



CODEN [USA]: IAJPBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1402665>Available online at: <http://www.iajps.com>

Research Article

**A DESCRIPTIVE RESEARCH ON THE INCIDENCE OF  
METABOLIC SYNDROME FREQUENCY IN THE PATIENTS  
WITH AND WITHOUT DIABETES MELLITUS (DM)****<sup>1</sup>Dr. Syed Rafeh Ali Bokhari, <sup>2</sup>Dr. Aiman Majeed, <sup>3</sup>Dr Rizwan Munir**<sup>1</sup>Government Filter Clinic 2-C-2 Township Lahore<sup>2</sup>Jinnah Hospital Lahore<sup>3</sup>SIMS/Services Hospital Lahore**Abstract:**

**Objective:** To find out the relationship and occurrences of Metabolic Syndrome in diabetes and non-diabetes patients with increased waist size.

**Methods:** The study was carried out at Sir Ganga Ram Hospital, Lahore (September, 2016 to October, 2017). The sample was composed of 50 diabetes and 50 non-diabetes (100) patients. The patients were selected by non-probable sampling. Male and female patients within age range of (30 – 50) years were selected having waist perimeter >102 cm and > 88 cm respectively. All the participants were informed about the objective of the research. Exclusion criteria included patients with cardiovascular diseases, diabetes during pregnancy and nephrotic syndrome (Kidney problems). Fasting blood samples were obtained and analyzed for blood sugar and lipid routines. The size of the waist in standing position was measured for each patient. All the clinical and demographic factors were filled on a form and later the analysis of the outcomes was carried out through SPSS.

**Results:** The ratio of males and females in diabetes patients was (62% & 32%) respectively whereas in non-diabetic, the ratio was (58% & 42%) respectively. All diabetic patients had dyslipidemia compared to 88% non-diabetics. The diabetes patients were suffering more from high blood pressure (88%) as compared to non-diabetic patients (34%). Metabolic syndrome prevalence was found in 60% diabetic cases; whereas, 28% non-diabetic patients were diagnosed ( $p = 0.001$ ).

**Conclusion:** The study inferred that the prevalence of metabolic syndrome in diabetes patients is very high in people with increased waist size.

**Keywords:** Diabetes, Metabolic Syndrome, Lipid, Glucose, Nephrotic Syndrome.

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Please cite this article in press Syed Rafeh Ali Bokhari et al., A Descriptive Research on the Incidence of Metabolic Syndrome Frequency in the Patients with and Without Diabetes Mellitus (DM), *Indo Am. J. P. Sci.*, 2018; 05(08).

**INTRODUCTION:**

The changing pattern of lifestyle has effected the human life in all dimensions especially health [1]. The prevalence of metabolic syndrome is an emerging health issue and the experts from the health departments around the world are struggling to fight the cluster of symptoms of different diseases [2].

The incidence of Metabolic Syndrome is often described by a combination of symptoms from different diseases. These include high blood sugar, disturbed lipid profile, increased fat around the waist and hypertension [3]. The word syndrome was first used by Gerald Reaven in 1988 for the combination of such symptoms [4].

The condition increases the risk for the morbidity of Diabetes Mellitus (DM) and many ischemic heart diseases including Stroke [6, 7]. Increased blood sugar owing to the condition of insulin resistance is the primary factor for most of the symptoms of the metabolic syndrome. The relationship of insulin resistance and heart diseases have been highlighted by some studies but more concentrated and bigger studies are needed to confirm the validation of the findings [7, 9].

Corpulence is also associated with high blood pressure, low HDL, insulin resistance, high blood sugar, elevated cholesterol levels and other heart diseases [7]. Metabolic syndrome patients are often seen with fat accumulation around the waist [10]. The condition of metabolic syndrome is seen in older patients irrespective of gender, especially in people with normal weight [11].

The spread of metabolic syndrome is reported in 10% – 40 % in different geographical locations from east and west [3, 6, 12, 13]. According to Metabolic Syndrome definitions by WHO, ATP & IDF, the incidences of Metabolic Syndrome was found to be 12%, 20%, and 27% respectively [14]. Metabolic syndrome is closely related to some other diseases such as diabetes and ischemic heart diseases therefore an early diagnosis and cure is likely to produce better results. The study is focused on exploring the relationship between diabetic & non-diabetic cases of metabolic syndrome with increased waist sizes.

**PATIENTS AND METHODS:**

The study was carried out at Sir Ganga Ram Hospital, Lahore (September, 2016 to October, 2017). The

sample was selected in light of WHO software [15] for probable sampling and consisted of 79 subjects. Initially, 100 patients were enrolled. The final sample after Type 2 error was restricted to 79 patients. The results were compared with the findings of the reference study conducted by Imam SK et al [11].

