

# Increased Serum Lipid Profile and Development of Vascular Complications in Diabetic Individuals - A comparative study

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## ABSTRACT

The presented results of present research described that the lipid abnormalities caused dyslipidaemia as hypercholesterolemia, hypertriglyceridemia, low levels of high density lipoproteins and high levels of low density lipoproteins in the diabetic patients. Coronary heart diseases are directly linked with Hyperlipidemia. Lipid profile and random glucose levels of Group B and Group C, significantly ( $p < 0.005$ ) showed big variations in comparison to the Control Group X. Comparatively serum cholesterol ( $125 \pm 13$ ,  $285 \pm 15$ ,  $260 \pm 16$ ), triglyceride ( $125 \pm 20$ ,  $175 \pm 20$ ,  $150 \pm 10$ ), low density lipoproteins ( $110 \pm 20$ ,  $185 \pm 10$ ,  $165 \pm 13$ ), High density lipoproteins ( $46 \pm 10$ ,  $28 \pm 22$ ,  $30 \pm 15$ ) and random glucose ( $82 \pm 15$ ,  $270 \pm 25$ ,  $230 \pm 15$ ) Group Z and Group Y levels were significant in comparison the control X Group and coronary cardiovascular disease is more common in diabetic men than diabetic women.

**Keywords:** Dyslipidaemia, Hypercholesterolemia, Hypertriglyceridemia, Hyperglycemia Hypoglycemia

## INTRODUCTION

Diabetes mellitus is a glucose intolerance syndrome in which human body cannot get energy from carbohydrates that we eat in our daily regular diet<sup>1</sup>. The different metabolic pathways of carbohydrates are correlated with the insulin. It is a natural hormone, secreted by the Beta cells of the pancreas. In diabetic mellitus conditions insulin produced but does not work in the body for carbohydrate metabolism such condition is known as insulin resistance<sup>3</sup>. Digested carbohydrates into simplest one that is glucose travels in the blood vessels and transported from one place to the other through blood. Glucose cannot enter into cells without insulin<sup>2</sup>.

The beta cells which produce insulin in pancreas are damaged in case of Diabetes I. due to any cause of biological system and then pancreas cannot make insulin therefore glucose does not provide energy to the body<sup>3</sup>. In case of diabetes type I people must use insulin injections for controlling their glucose level in blood.(4). Type 2 diabetes mellitus occurs mostly in people of age 40 years but it may be found in early ages depend upon risk factors present. Type 2 diabetes can control with balanced diet, exercise, weight management and medicine<sup>3</sup>.

Lipids profile is biomarkers for atherosclerosis and Coronary Heart Disease (CHD)<sup>4</sup>. Fats have hydrophobic nature, therefore total cholesterol, triglycerides and phospholipids which are also derivatives of hydrophobic molecules travelled in the form of lipoproteins to the other tissues<sup>5</sup>. Chylomicrons, HDL-C and LDL-C are major classes of lipoproteins and apo proteins regarding their receptors. It is concluded by different studies that free fatty acids, triacylglycerols are combined with phospholipids and free cholesterol in the liver.

An Apo 100 protein which is part of LDL is the major transporter of cholesterol in the biological system<sup>4</sup>. Low levels of HDL are also risk factor of coronary vascular diseases. The process of atherosclerosis caused by the deposition of higher concentration of cholesterol in the blood

vessels and ultimately flow of blood towards heart muscles become slow or decreased<sup>6</sup>. Different studies stated that hypertriglyceridemia and hypercholesterolemia are the main causes of atherosclerosis<sup>4,6,3</sup>.

## MATERIALS AND METHODS

In current study 50 healthy individuals of both genders having age in between 30 to 50 years were selected and they have not any history of cardiac complications. They were selected and treated as the control group X. This study was conducted in IMBB, The University of Lahore. Pakistan. Blood samples were collected from Mayo hospital and Jinnah Hospital Lahore. 150 men and women subjects with CHD were selected and divided into group Y and Group Z. The variables that are cholesterol, low density lipoproteins, High density lipoproteins, triglycerides and random glucose levels were diagnosis in Group X, Y and Z comparatively. Colorimetric methods were used with the help of different Kits in the Lab. In this study raw data was presented statistically through SPSS model 20.

