



## RESEARCH ARTICLE

### STUDY OF LIPID PROFILE IN PREDIABETES IN JHARKHAND

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#### ABSTRACT

**Introduction:** Diabetes is one of the most prevalent diseases in the world. Diabetes mellitus is a metabolic disorder presenting with hyperglycemia. Worldwide, the prevalence is increasing drastically.

**Materials and Methods:** It is a cross-sectional case-control study. The sample size: 150 cases with age and sex matched .controls meeting inclusion criteria of this study from outpatients and inpatients of RIMS, Ranchi.

**Results:** The overall presence of abnormal serum total cholesterol (TC), low-density lipoprotein (LDL), triglycerides (TGs), very LDL (VLDL), TG/high-density lipoprotein (HDL) ratio, and LDL/HDL ratio with statistical significance is tabulated in tables.

**Conclusion:** TC, LDL, TG, and VLDL were significantly raised in prediabetics as compared to normal healthy subjects whereas HDL was significantly lower in prediabetics as compared to normal healthy subjects.

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#### INTRODUCTION

Diabetes has been known since ancient times. Ancient Indian physician Charaka and Sushruta gave the earliest description of the disease. Diabetes is heterogenous group of disease characterized by a state of chronic hyperglycemia, resulting from a diversity of etiologies, environmental and genetic factors acting jointly (Standard medical care in diabetes, 2011). Diabetes is an "iceberg disease" (Twigg et al., 2007) and is a major health problem that is associated with significant morbidity and mortality. Although increase in both prevalence and incidence of diabetes have occurred globally, these have been dramatic especially in societies under economic transition, of newly industrialized countries and developing countries. Prediabetes is forerunner of Type 2 diabetes. Prediabetic state is the intermediate phase between frank diabetes and normoglycemic state. In ADA 2011 consensus statement, HB A1 C is also added to define prediabetes (Standard medical care in diabetes, 2011). The progression of prediabetes to type 2 diabetes has been examined in a number of population with varying result. In general, epidemiological studies indicate that approximately 25% of subjects with IFT or IGT progress to type 2 diabetes in 5 years, whereas 50% remain prediabetics and 25% revert back to normal (Larson et al., 2004; Danaei et al., 1980). Dyslipidemia literally means disruption of the amount of lipid in blood and refers to a

disorder in lipoprotein metabolism including lipoprotein overproduction or deficiency (low HDL). The presence of dyslipidemia in diabetes is very well studied since macrovascular disease in diabetes precedes the diagnosis of diabetes, it is likely that prediabetics are also at increased risk of the same. The aim of study is to identify the unnoticed major lipid profile changes in population of Jharkhand.

#### MATERIALS AND METHODS

The study was conducted at inpatient and outpatient departments of the Department of Medicine, RIMS, Ranchi and the subjects with pre-diabetes be selected from those attending the medicine OPD. The study period was between February 2010 to July 2011. A total of 150 patients participated in the study, out of which 75 were prediabetic patients and each group of IFG, IGT and IFG& IGT consisted of 25 subjects. The control group consisted of 75 patients of which (NFG/NGT) were taken. The study was approved by the ethical review committee.

##### Inclusion criteria

Age-18-60 years

Presence of pre-diabetes, either newly diagnosed or previously diagnosed.

Nonalcoholic

Patients consenting to undergo blood test

Patients willing to undergo special investigations if required

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Table 1. Age and BMI distribution

	Group		p value	Significance
	Test/ Prediabetes	Control		
Age	41.68±12.38	38.46±11.6	0.103	NS
BMI	24.96±2.66	24.29± 2.18	0.182	NS

Table 2. Lipid profile distribution

	Group		pvalue	significance
	Test/Prediabetes	Control		
Total cholesterol	184.62±31.45	135.89±28.11	<0.001	significant
LDL	101.07±21.6	73.62±20.71	<0.001	significant
HDL	42.76±8.7	43.16±7.64	0.739	Non significant
Triglyceride	206.36±86.19	100.48±43.76	<0.001	significant
VLDL	40.48±17.84	20.24±9.53	<0.001	significant

