**ORIGINAL RESEARCH ARTICLE**

# Assessment of Prevalence of Cardiovascular Risk in Diabetic Patients Attending OPD of Chitwan Medical College Teaching Hospital

**Sanjay Yadav[1], Kalpana Sharma Dhakal[2], Mamata Sharma Neupane [2], Subodh Kumar Yadav [3], Birendra Yadav[3] , Renu Yadav [4] , Md.Nazrul Islam[4] and Bijay Aryal[*5]**

[1]Department of Biochemistry, [2]Department of Nursing, [3]Department of Anatomy, [4]Department of Physiology and [5]Department of Pharmacology, Chitwan School of Medical Sciences P.Ltd, Bharatpur-10, Chitwan, Nepal

**ABSTRACT**

Dyslipidemia, including high serum total cholesterol, LDL cholesterol and triglyceride levels and low HDL cholesterol levels, is an established risk factor of coronary heart disease. Most cases of dyslipidemia have a genetic bases, in some cases, in addition to genetic disorder(s), environmental factors such as diet, exercise and smoking habits also play important role in manifestation and progression of the disease. LDL cholesterol is atherogenic and it is associated with increased risk of atherosclerosis and its complications such as coronary heart disease and stroke.Hence the present study was under taken to assess the prevalence of cardiovascular risk in diabetic patients attending OPD of Chitwan Medical College Teaching Hospital. This cross-sectional study was carried in total 500 diabetic patients above aged 30.Result showed that the correlation coefficient between individual parameters of blood sugar (fasting, PP and random) and lipid profile (total cholesterol, TG, LDL and HDL) in diabetic patients of the present study was found to be statistically significant ($p<0.01$). In conclusion, dyslipidemia was mostly raised triglycerides followed by raised LDL-cholesterol, decreased HDL- cholesterol and raised total cholesterol level in diabetic patients.

**Key words:** Dyslipidemia, diabetic mellitus, blood sugar levels and total lipid profile.

**INTRODUCTION**

Dyslipidemia, including high serum total cholesterol, LDL cholesterol and triglyceride levels and low HDL cholesterol levels, is an established risk factor of coronary heart disease [1, 2]. Most cases of dyslipidemia have a genetic bases, in some cases, in addition to genetic disorder(s), environmental factors such as diet, exercise and smoking habits also play important role in manifestation and progression of the disease. LDL cholesterol is atherogenic and it is associated with increased risk of atherosclerosis and its complications [3, 4] such as coronary heart disease and stroke. Small and dense LDL cholesterol particles are more atherogenic [5, 6] and have greater predictive value for cardiovascular disease risk as compared to its simple quantitative measurement [6]. LDL cholesterol level is elevated by a diet rich in saturated fats, smoking, sedentary life style, and increased visceral fat [7] the risk of coronary heart disease is decreased by lowering its level. The incidence of coronary heart disease (CHD) rises steadily and exponentially with increasing serum cholesterol levels [8]. Cholesterol concentration also exhibits a positive relationship with coronary heart disease mortality[9]. HDL cholesterol is antiatherogenic, and it protects against the coronary heart disease [10, 11]. Low HDL- cholesterol increases the risk of cardiovascular disease [12]. HDL cholesterol levels are increased in individuals who exercise, where as obesity is associated with low HDL cholesterol and high serum triglyceride levels and increased cardiovascular disease risk [13]. Although correlation between serum cholesterol levels and atherosclerosis diminishes with advancing age, but the predictive value of cholesterol is restored when fractioned into its atherogenic LDL and protective HDL components [6]. High serum triglyceride levels are also associated with increased risk of coronary heart disease [10,11]. Hence, this study was carried out to assess the prevalence of cardiovascular risk in diabetic patients attending OPD of Chitwan Medical College Teaching Hospital.

**\*Corresponding Author:** Dr. Bijay Aryal , **Email:** phrbijayaryal@gmail.com, **Phone No:** 977-9843087444

## MATERIALS AND METHODS

This cross-sectional study was carried out at OPD of Chitwan School of Medical Sciences P.Ltd and a total 500 subjects above aged 30 were recruited for the study. Informed consent was obtained from each subject. This study was conducted from 5th August, 2011 to 21st January 2012. All historical information was obtained by interview and medical records.

### Inclusion Criteria

Type 2 diabetic patients between the ages of 30 to 70 years who were otherwise healthy were included .

### Exclusion Criteria

Diabetic patients those suffering from hypothyroidism or had family history of early CHD were excluded.

### Methods

Venous blood sample (3 ml) was collected in plane bottle after twelve hours fast, and serum obtained from clotted blood sample was utilized to determine serum cholesterol, high density lipoproteins,(HDL) low density lipoproteins (LDL) and triglyceride concentration.Patients having serum cholesterol levels above 200mg/dl (5.2mmol/l) ,serum triglyceride levels exceeding 200 mg/dl (2.3mmol/l),serum LDL-cholesterol above 130 mg/dl and HDL-cholesterol below 35 mg/dl were declared having dyslipidemia. They were also questioned about their awareness regarding dyslipidemia as a risk factor for heart disease.

