Original Article

Metabolic Syndrome in Type 2 Diabetes Mellitus

Hamim Bokhari[1], Nasreen Hamid[2], Amna Naveed[4], Mohsin Masud Jan[3], Zoufishan Altaf[1] and Muhammad Adnan[2]

ABSTRACT

Objective: The aim of the present study was to examine metabolic syndrome in type 2 diabetes mellitus.
Study Design: Descriptive / quantitative / cross sectional study.
Place and Duration of Study: This study was carried out at Medical outdoor, Pakistan Medical Research Center (PMRC) Sir Ganga Ram Hospital, Lahore from 1st January 2014 to 1st July 2014.
Materials and Methods: The study was included three steps of data collection such as questionnaire, measurement of blood pressure, height and weight, Collection of blood samples for the estimation of triglycerides and high density lipoprotein**.** Twenty five male patients and 25 female with T2DM of age 35 to 70 years were taken. Non probable sampling technique was used for collection of sample. The criteria for diagnostic patient was taken as fasting glucose level range greater than 110mg/dl
Results: The mean systolic and diastolic blood pressure of diabetic patients was 140mm/Hg and 90mm/Hg. The mean and standard deviation of triglyceride and high density lipoprotein were 186.1600+_95.6 and 48.32 +_8.33 respectively.
Conclusion: It is concluded that there are multiple risk factors involved in type 2 diabetes mellitus which are obesity, hypertension and dyslipidemia among these dyslipidemia proves to be the highest risk factor than hypertension and obesity. Physical activity, weight loss and diet favorably affect components of metabolic syndrome at least in the relatively short term. However randomized control trials shows that lifestyle intervention can prevent metabolic syndrome.

Key Words: Metabolic syndrome, Hypertension, obesity, Diabetics II.

Citation of article: Bokhari H, Hamid N, Naveed A, Jan MM. Altaf Z, Adnan M. Metabolic Syndrome in Type 2 Diabetes Mellitus. Med Forum 2017;28(6):158-161.

INTRODUCTION

Most of the people suffering from obesity are at high risk of hypertension. But unfortunately the nature of relationship between obesity and hypertension is not clearly understood by the people. Triglyceride and high density lipoprotein are considered to be the risk factors for cardiovascular disease, heart attack and stroke. The treatment includes in diet, oral medications, and in some cases, daily injections of insulin[1]

Type 1 diabetes results from the autoimmune destruction of insulin producing beta cells in the pancreas if the amount of glucose in blood is too high it can seriously damage the body organ. The patient shows retinopathy, nephropathy and basement membrane of the arterioles throughout the body[2]. Type 2 diabetes is the most common form of diabetes affecting 85-90% of all people with diabetes while it usually affects adults, younger people, even children are getting type 2 diabetes[3]. It is characterized by hyperglycemia in the context of insulin resistance relative lack of insulin[4].This is in contrast to diabetes mellitus type1, in which there is an absolute lack of insulin due to breakdown of islet cells in the pancreas [5]. Over the time the high glucose levels in the blood can damage the nerves and small blood vessels of eyes, kidneys, and heart and lead to atherosclerosisor hardening of the arteries that can cause heart attack and stroke [6].However.in rare cases diabetic keto-acidosis can also occur in patients with type 2 diabetes, usually due to a serious infection or another severe illness[7]. Hyperglycaemic hyperosmolar non ketonic syndrome it is a serious complication of diabetes that include high blood sugar levels, dry mouth, extreme thirst ,high fever ,loss of consciousness, coma and death[8],[9]. Type 2 diabetes is typically a chronic disease associated with ten years shorter life expectancy. In the developed world it is the largest cause of non traumatic blindness and kidney failure[11]. It has been associated with an increased risk of cognitive dysfunction and vascular dementia[12]. The development of type 2 diabetes is caused by a combination of life style and genetic factors[13]. A lack of sleep has been linked to type 2 diabetes. This is believed to act through its effect on metabolism [14]. The nutritional status of a mother during fetal development may also play a role with one propose mechanism being that of altered DNA

1. Department of Chemistry, Postgraduate Islamia College, Cooper Road, Lahore.
2. Department of Obst. & Gynae / Surgery[3], RMDC, Lahore.
4. Department of Pathology, CMHLMC, Lahore.
5. Pakistan Medical Research Council Center, Sir Ganga Ram Hospital Lahore, Pakistan

Correspondence: Hamim Bokhari, Assoc. Prof. of Chemistry, Postgraduate Islamia College, Cooper Road, Lahore.
Contact No: 03214598114
Email: a1hamim@yahoo.com

Received: April 12, 2017; Accepted: May 20, 2017

methylation[15,16]. A number of life style factors are known to be important to the development of type 2 diabetes dietary factors, consumption of sugar sweetened drinks in excess is associated with increased risk [17,18]. A lake of exercise is believed to cause 7% of cases , presence of metabolic syndrome doubles the risk of developing type 2 diabetes [19.20].

