
**Table 1: Demographic parameters**

Parameters	Group I	Group II	P value
Age (Years)	35.2	36.5	0.94
Gender (M: F)	25:20	28:17	-
Weight (Kgs)	61.2	59.4	0.19
Height (m)	1.72	1.68	0.17
BMI (Kg/m <sup>2</sup> )	22.87	22.41	0.02
WC (cm)	78.2	73.5	0.01
HC (cm)	97.3	96.5	0.04
W/H ratio	0.82	0.76	0.05

[Table 1] shows that mean age in group I was 35.2 years and in group II was 36.5 years, there were 25 males and 20 females inn group I and 28 males and 17 females in group II, mean weight was 61.2 kg in group I and 59.4 kg in group II, height was 1.72 meters in group I and 1.68 meters in group II, BMI was 22.87 Kg/m<sup>2</sup> in group I and 22.41 Kg/m<sup>2</sup> in group II. Waist circumference was 78.2 cm in group I and 73.5 cm in group II, hip circumference was 97.3 in group I and 96.5 in group II, W/H ratio was 0.82 in group I and 0.76 in group II. The difference was significant (P< 0.05).

**Table 3: Biochemical parameters**

Parameters	Group I	Group II	P value
RBS (mg/dl)	93.2	92.4	0.71
hs- CRP (mg/dl)	2.5	1.3	0.02
TG mg%	168.2	125.3	0.01
TC mg%	178.4	148.2	0.04
HDL mg%	38.2	52.3	0.01
LDL mg%	104.2	72.4	0.05
VLDL mg%	34.5	26.1	0.02



**Figure 1: Biochemical parameters**

[Table 2 & Figure 1] shows that mean random blood glucose level in group I was 93.2 mg/dl and in group

II was 92.4 mg/dl, hs- CRP was 2.5 mg/dl in group I and 1.3 mg/dl in group II, TG (mg%) was 168.2 and 125.3 in group I and group II, TC (mg%) was 178.4 and 148.2 in group I and group II, HDL (mg%) was 38.2 and 52.3 in group I and group II, LDL (mg%) was 104.2 and 72.4 in group I and group II and VLDL was 34.5 mg% in group I and 26.1 mg% in group II. The difference was significant (P< 0.05).

**Table 3: Correlation between hs-CRP and lipid profile**

Lipid profile	R value	P value
TG	0.28	0.04
TC	0.42	0.001
HDL	-0.28	0.05
LDL	0.41	0.001
VLDL	0.28	0.04

[Table 3] shows that there was positive correlation of TG (r- 0.28, p< 0.05), TC (r-0.42, p< 0.05), LDL (r- 0.41, p< 0.05) and VLDL (r- 0.28, p< 0.05) and negative correlation of HDL (r- -0.28, p< 0.05) with hs-CRP.

## DISCUSSION

Type 2 diabetes mellitus is associated with a number of other metabolic disorders including elevated triglycerides (TGs), low high- density lipoprotein cholesterol (HDL- C) and central obesity. It is also associated with disorders related with protein, carbohydrate, and fat metabolism.<sup>[7]</sup> Reduced glucose uptake by muscle and adipose tissue can be seen in people with diabetes, which is a consequence of chronic hyperglycemia and eventually tissue damage and chronic vascular problems. The absolute number of people with diabetes is increasing due to population growth, ageing of the population, urban settlement, and factors such as obesity and lack of physical activity.<sup>[8]</sup>

CRP is a pentameric and nonimmunoglobulin protein having five identical subunits that have been introduced as the most important marker of inflammation.<sup>[9]</sup> Serum levels of high- sensitivity CRP (hs- CRP) can be measured at very low levels using highly sensitive assays and may indicate increased inflammatory activity in the vessel wall. Thus, chronic systemic inflammation has been identified as an associated factor in the metabolic syndrome and diabetes mellitus.<sup>[10]</sup> The present study assessed lipid profile and CRP level in offspring of diabetes mellitus patients.