### Statistical Analysis:

The statistical software SPSS (version 15) was use for data analysis. The mean values of Fasting, PP and random blood sugar levels and total lipid profile were determined. Correlations between the lipid profile and blood sugar were examined using the Pearson correlation coefficients keep statistical significance at 95% confidence interval of mean (P=0.05).

### RESULTS AND DISCUSSION

All the subjects selected in the present study were inhabitants of Chitwan and its surroundings. Chitwan is a valley with a mild hot weather situated in the eastern region of Nepal. Most of the subjects of this study were from middle class families. The mean age of all subjects were found to be $51.675 \pm 12.78$ years. Out of which the average age of male and female diabetic patients were found to be $57.432 \pm 11.68$ and $51.476 \pm 15.75$ years respectively. The level of fasting blood sugar, PP sugar, random sugar and total lipid profile was shown in (**Table 1**). There was significant difference between the blood sugar level and lipid profile levels between male and female ($P<0.05$).The lipid profile levels and blood sugar levels was shown in (Table 1).

**Table 1: Socio-demographic characteristics (n=500)**

| Parameters | All Subject X±SD | Male X±SD | Female X±SD | P-value |
|---|---|---|---|---|
| Age (years) | 51.675±12.78 | 57.432 ± 11.68 | 51.476± 15.75 | 0.052 |
| Fasting Sugar (mg/dl) | 412.23 ±24.79 | 612.98±34.18 | 517.98±25.98 | 0.001 |
| PP Sugar (mg/dl) | 700.67 ±26.89 | 815.43±64.98 | 634.98 ±58.44 | 0.012 |
| Random Sugar (mg/dl) | 478.87 ±39.67 | 678.87 ±34.78 | 477.87±26.87 | 0.0001 |
| Total Cholesterol(mg/dl) | 376.89 ±34.87 | 465.77 ±19.98 | 365.78 ±19.78 | 0.0001 |
| TG (mg/dl) | 250.87 ±22.98 | 340.98 ±11.98 | 356.98±22.78 | 0.0013 |
| LDL (mg/dl) | 287.78 ±34.87 | 287.97±34.22 | 378.87 ±19.87 | 0.0001 |
| HDL (mg/dl) | 36.78 ±23.66 | 24.87 ±16.98 | 30.76 ±13.89 | 0.028 |

The correlation coefficient between individual parameters of blood sugar and lipid profile in diabetic patients of the present study was found to be statistically significant ($p<0.01$) i.e. dyslipidemia is increased with advancement of blood sugar levels. The correlation between cardiovascular risk and blood sugar levels was shown in (**Table 2**).

DM is the commonest endocrine syndrome which is characterized by hyperglycemia due to relative or absolute deficiency of insulin. The diagnosis of DM is established with fasting plasma glucose $\geq$ 7.0 mmol/l (126mg/dl) or random plasma glucose $\geq$ 11.1 mmol/l (200 mg/dl). In asymptomatic patients two samples are required to confirm diagnosis [7, 8].

**Table 2: Correlation between cardiovascular risk and blood sugar levels**

| | | Fasting | PP | Random |
|---|---|---|---|---|
| **Total Cholesterol** | **R** | 0.251 | 0.278 | 0.262 |
| | **p-value** | 0.011 | 0.001 | 0.002 |
| **TG** | **R** | 0.485 | 0.191 | 0.213 |
| | **p-value** | 0.026 | 0.0001 | 0.0003 |
| **LDL** | **R** | 0.254 | 0.269 | 0.396 |
| | **p-value** | 0.000 | 0.013 | 0.001 |
| **HDL** | **R** | 0.259 | 0.298 | 0.313 |
| | **p-value** | 0.000 | 0.001 | 0.0002 |

Diabetes is associated with both short and long term complications which are the cause of increased mortality and morbidity among which diabetic dyslipidemias are very important. DM is a CHD equivalent. The major reason for this is diabetic dyslipidemia which make these patients 2-4 times more prone to CAD as compared to normal population. However the various dyslipidemias prevalent in diabetics differ in their frequency [8]. A lot of work has been done internationally on diabetic dyslipidemias. Some study compared the frequency of various dyslipidemias in diabetics and age, sex matched healthy controls in Sudan and found an increased incidence of various dyslipimedias in diabetics as compared to controls with particularly statistically significant increase in triglycerides level and a decrease in HDL-C levels. Other studies also showed a high prevalence of dyslipidemias in diabetics [9].

Another study showed that comparative cross sectional study on type 1 and 50 type 2 diabetics and found a high frequency of dyslipidemias in both groups. Similarly, other study has also shown that dyslipidemias are very common in diabetic population[10].

International studies done show that among the diabetic dyslipidemias, hypertriglyceridemia is the commonest. One study found that the most common lipid abnormality found in diabetics is increased serum triglyceride levels around 73.3%. The next common abnormality is decreased serum HDL-Cholesterol levels and increased serum LDL-Cholesterol levels, both seen in 66.7% patients respectively. A high total serum cholesterol level is seen in 46.7% patients [11, 12]. Our study showed that timely diagnosis and treatment of dyslipidemias is crucial in managing diabetic patients. In conclusion, dyslipidemia was mostly raised triglycerides followed by raised LDL-cholesterol, decreased HDL- cholesterol and raised total cholesterol level in diabetic patients.

## ACKNOWLEDGEMENT

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