COMPARISON OF LIPID PROFILES AND METABOLIC SYNDROME AMONG SELECTED COHORT OF CHRONIC AND RECENTLY DIAGNOSED TYPE II DIABETES MELLITUS PATIENTS WHO ATTENDED FAMILY PRACTISE CENTER OF UNIVERSITY OF SRI JAYEWARDENEPURA AND COLOMBO SOUTH TEACHING HOSPITAL

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Introduction

Type 2 Diabetes Mellitus (T2DM) is the predominant type of diabetes mellitus as it represents 90% of all diabetic cases. It is characterized by impaired insulin secretion and increased insulin resistance [1]. T2DM is a multifactorial disease which results from the combination of both genetic and environmental factors. The pathogenesis of T2DM is associated with many factors including obesity, age, physical inactivity, unbalanced dietary patterns and genetic factors.

Both T2DM and metabolic syndrome (MS) lead to the development of cardiovascular disease. The metabolic syndrome (MS) is a combination of metabolic risk factors that increases the risk of developing atherosclerotic cardiovascular diseases (ASCVD). According to the World Health Organization (WHO), clinical criteria for MS, insulin resistance is identified by T2DM, impaired fasting glucose levels or impaired glucose tolerance. Simultaneously two of the following, should be presented to diagnose MS; antihypertensive medication and/or high blood pressure (≥140 mm Hg systolic or ≥90 mm Hg diastolic), Plasma TG ≥150 mg/dL (≥1.7 mmol/L), HDL cholesterol <35 mg/dL (<0.9 mmol/L) in men or <39 mg/dL (<1.0 mmol/L) in women, BMI >30 kg/m^2 and/or waist: hip ratio >0.9 in men, >0.85 in women or Urinary albumin excretion rate ≥20 μg/min or albumin: creatinine ratio ≥30 mg/g [4].

Macrovascular disease is one of the predominant causes for mortality and morbidity in T2DM. Dyslipidemia is the principle risk factor for the development of macrovascular complications along with T2DM. Epidemiological studies have reported that most of the individuals with T2DM have altered lipid profiles [2]. Elevated levels of plasma triglycerides (TG) and low density lipoprotein (LDL) with reduced high density lipoprotein (HDL) levels are the main abnormalities that are used to diagnose dyslipidaemia. Elevated levels of LDL increase the risk for coronary heart diseases and stroke. Many studies have stated that, dyslipidemia is a significant risk factor for CHD and abnormalities in lipid metabolism are accountable for 56% of CHD worldwide [3].

In addition, MS is becoming a threat especially among the Asian populations. Hence this study was carried out to compare lipid profiles and to determine the prevalence

of MS among chronic (more than five years) and recently (less than one year) diagnosed T2DM patients.

Materials and methods

Chronic diabetic patients [with greater than 5 years duration (n=43)] and recently diagnosed diabetic patients [with less than one year (n=38)] were included in this study. Subjects with 35-65 years were included in this study. Data collection was done at the Family Practice Center, Faculty of Medical Sciences (FMS), University of Sri Jayewardenepura (USJP) and Colombo South Teaching Hospital, Kalubowila. Biochemical analysis was carried out in Department of Biochemistry, FMS, and USJP. Before the commencement of the study, ethical approval was obtained from the ethic review committee of FMS, USJP, and Colombo South Teaching Hospital, Kalubowila. Socio-demographic data was collected using an interviewer administered questionnaire. After a period of 12 hours fasting, 5 mL of venous blood was collected to perform the Fasting Serum Glucose (FSG) and lipid profile. Glucose oxidase and quantitative enzymatic-colorimetric determination methods were used to estimate plasma glucose concentrations and lipid profiles respectively. The results were analyzed using SPSS version 16.0.

Results and discussion

Among the study population of 81 subjects, 48 (59.3%) were females. All the participants in the study were Sinhalese with a mean age of 54±8 years. Within the selected cohort, 34.9% of subjects with chronic diabetes and 21.1% of recently diagnosed subjects were under treatment for dyslipidemia.

