

Effect of Obesity on Diabetes Control and lipids profile in both genders, a comparative study

HUMAIRA SHAUKAT¹, SHAZIA AKBAR², AMER SHOAB³, KANWAL FIRDOUS⁴

ABSTRACT

The main objective of this study was to observe the relationship of BMI with glucose levels and dyslipidemia in diabetic male and female patients. This study shows that high BMI is related with poor glycaemic control and lipids profile. Total 150 individuals were selected and divided into three groups. This study was conducted in medical and diabetic care units of Jinnah Hospital Lahore. The male patients with BMI (30-35kg/m²) showed (267.90±13.36), (230.40±79.23), (280.10±86.76) and (190.30±54.61) and (29.20±43.32)serum Glucose, LDL, Cholesterol, Triglyceride and HDL levels respectively. While the female patients with BMI (30-35kg/m²) showed (230.60±53.46), (225.30±49.53), (247.20±26.46), (170.25±63.41) and (30.31±25.28) serum Glucose, LDL, Cholesterol, Triglyceride and HDL levels respectively. Results showed that obese male has higher serum Glucose, LDL, Cholesterol, Triglyceride and HDL levels than the female of same BMI respectively.

Keywords: Diabetes mellitus, obesity, dyslipidemia

INTRODUCTION

Diabetes mellitus is a metabolic disorder in which blood glucose levels increased over a prolonged period. Symptoms of high blood glucose levels are frequent urination, increased thirst and increased hunger. Mainly diabetes mellitus has three types i.e., Type 1, Type 2 and Gestational diabetes. All types of diabetes increase the risk of long-term complications. These complications developed after 10 to 20 years in the body (Polisena et al., 2009). Type 2 DM is the most common type of diabetes mellitus. Type 2 Diabetes mellitus is an insulin resistance problem; in which insulin do not work properly. In this problem attachment of insulin not occurred with insulin receptors. There are number of lifestyle factors due to which type 2 Diabetes mellitus developed while obesity is one of them (Block et al., 2015)

Obesity is an abnormality in which large amount of fat deposits in the body of a person and creates negative effects on his health. If the body weight of a person increased 20% than the required weight therefore he or she is considered obese. If your Body Mass Index (BMI) is between 25 and 29.9 you are considered overweight (Amini et al., 2011). Hence if a body has 30 BMI or over than body is considered obese. Different studies claimed that Type 2 diabetic patients are mostly either overweight or obese. The pathology of Type 2 described that increase in weight

results in a proportional increase in resistant to endogenous insulin. While there are many other causes of Type 2 diabetes but increased Body Mass Index (BMI) is one of the most important. Number of studies described that obesity leads to poor control of diabetes (Piřhová et al., 2015).

Metabolic disorder of lipoprotein is called dyslipidemia. Dyslipidemia is an abnormal condition in which lipoproteins overproduction or deficiency occurred. In the case of dyslipidemia it has concluded by different studies those levels of "bad" low-density lipoprotein (LDL) cholesterol and the triglyceride increased while "good" high-density lipoprotein (HDL) cholesterol decreased in the blood. For adults with diabetes, it has been recommended that the levels of LDL, HDL, and total cholesterol, and triglyceride be measured every year. Diabetes increases the risk of many complications which can affect the quality of life (Vázquez et al. 2014).

MATERIALS AND METHODS

This is a comparative study and total 150 individuals were selected in this study. 50 individuals were control out of which 25 were male and 25 female. These individuals were placed in Group 1. 50 diabetic male patients were in Group 2 while 50 diabetic female patients were in Group 3 respectively. The study is conducted was medical and diabetic care units of Jinnah Hospital Lahore. Relation of obesity with hypercholesterolemia and glucose levels was observed according to BMI. In each gender, BMI, glucose levels and lipid profile of all the patients were noted. BMI was divided into two classes as Underweight (less than 20kg/m²) and overweight (26-

¹Department of Physiology, AkhtarSaeed Medical and Dental college Bahria Town Lahore-Pakistan

²Dept of Physiology, FMH College of Medicine & Dentistry, Lahore-

³Dept of Physiology, FMH College of Medicine & Dentistry, Lahore-

⁴Institute of Molecular Biology and Biotechnology (IMBB), The University of Lahore, Lahore-Pakistan

Corresponding to Shazia Akbar irfan_0656962@yahoo.com; Cell:03348049239

36kg/m²). Glucose levels performed through randomly taken blood samples. Different kits were used for each biomarker in this study. Data was analysed by using SPSS software. Mean and standard deviation for the Quantitative variables were calculated. P value of <0.05 was considered as significant.

RESULTS

In this study there were total 150 individuals and all were divided into three different groups i.e., in Group 1, Group 2 and Group 3. In Group 1 the BMI was of both male and female was considered less than 20 kg/m². Individuals of Group 1 have almost equal obesity in both genders. Five variables were determined experimentally in each group. Significant P<0.001 changes were seen in diabetic obese individuals in both Group 1 and Group 2. In Group 2 all the patients were diabetic male with BMI (20-30 kg/m²) and (30-35kg/m²) and similarly in Group 3 all patients were female of BMI (20-30 kg/m²) and (30-35 kg/m²).