MATERIALS AND METHODS

Fifty patients were included in the present study twenty five were male of 35 to 70 of age the remaining twenty five were female of same age group having 1 to 20 years of duration of diabetes. The demographic variables included in the questionnaire were name, age, gender, socioeconomic status, dietary intake, family history of disease, duration of diabetes medication smoking. Patient who were newly diagnosed with type 2, with cancer, hepatitis were excluded from the study

The experimental procedures are outlined below.

Collection of blood samples and preservation. Blood samples of 3cc were collected from patients. A code was used to identify each sample at the time of collection and for preservation of samples. The blood was transferred to a clean labeled vial, then kept into water bath, after it was drawn using a disposable syringe in order to avoid hemolysis of red blood cells and sample was allowed to clot so that the serum was separated. The serum was transferred to the falcon tubes, centrifuged at 4000 revolution /min at 37°C for 5 min in order to separate serum .The serum was transferred to eppendorf tubes in freezer at -20°C for laboratory investigations. Triglyceride, fasting blood sugar and high density lipoprotein were measured.

Estimation of Triglyceride: Triglyceride was detected by using kit by Randox and estimation was done by liquid reagent GPO-PAP method after enzymatic hydrolysis with lipases. For estimation of triglyceride 1000 ul of reagent was taken with the help of micropipette in three small test tubes labeled test, standard and blank respectively. 10ul serum was added in test labeled, 10ul standard triglyceride solution in standard labeled tube and nothing in blank labeled, mixed and incubated in water bath for 5 min at 37°C. The absorbance of colour was developed against the reagent blank at 500nm on spectrophotometer (Humalyzer 3000).The absorbance of sample and standard was determined. The reference value was 50-150mg/dl

Estimation of high density lipoprotein cholesterol: It was calculated using their serum by using kit by human. For estimation of high density lipoprotein –cholesterol (1000ul) of reagent 1 was taken with the help of micropipette in three small test tubes labeled test, standard and blank respectively. 10ul serum was added in test labeled, 10ul cholesterol standard solution reagent 2 in labeled tube. The contents were, mixed and allowed to settle down for 20 min in water bath at 37°C. It was centrifuged test labeled at 3000rpm and separated supernatant. In separate test tube 1000ul of cholesterol reagent and 10ul of supernatant. The absorbance of colour was developed against the reagent blank at 500nm on spectrophotometer (Humalyzer 3000).The absorbance of sample and standard was determined. The reference value was 40-70mg/dl. Statistical tests were performed on the data collected for metabolic syndrome in type 2 diabetes mellitus.

RESULTS

The mean systolic and diastolic blood pressure of diabetic patients was 140mm/Hg and 90mm/Hg. The mean and standard deviation of triglyceride and high density lipoprotein were 186.1600+_95.6 and 48.32 +_8.33 respectively. The results are displayed in Table 1 to Table 4

Table No.1: Demographic profile percent

Gender	**Male 50%**	**Female 50%**
Socio-economic status		
Poor class	80%	80%
Middle class	14%	14%
Upper class	6%	6%
Education level		
Literate	24%	18%
Illiterate	26%	32%
History of smoking	100%	0%
Carbohydrates		
High	2%	4%
Low	4%	14%
Protein		
High	6%	0%
Low	2%	2%
Fat		
High	32%	30%
Low	4%	6%
Medication	33%	39%
Family history disease	55%	45%

Table No.2: Mean of Triglyceride and High density lipoprotein

SR. No	No of sample	Triglyceride	High density lipoprotein
1	Fifty	183	50
2	Mean	186.160	48.320
3	Standard deviation	95.96	8.33

Table No.3: Prevalence of metabolic syndrome and its different components in type 2 diabetes

Sr. No.	No of samples N=50	Male N=25 (50%)	Female N=25 (50%)	Total
1	Metabolic syndrome	15(52%)	14(48%)	29 (58%)
2	Obesity	5(20%)	9(36%)	14(28%)
3	Hypertension	13(52%)	11(44%)	24(48%)
4	Dyslipidemia	17(60%)	15(60%)	32(64%)

Table No.4: Statistical data of different factors of metabolic syndrome

Sr.No.	Metabolic syndrome	
1	Age (mean)	50 years
2	Systolic blood pressure	140
3	Diastolic blood pressure	90
4	Hypertension (mean)	140/90
5	HDL(mean)	48.320
6	Serum triglyceride (mean)	186.160

DISCUSSION

Demographic information in table 1 indicates socioeconomic status belongs to poor class is higher (80%) than middle class (14%) and less in upper class (6%).Education level of literate male(24%) is higher than literate female (18%)it may be due to the reason that poor community have less resources than upper class. Smoking history indicates 0% in female and 100% in male. It may be that males continue smoking as enjoyment and to reduce social stress. Amount of carbohydrates (4%) in female is high than male (2%) even low carbohydrate level in female (14%) than low carbohydrates (4%) in male, due to diet, way of living style.