A total of 100 patients were selected through probable sampling. The age of the sample was between 30-50 years. The ratio of diabetic and non-diabetic patients was 1:1 (50 patients in each category). The patients with diabetes duration of more than three years were included and non-diabetic patients with increased waist size (Male > 102 cm & Females > 88 cm) were selected for the study from OPD of Medical Unit II [16]. The subjects with cardio vascular diseases, kidney problems, pregnancy related diabetes and disturbed lipid profiles were excluded from the study. Patients' history and reporting symptoms were recorded. Clinical findings were made after taking 12 hours fasting blood sample. Waist perimeter and blood pressure was measured for each patient. Patients were informed about the procedures and objective of the research. Other factors including age, sex, lipid routines etc. and their effect on Metabolic Syndrome was recorded on a form.

Data was analyzed by using SPSS. The values were presented in form of the means and percentages depending upon their properties. Cases and controls were compared through Chi-square test. Students' t-test (unpaired) was conducted for the comparison of mean values between diabetic & non-diabetic cases (p-value < 0.05).

**RESULTS:**

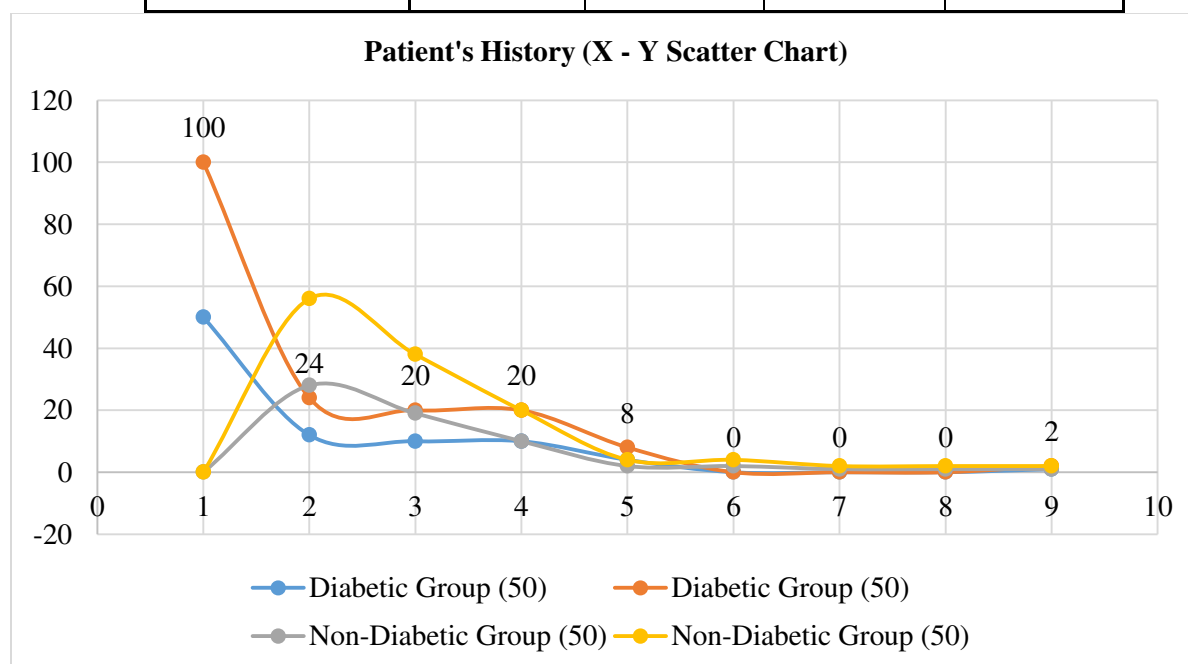
Our sample was composed of 100 patients (50 each from diabetic and non-diabetic group). In diabetic group, 62% were males and 38% were females. In non-diabetic category, 58% were males and 42% were females. Mean age of diabetic and non-diabetic groups were (41.6 ± 6.04) & (41.3 ± 6.61) years respectively. The difference in ages and gender was statistically insignificant.

It was observed that he patients were suffering from diabetes for more than 7 years in diabetic group. Fever was reported in some patients in both groups (28 non-diabetic patients and 12 diabetic patients). Some patients from both the groups 20% diabetics and 38% non-diabetic reported with the symptoms of

cough. Some other general symptoms of the patients are given in Table – I.

**Table – I:** Comparison of history of presenting complaints between diabetic and non-diabetic groups

Patient's history	Diabetic Group (50)		Non-Diabetic Group (50)	
	Number	Percentage	Number	Percentage
Diabetes mellitus	50	100	0	0
Fever	12	24	28	56
Cough	10	20	19	38
Burning	10	20	10	20
Epigastric pain	4	8	2	4
Hepatitis C Virus	0	0	2	4
Abdominal pain	0	0	1	2
Vertigo	0	0	1	2
Diarrhea	1	2	1	2



The prevalence of dyslipidemia and hypertension in both diabetic & non-diabetic cases was 100% & 44% and 44% & 34% respectively. The difference was statistically significant for these features. Metabolic Syndrome prevalence was 30 diabetes (60%) cases and 14 non-diabetic (28%) cases (p-value 0.001).