## RESULTS

Group X Control, n= 50 healthy and normal subjects

Biomarkers	Units	Mean $\pm$ SD	P-value
Triglyceride	Mg/dl	125 $\pm$ 20	0.0
Cholesterol	Mg/dl	125 $\pm$ 13	0.0
LDL	Mg/dl	110 $\pm$ 20	0.0
HDL	Mg/dl	46 $\pm$ 10	0.0
Glucose levels random	Mg/dl	82 $\pm$ 15	0.00

<0.005

Group Y, Men subjects with CHD (n=100)

Biomarkers	Units	Mean $\pm$ SD	P-value
Triglycerides	Mg/dl	175 $\pm$ 20	0.0
Cholesterol	Mg/dl	285 $\pm$ 15	0.0
HDL	Mg/dl	28 $\pm$ 22	0.0
LDL	Mg/dl	185 $\pm$ 10	0.0
Glucose levels random	Mg/dl	270 $\pm$ 25	0.0

<0.005

Group Z, Women subjects with CHD (n=50)

Biomarkers	Units	Mean± SD	P-value
Triglyceride	Mg/dl	150±10	0.0
Cholesterol	Mg/dl	260±16	0.0
HDL	Mg/dl	30±15	0.0
LDL	Mg/dl	165±13	0.0
Glucose levels random	Mg/dl	230±15	0.00

<0.005

The results of this study were significant ( $p < 0.005$ ). Lipid profile and random glucose levels of Group B and Group C, significantly ( $p < 0.005$ ) showed dramatic changes in comparison to Control Group X. Comparatively serum cholesterol (125±13, 285±15, 260±16), triglyceride (125±20, 175±20, 150±10), low density lipoproteins (110±20, 185±10, 165±13), High density lipoproteins (46±10, 28±22, 30±15) and random glucose (82±15, 270±25, 230±15) The levels of Group Z, and Group Y were more significant as compared to the levels of control Group X.

## DISCUSSION

In many studies the diabetic patients in patients have number of medical complications because of chronic hyperglycemia and hypoglycemia<sup>7</sup>, these two abnormalities in biological system creates harmful effects in metabolic pathways<sup>8</sup>. Researchers stated that both lipid profile and diabetes are major biomarkers and important predictors for metabolic disorders including dyslipidaemia and cardiovascular diseases<sup>9</sup>. In diabetic patients pathogenesis is correlated with lipids. Dyslipidaemia as a metabolic abnormality is frequently associated with diabetes mellitus<sup>10</sup>. The chances of cardiovascular arteriosclerosis are more common in diabetic individuals as compared the non-diabetics<sup>1,10</sup>. In this study the mean serum levels of cholesterol, triglycerides and LDL (125±13, 285±15, 260±16), (125±20, 175±20, 150±10), (110±20, 185±10, 165±13) were higher than the control. While the HDL (46±10, 28±22, 30±15) levels are significantly lower than control. In this study it is seen that the concentration of

coronary cardiovascular diseases is far more common in diabetic males as compared to the diabetic females. Finally it is concluded that lipid profile and random glucose levels of Group Y and Group Z, significantly ( $p < 0.005$ ) showed big changes as compared to the Control Group X.

## REFERENCES

1. Abou-Seif MA, Youssef AA: Evaluation of some biochemical changes in diabetic patients. *ClinChimActa*. 2004, 346: 161-170.
2. Gadi R, Samaha FF: Dyslipidemia in type 2 diabetes mellitus. *CurrDiab Rep*. 2007, 7 (3): 228-234.
3. Elinasri HA, Ahmed AM: Patterns of lipid changes among type 2 diabetes patients in Sudan. *East Mediterr Health J*. 2008, 14 (2): 314-324.
4. Unalacak M, Kara IH, Baltaci D, Ozgur E, Bucaktepe PGE: Effects of Ramadan fasting on biochemical and hematological parameters and cytokines in healthy and obese individuals. *Met SyndrRelDisord*. 2011, 9 (2): 157-161. 10.
5. Folli F, Corradi D, Fanti P, Davalli A, Paez A, Giaccari A, Perego C, Muscogiuri G: The role of oxidative stress in the pathogenesis of type 2 diabetes mellitus micro- and macrovascular complications: avenues for a mechanistic-based therapeutic approach. *Curr Diabetes Rev*. 2011, 7 (5): 313-324.
6. Wexler DJ, Grant RW, Meigs JB, Nathan DM, Cagliero E: Sex disparities in treatment of cardiac risk factors in patients with type 2 diabetes. *Diabetes Care*. 2005, 28 (3): 514-520.
7. Chou, R; Dana, T; Blazina, I; Daeges, M; Bougatsos, C; Jeanne, TL (18 October 2016). "Screening for Dyslipidemia in Younger Adults: A Systematic Review for the U.S. Preventive Services Task Force". *Annals of Internal Medicine*. **165** (8): 560–564.
8. Regmi P, Gyawali P, Shrestha R, Sigdel M, Mehta KD, Majhi S: Pattern of dyslipidemia in type-2 diabetic subjects in Eastern Nepal. *J Nepal Assoc Med Lab Sci*. 2018, 10 (1): 11-13.
9. Krauss RM: Lipids and lipoproteins in patients with type 2 diabetes. *Diabetes Care*. 2004, 27 (6): 1496-1504.
10. Smith S, Lall AM: A Study on lipid profile levels of diabetics and non-diabetics among Naini region of Allahabad, India. *Turk J Biochem*. 2019, 33 (4): 138-141.