Females have (0%) high protein and (30%) high fat than males which have (6%) high protein and (32%) high fats. While in case of oral medication (39%) in females and (33%) in males, it may be due to less capability of tolerance in females. Study of family history of disease indicates(45%) in females and (55%) in males .The mean and standard deviation from table 2 indicates triglyceride and high density lipoprotein are 186.160+_95.96 and 48.32+_8.33 respectively. Prevalence of metabolic syndrome and its different components from table 3 indicates that metabolic syndrome (52%) in males and(48%) in females prove that disease is more dominant in male when this result was compared with Yoshionri [21] who has shown high prevalence of metabolic syndrome among males (49%) and (28%) females. Our results are in agreement with his results. Obesity high in female(36%) as compared to male (20%).When this result is compared with Alebiosu[22] result ,the close agreement is found between them ,it may be due to physical inactivity, repeated pregnancies depression and joblessness. Hypertension is found high in male(52%) than female(44%).It shows that greater risk of developing hypertension is associated with increasing body mass.Dyslipidemia is less (60%) in female and high (68%) in male. This may be due to prensence of triglycerides and increase deposition of fats in the body which increases the weight and results in the development of cardio vascular diseases.

The results indicate that metabolic syndrome is more dominant in male.

CONCLUSION

It is concluded from present study that serum triglyceride is positively correlated with the development of type 2 diabetes mellitus. It also depicts the significance of hypertension as risk factor of diabetes. It shows an alarming situation regarding metabolic syndrome and its mortality. It should be controlled epidemically with respect to control hypertension, maintain normal weight, regular physical exercise, normal blood sugar control. There should be health promotion programs towards risk groups and encouraging awareness in people about their weight and physical fitness to reduce obesity and hypertension.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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Corrigendum 1:

Due to typographic mistake, Figure No.1 in the article titled "Array of Unnatural Deaths: A Study of Medico Legal Autopsies at District Head Quarter Hospital Lakki Marwat" with authors Khalil ur Rehman[1], Abdul Haq Wazir[3], Amir Hamza[4], Mian Mujahid Shah[1] and Sher Bahadur[2] published in Med. Forum Journal Vol.28 No.3 at pages 30-32 was omitted, which may be seen and read as under:-

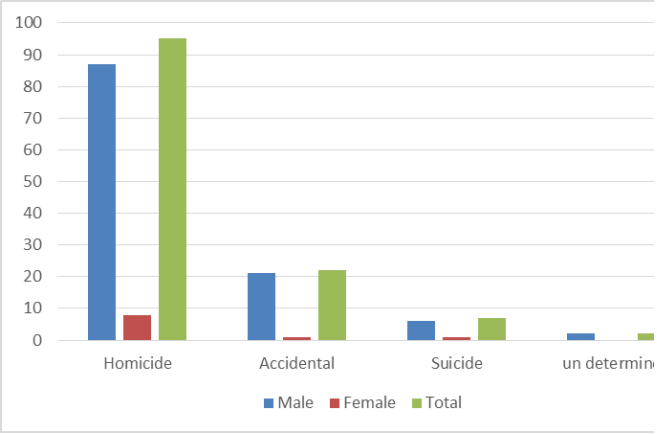

Figure No. 1: Gender wise distribution of manner of death

Editor

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Corrigendum 2:

Due to typographic mistake, Study Design in the Abstract of article titled "Efficacy of Cranberry Extract Bacillus Coagulans & Turmeric Extract in Patients With Bacterial Vaginosis" with authors Syeda Batool Mazhar,[1] Tazeen Fatima Munim,[2] Haleema Yasmin[3], Jehan Ara[4], Shamsa Humayun,[5] Rakhshan Najmi,[6] Yasmin Noman,[7] Muhammad Ikram,[8] Khadija Khatoon,[9] Neeta Maheshwary[10] published in Med. Forum Journal Vol.28 No.5 at pages 59-63 which may be read as under:-

Study Design: Phase IV Interventional, Prospective study

Editor

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