In present study, mean age in group I was 35.2 years and in group II was 36.5 years, there were 25 males and 20 females inn group I and 28 males and 17 females in group II, mean weight was 61.2 kg in group I and 59.4 kg in group II, height was 1.72 meters in group I and 1.68 meters in group II, BMI was 22.87 Kg/m<sup>2</sup> in group I and 22.41 Kg/m<sup>2</sup> in group II. Waist circumference was 78.2 cm in group I and 73.5 cm in group II, hip circumference was 97.3 in group I and 96.5 in group II, W/H ratio was 0.82 in group I and 0.76 in group II.

Mane et al,<sup>[11]</sup> conducted study on 100 nondiabetic siblings and offspring of T2DM patients between the age group 20 and 50 years. The mean value of blood sugar level did not show significant difference between the cases and controls ( $92.02 \pm 9.23$  vs  $91.77 \pm 7.99$ ,  $p \geq 0.05$ ). The mean values of hs-CRP ( $2.4 \pm 1.98$  vs  $1.0 \pm 0.38$ ), TG ( $167.35 \pm 17.35$  vs  $124.63 \pm 13.55$ ), total cholesterol (TC) ( $176.99 \pm 12.45$  vs  $147.59 \pm 9.72$ ), low-density lipoprotein (LDL) ( $106.41 \pm 12.99$  vs  $71.65 \pm 11.24$ ), and very high-density lipoprotein (VHDL) ( $33.47 \pm 3.47$  vs  $24.93 \pm 2.71$ ) (all  $p < 0.001$ ) were increased, however mean value of HDL ( $37.11 \pm 3.99$  vs  $51.01 \pm 3.93$ ) was decreased in the cases as compared to controls. High-sensitivity C-reactive protein shows positive correlation with TG, TC, LDL, and very low-density lipoprotein and has negative correlation with HDL.

We found that mean random blood glucose level in group I was 93.2 mg/dl and in group II was 92.4 mg/dl, hs- CRP was 2.5 mg/dl in group I and 1.3 mg/dl in group II, TG (mg%) was 168.2 and 125.3 in group I and group II, TC (mg%) was 178.4 and 148.2 in group I and group II, HDL (mg%) was 38.2 and 52.3 in group I and group II, LDL (mg%) was 104.2 and 72.4 in group I and group II and VLDL was 34.5 mg% in group I and 26.1 mg% in group II. Ebrahimi et al,<sup>[12]</sup> conducted study on 7,762 subjects divided into four groups—nonobese/nondiabetic, obese/nondiabetic, nonobese/diabetic and obese/diabetic—based on the BMI classification and their FBG. Several clinical and biochemical characteristics were significantly different among the four groups: FBG,  $P < 0.001$ ; total cholesterol (TC),  $P < 0.001$ ; and triglyceride (TG),  $P < 0.001$ . The subjects with a serum hs- CRP  $>3$  mg/dl had higher TC ( $P < 0.001$ ), low- density lipoprotein cholesterol (LDL- C,  $P < 0.001$ ), TG ( $P < 0.001$ ), fat percentage ( $P < 0.001$ ), and systolic and diastolic blood pressure ( $P < 0.001$ ) compared with subjects with a serum hs- CRP  $<3$  mg/dl. Multivariate analysis showed FBG, LDL- C, and waist circumference (WC) associated with increased serum hs- CRP levels ( $P < 0.001$ ).

We found that there was positive correlation of TG ( $r=0.28$ ,  $p < 0.05$ ), TC ( $r=0.42$ ,  $p < 0.05$ ), LDL ( $r=0.41$ ,  $p < 0.05$ ) and VLDL ( $r=0.28$ ,  $p < 0.05$ ) and negative correlation of HDL ( $r=-0.28$ ,  $p < 0.05$ ) with hs-CRP. The shortcoming of the study is small sample size.

## CONCLUSION

Authors found that there was increased level of high-sensitivity C-reactive protein and alteration of lipid profile in offsprings of type II diabetes parents as compared to control.

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