

LIPID PATTERN OF DIABETES PATIENTS AT JOS UNIVERSITY TEACHING HOSPITAL, JOS

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ABSTRACT

OBJECTIVE:

The aim of this study is to examine the pattern of total cholesterol, triglyceride, HDL-cholesterol, and LDL-cholesterol in diabetic patients attending Jos university teaching hospital, Jos, in plateau central Nigeria.

MATERIALS AND METHODS:

Twenty-five diabetic subjects and 51 non diabetics were included in this study. Fasting plasma glucose and serum total Cholesterol, triglyceride, HDL – cholesterol were analyzed using standard procedures. The LDL-cholesterol was calculated using Friedewald's formulae.

RESULTS:

Fasting plasma glucose and serum triglycerides were significantly Higher in diabetic subjects than control ($p < 0.05$) in each case while HDL-cholesterol was significantly lower in diabetics and LDL-Cholesterol, significantly higher in diabetics compared to controls.

CONCLUSION:

This study shows that there is a serious need to monitor lipids in diabetics to avert possible complications.

Key words – Diabetics, Lipids, Complications.

INTRODUCTION

Diabetes mellitus is not a single disease entity, but includes a variety of metabolic disorders associated with relative deficiency of Insulin action, leading to an increase in blood glucose level 1.

Insulin is a hormone produced from β -cells of the endocrine pancreas and its relative or absolute deficiency causes hyperglycemia . The absolute and/relative deficiency of Insulin causes diabetes mellitus, classified as type 1 and II diabetes respectively though other types such as gestational diabetes exist 2.

There are many predisposing factors for the development of diabetes mellitus, such as overweight, smoking etc.3.

Lipids are water insoluble food substances both exogenous and endogenously carried in body fluid and stored in adipose tissues. The focus in this study is on cholesterol and triglycerides. Cholesterol and triglycerides play important roles in the body including functioning virtually in all aspects of biological life serving as energy stores and metabolic fuel, hormones and precursors, acts as structural and functional components of biologic membranes and insulation to prevent heat loss among others⁴.

In the absence of glucose entering the cells due to insulin deficiency lipids are then broken down as source of energy or metabolic fuel.

The aim of the study is to look at the cholesterol and triglycerides in diabetic patients attending Jos University Teaching Hospital, Jos.

The diagnosis of diabetes mellitus in spite of all forms of clinical manifestation is necessarily demonstration of hyperglycemia and therefore is laboratory base diagnosis.

MATERIALS AND METHODS

Twenty-five Diabetic subjects (15 males and 10 females age range of about 30-55 years) visiting Jos University Teaching Hospital were used after an informed consent. The entire subjects were diagnosed for not less than one year prior to the study. Fifty-one control subjects (25 males and 26 females aged about 25 – 50

years) were selected from apparently healthy volunteers from among staff, students and patients relative who present with the patients after an informed consent verbally.

Samples were taken from both groups (diabetics and control). 10ml of whole blood each, and this was divided into two. 3ml into fluoride oxalate bottle and 7mls into chemically clean plain tubes. The samples in the oxalate bottles were mixed thoroughly and centrifuged immediately to get the plasma while the plain bottle samples were allowed to stand for 15 minutes at room temperature to enable the sample clot and retract. The serum was obtained by centrifuging at 3000 rps for 5 minutes. The serum was deep frozen at -20oC until lipid analysis was done. The glucose and lipid assay were done by standard enzymatic method ^{5,6,7}. The HDL – cholesterol was determined by method of Bachorik et al ⁸ and LDL-cholesterol was calculated using friedewald formulae ⁹.

RESULTS

The result of the assayed parameters are as presented in tables I, II and III respectively.

Table I shows fasting plasma glucose and serum lipid levels in the diabetic subjects (mean glucose = 12.6, mean total cholesterol = 4.0, mean triglyceride = 1.4 all in mmol/l), while table II shows fasting plasma glucose level and serum lipids levels in the control group (mean glucose=4.0, mean total cholesterol =3.8, mean triglyceride

=0.89) respectively. Table III shows comparison of mean plasma glucose level and mean serum lipid levels between the diabetic subjects and the

control group respectively. The student's 't' test was used for the test of statistical significance.