Table 3. Different parameters with their comparison

Parameters	Test cases (n=75)		Control cases (n=75)		
Sex					
Male n(%)	Female n(%)	Male n(%)	Female n(%)		P value
46(61.2)	29(38.6)	43(57.3)	32(42.6)		0.37 (NS)
Age		Mean ±SD	Mean± SD		P value
		41.7±12.3	38.5±11.8		0.103
Fasting blood glucose		105.1±21.8	81.2±11.6		0.000
Oral glucose tolerance test	148.4±13.2		117.7±11.2		0.000
Dyslipidemia	Present n(%)	absent(%)	Present n(%)	Absent n(%)	
	54(72)	21(28)	19(25.3)	56(74.7)	
P value	0.0000				

### Exclusion criteria

Age - <18 years or >60 years

Clinical and biochemical markers of Familial dyslipidemia  
Acutely ill patients such as overt cardiac, renal respiratory failure or recent stroke

Alcoholic subjects, Diabetes, smokers, pregnant females, cushing's syndrome and acromegaly, lipodystrophy syndromes, history of following drug intake past 6 months

**Study design:** The patients were screened thoroughly by appropriate history including family history, clinical examination followed by tests. Every patients will be enlisted by his /her name, age, sex, address with telephone numbers, presenting complaints with relevant positive or negative history and important findings will be documented. Special laboratory investigations will be done when indicated from the initial data. The study was a cross sectional comparative study in a tertiary care hospital.

**Statistical analysis:** The data for prevalence of dyslipidemia in pre- diabetic population compared to normoglycemic population was analysed by SPSS version 16. Categorical variables were expressed as number of patients and percentage of patients using chi square test for independence of attributes. ANOVA and unpaired t Test were used comparison for groups.

### RESULTS

Table 1 shows the mean age of 41.68±12.38 in prediabetic patients (study group) and control group mean age of 38.46±11.6 yrs. There was a statistically no significant difference showing that the homogenous population was selected. Table 2 shows that there was a statistical significant difference between control and prediabetic group in lipid

profile except in the level of HDL. A statistically significant difference was observed in the FBS, OGTT and dyslipidemia among the study and control group. (Table 3)

### DISCUSSION

In the present study, we evaluated 75 patients having prediabetes by standard definition. They were compared with a population of 75 patients who were not having diabetes. Similar to our study, Williams *et al.* (2005) studied data from National Health and Nutrition Examination Survey done in 1999-2000 (NHANES). The mean total cholesterol of the prediabetic subjects were higher (174.2mg/dl) than the controls (157.5mg/dl). They concluded that adolescents with impaired fasting glucose had significantly high total cholesterol than adolescents with normal fasting glucose (Williams *et al.*, 2005). In a study conducted by Miyazaki *et al* observed low HDL levels in prediabetic subjects than controls (Miyazaki *et al.*, 2012). Shin *et al.*, 2011 also concluded that there is statistical significant difference in mean HDL between non-diabetes controls (n=172) and prediabetes (n=138) subjects with a mean HDL (mg/dl) 54.7±13.3 mg/dl and 49.9±11.6 mg/dl respectively. The results were similar to our study. The result of our present study is consistent with atherogenic dyslipidemia of low HDL, high TG and small dense LDL. Here, we could not measure the density of LDL. As a whole, 72% of prediabetic population in our study is dyslipidemic as compared to 25.3% of normal control subjects and the difference is significant (p, 0.001).

### Conclusion

In future progression from our study, it can be suggested that serum lipid profile must be included in the evaluation of prediabetes population. The pattern of dyslipidemia is to be noted and carefully followed up in long term and appropriate

measures should be taken as per national guidelines or standard lipid goals.

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