The male patients with BMI (30-35kg/m²) showed (267.90±13.36), (230.40±79.23), (280.10±86.76), (190.30±54.61) and (29.20±43.32) serum Glucose, LDL, Cholesterol, Triglyceride and HDL levels respectively. While the female patients with BMI (30-35 kg/m²) showed (230.60±53.46), (225.30±49.53), (247.20±26.46), (170.25±63.41) and (30.31±25.28) serum Glucose, LDL, Cholesterol, Triglyceride and HDL levels respectively.

Current study is a comparative study and results showed that obese male has higher serum Glucose, LDL, Cholesterol, Triglyceride and HDL levels than the female of same BMI respectively.

Group 1: Control BMI(less than 20 kg/m²) n = 25 male

Biomarkers	Mean + SD	Significance
Glucose levels mg/dL	110.30±13.36	P<0.01
LDL levels mg/dL	150.40±52.23	P<0.01
Cholesterol levels mg/dL	200.10±16.46	P<0.01
Triglyceride levels mg/dL	130.30±23.21	P<0.01
HDL levelsmg/dL	40.10±19.18	P<0.01

Group 2: Control BMI(less than 20 kg/m²) n = 25 female

Biomarkers	Mean + SD	Significance
Glucose levels mg/dL	100.30±13.36	P<0.01
LDL levels mg/dL	120.10±52.23	P<0.01
Cholesterol levels g/dL	210.10±16.46	P<0.01
Triglyceride levels g/dL	120.30±23.21	P<0.01
HDL levels mg/dL	40.20±15.18	P<0.01

Group 3: Diabetic BMI(20-30 kg/m²) n = 25male

Biomarkers	Mean + SD	Significance
Glucose levels mg/dL	240.70±43.76	P<0.01
LDL levels mg/dL	220.40±89.33	P<0.01
Cholesterol levels mg/dL	250.10±16.46	P<0.01
Triglyceride levels mg/dL	170.30±93.61	P<0.01
HDL levels mg/dL	32.20±25.28	P<0.01

Group 4: Diabetic BMI(30-35 kg/m²) n = 25 female

Biomarkers	Mean + SD	Significance
Glucose levels mg/dL	267.90±13.36	P<0.01
LDL levels mg/dL	230.40±79.23	P<0.01
Cholesterol levels mg/dL	280.10±86.76	P<0.01
Triglyceride levels mg/dL	190.30±54.61	P<0.01
HDL levels mg/dL	29.20±43.32	P<0.01

Group 5: Diabetic BMI(20-30 kg/m²) n = 25male

Biomarkers	Mean + SD	Significance
Glucose levels mg/dL	220.60±53.46	P<0.01
LDL levels mg/dL	220.40±89.33	P<0.01
Cholesterol levels mg/dL	240.10±26.36	P<0.01
Triglyceride levels mg/dL	160.20±73.51	P<0.01
HDL levels mg/dL	34.40±25.18	P<0.01

Group 6: DiabeticBMI(30-35 kg/m²) n = 25female

Biomarkers	Mean + SD	Significance
Glucose levels mg/dL	230.60±53.46	P<0.01
LDL levels mg/dL	225.30±49.53	P<0.01
Cholesterol levels mg/dL	247.20±26.46	P<0.01
Triglyceride levels mg/dL	170.25±63.41	P<0.01
HDL levels mg/dL	30.31±25.28	P<0.01

DISCUSSION

Vazquez et al.,2014 documented that the diabetes control is independent of BMI. But when they conducted their study on other individuals how were some young than the previous individuals than they found absolutely different results. In the new study all the individuals were diabetic and have obesity. The results of their new study showed that obesity may cause cardiovascular abnormalities and can increase risk factors like hypertension and hyperlipidaemia. In another study Agarwall, 2009 suggested that obesity increases hypertension, dyslipidaemia and glucose levels in diabetic patients.

There were many studies describing significant changes in glucose levels and dyslipidaemia in both male and female regarding different ranges of BMI. Amini et al., 2011 suggested that there is a direct relationship of High BMI with poor control of glucose and Cholesterol levels in our population. Levine et al., 1995 published a review article, supporting that cholesterol reduction resulted in decrease in the cardiovascular events. They also identified a level of cholesterol which was significant, and documented that with increasing levels over years, the chances of getting cardiovascular disease were higher. However, we did document that the poor cholesterol has direct relationship with high BMI and poor diabetic control (Stone et al., 2013).

Fasamande et al 2013 studied a similar association between BMI and abdominal adiposity with atherogenic lipid profile in Type 2 diabetics with hypertension and other diseases. They also found that BMI was higher in the hypertensive group as compared to diabetics, and the most common dyslipidaemia was LDL cholesterol. Current study described the effect of obesity in male and female regarding their glucose levels and lipid profile by considering BMI. It has been seen that male patients with BMI (30-35 kg/m²) showed higher serum Glucose, LDL, Cholesterol, Triglyceride and HDL levels than female of same BMI respectively.

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