TABLE 1: MEAN FASTING PLASMA GLUCOSE AND SERUM LIPID LEVELS IN DIABETIC SUBJECTS (MMOL/L)

STATISTICAL PARAMETER	AGE (YRS)	FASTING PLASMA GLOCUSE	TOTAL CHOLESTEROL	HDL CHOLOESTEROL	TRIGLYCERIDE	CH
N (SAMPLE SIZE)	25	25	25	25	25	
X (MEAN)	41.80	12.60	4.00	0.93	1.40	
SD	11.60	6.90	1.40	0.39	0.57	
RANGE	30.2 - 53.4	5.7-19	2.6-5.4	0.54 -1.32	0.83-1.97	

TABLE 2: MEAN FASTING PLASMA GLUCOSE AND SERUM LIPID LEVELS IN CONTROL SUBJECTS (MMOL/L)

STATISTICAL PARAMETER	AGE (YRS)	FASTING PLASMA GLOCUSE	TOTAL CHOLESTEROL	HDL CHOLOESTEROL	TRIGLYCERIDE	CH
N (SAMPLE SIZE)	51	51	51	51	51	
X (MEAN)	38.2	4.00	3.80	1.11	0.89	
SD	10.4	0.62	0.64	0.34	0.44	
RANGE	27.8-48.6	3.38-4.62	3.16-4.44	0.75-1.47	0.45-1.33	

TABLE 3: COMPARISON OF MEAN PLASMA GLUCOSE AND SERUM LIPIDS BETWEEN CONTROLS AND DIABETIC SUBJECTS IN (MMOL/L)

PARAMETER	CONTROLS	DIABETICS	P. VALUE	COMMENTS
N	51	25		
FASTING PLASMA GLUCOSE	4.00 ±0.62	12.600 ± 6.9	P<0.001	SIGNIFICANT

TOTAL CHOLESTEROL	3.80 ± 0.64	4.0 ± 1.40	P>0.05	NOT SIGNIFICANT
HDL CHOLESTEROL	1.11 ± 0.36	0.93 ± 0.30	P<0.05	SIGNIFICANT
TRIGLYCERIDE	0.89 ± 0.44	1.40 ± 0.57	P<0.001	SIGNIFICANT
LDL CHOLESTEROL	2.29 ± 0.70	3.3 ± 1.50	P<0.05	SIGNIFICANT

N = SAMPLE SIZE
X = MEAN
S.D. = STANDARD DEVIATION

DISCUSSION

Diabetes mellitus is a major metabolic health problem world-wide leading to a vast derangement in glucose and subsequently lipids homeostasis with attendant vascular complications 10.

The close association between plasma lipid abnormalities and vascular disease has been confirmed in a number of studies 11 and has been subject of considerable interest among patients with diabetes mellitus disease.

In this study it was shown from the result that high triglyceride level and lower HDL – cholesterol levels are seen in diabetics compared to control group. This is in conformity with other studies done else where.12 In Zaria Nigeria, Anaja 12 reported significantly elevated levels of triglyceride in diabetic subjects and that is in conformity with the findings in this study.

EL-Hazmi and Warsy in 1994 reported a significantly raised total cholesterol level among diabetics compared with controls in Saudi Arabia.13 they further suggested that this difference might be due to genetic and

environmental factors. In this study however, the mean total cholesterol level was higher in the diabetics compared to the control group but the difference was not statistically significant. From the results presented in table III it is also clear in this study that there were statistically significant differences between the HDL – cholesterol and LDL – cholesterol of the Diabetic group and the control group respectively i.e. lower HDL – cholesterol in diabetics and higher LDL – cholesterol in diabetics. There are suggested target levels of lipids provided by National Cholesterol Education Programme of America (NCEP), European Arteriosclerosis Society (EAS) and American Diabetes Association (ADA) to provide a guide for lipid profile among diabetic subjects above which complications may set in 14 15 16 17. This can be used to evaluate the lipid status of diabetics for proper management.

Conclusion

This study shows that diabetes mellitus has a great impact on lipid levels of patients and that lipid profile should be closely monitored along with their

plasma glucose levels during the management of these patients to avoid vascular complications.

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