Among the recently diagnosed group, there were 42.1% of subjects with elevated total cholesterol (TC) levels (≥200 mg/dL) and among the chronic diabetics it was 18.6% and the values were significantly different.

21.1% of recently diagnosed subjects and 11.6% of chronic diabetics had elevated TG levels (≥150mg/dL). Among chronic diabetics 25.6% of the subjects had low HDL levels (<40mg/dL) and among recently diagnosed diabetics 18.4% had low HDL levels. However, there was no significant difference (p>0.005) between these two cohort.

Table 1. Comparison of mean FSG levels and parameters of lipid profiles between the recently diagnosed and chronic diabetic patients

Test	Recent diabetics (38)	Chronic diabetics (43)	P value
FSG (mg/dL)	128.0±37.2	176.7±78.9	0.008*
TC (mg/dL)	197.6±35.7	165.4±46.6	0.021*
TG (mg/dL)	105.9±52.4	102.7±45.2	0.249
HDL(mg/dL)	49.3±13.5	49.2±13.4	0.439
LDL(mg/dL)	125.5±35.5	96.2±46.8	0.000*
TC/HDL	4.2± 1.3	3.5± 1.3	0.268

**difference was significant at the level of 0.05*

Among recently diagnosed diabetics and chronic diabetics, 81.6% and 34.9% of subjects had elevated LDL levels (>100 mg/dL), respectively. There was a significant difference ($p<0.005$) in LDL levels between chronic and recently diabetics subjects. Among chronic diabetics subjects, 16.3% had elevated TC/HDL ratio (>5) and 26.3% of recently diagnosed diabetes patients had elevated TC/HDL ratio, but there was no significant difference ($p>0.005$).

Even with a fairly good glycaemic control, most of the individuals with T2DM are generally dyslipidemic. They are presented with elevated TG and LDL levels and reduced HDL levels. These abnormalities are due to impaired insulin action and hyperglycemia which lead to changes in plasma lipoproteins in patients with T2DM. Higher incidence of dyslipidemia is associated with increasing duration of T2DM [5]. In the current study, recently diagnosed subjects have higher lipid parameters compared to the chronic group. In addition higher percentage of chronic diabetics subjects had under gone treatment for dyslipidemia when compared to recently diagnosed subjects. This could have contributed to the reduction in lipid parameters among chronic subjects.

Table 2. Comparison of lipid profile parameters between the recently diagnosed and chronic diabetic patients with treatment for dyslipidemia

Test	Recent diabetics with treatment for dyslipidemia (n=38)	Chronic diabetics with treatments for dyslipidemia (n=43)	P value
TC (mg/dL)	207.5±50.2	158.7±58.3	0.015*
TG (mg/dL)	129.6±51.5	100.9±35.7	0.181
HDL(mg/dL)	52.7±20.4	51.5±16.8	0.842
LDL(mg/dL)	129.3±46.3	87.1±46.8	0.002*
TC/HDL	4.3± 2.0	3.2± 1.1	0.043*

**difference was significant at the level of 0.05*

TC, LDL and TC/HDL ratio are significantly different among the recently diagnosed and chronic diabetics patients with treatment for dyslipidemia (Table 2).

When considering the whole study population there were 4.9% of subjects with metabolic syndrome according to the above mentioned criteria. When considering the two groups there were 4.7% and 5.3% of subjects with metabolic syndrome among chronic diabetics and recently diagnosed diabetics respectively.

Conclusions and recommendations

Recently diagnosed subjects with T2DM had significantly more atherogenic lipid profiles and a higher percentage of MS, indicating the necessity to identify the subjects with risk of development of dyslipidemia at the time of diagnosis of diabetes. It is necessary to have proper educational and screening programmes for the recently diagnosed diabetics as well as the apparently healthy middle aged individuals.

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