Gender distribution for both groups is presented in Table – II. Out of males in diabetic group, Metabolic Syndrome was present in 64.5% patients. Metabolic Syndrome in female diabetic patients was 52.6%. The analysis revealed that the values are not statistically significant. Similarly, non-diabetic males showed the prevalence of Metabolic Syndrome only in 37.9% and females in 14.3%. Difference between prevalence of Metabolic Syndrome in both diabetic & non-diabetic cases was also non-significant (p-value = 0.110).

**Table – II:** Comparison of gender between diabetic and non-diabetic groups in relation with Metabolic Syndrome

Group		Male		Female		p-value
		Number	Percentage	Number	Percentage	
Diabetic	Metabolic syndrome	20	64.5	10	52.6	0.405
	Non-metabolic syndrome	11	35.5	9	47.4	
	Total	31	100	19	100	
Non-Diabetic	Metabolic syndrome	11	37.9	3	14.3	0.11
	Non-metabolic syndrome	18	62.1	18	85.7	
	Total	29	100	21	100	

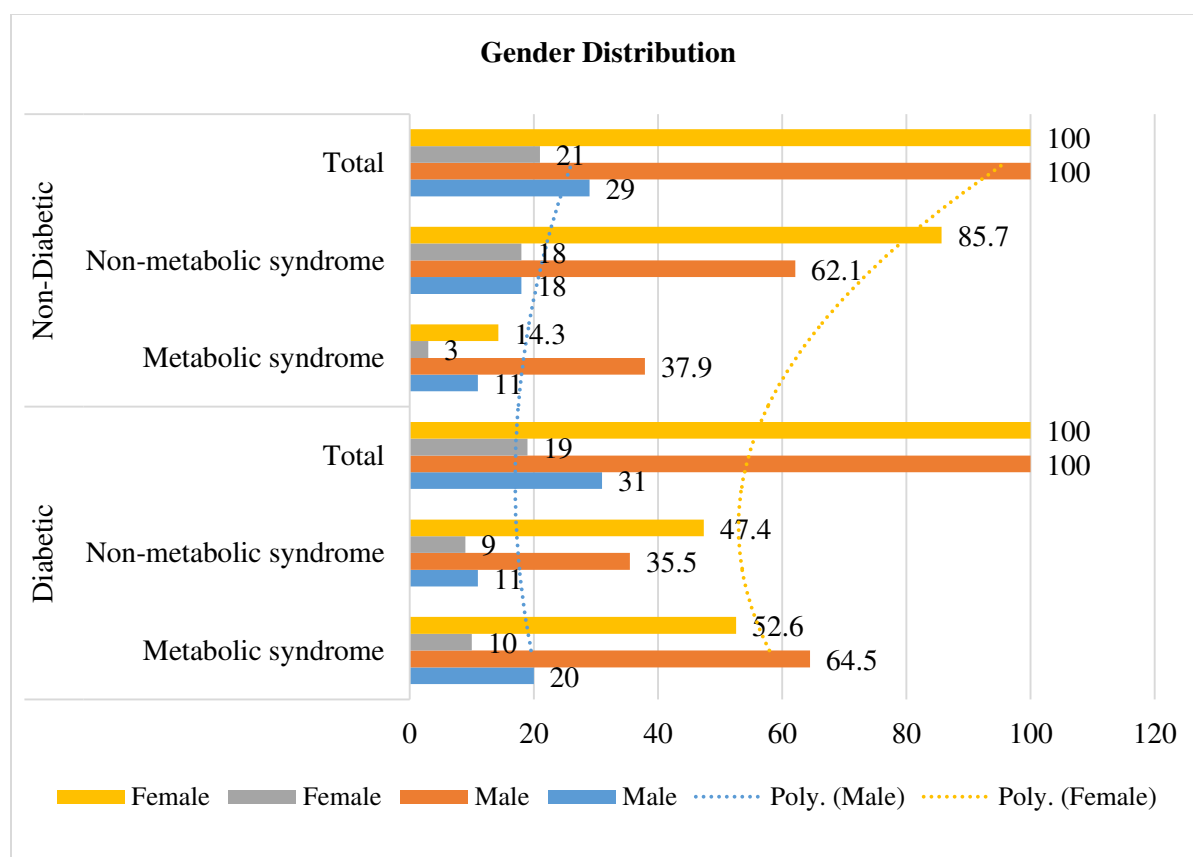
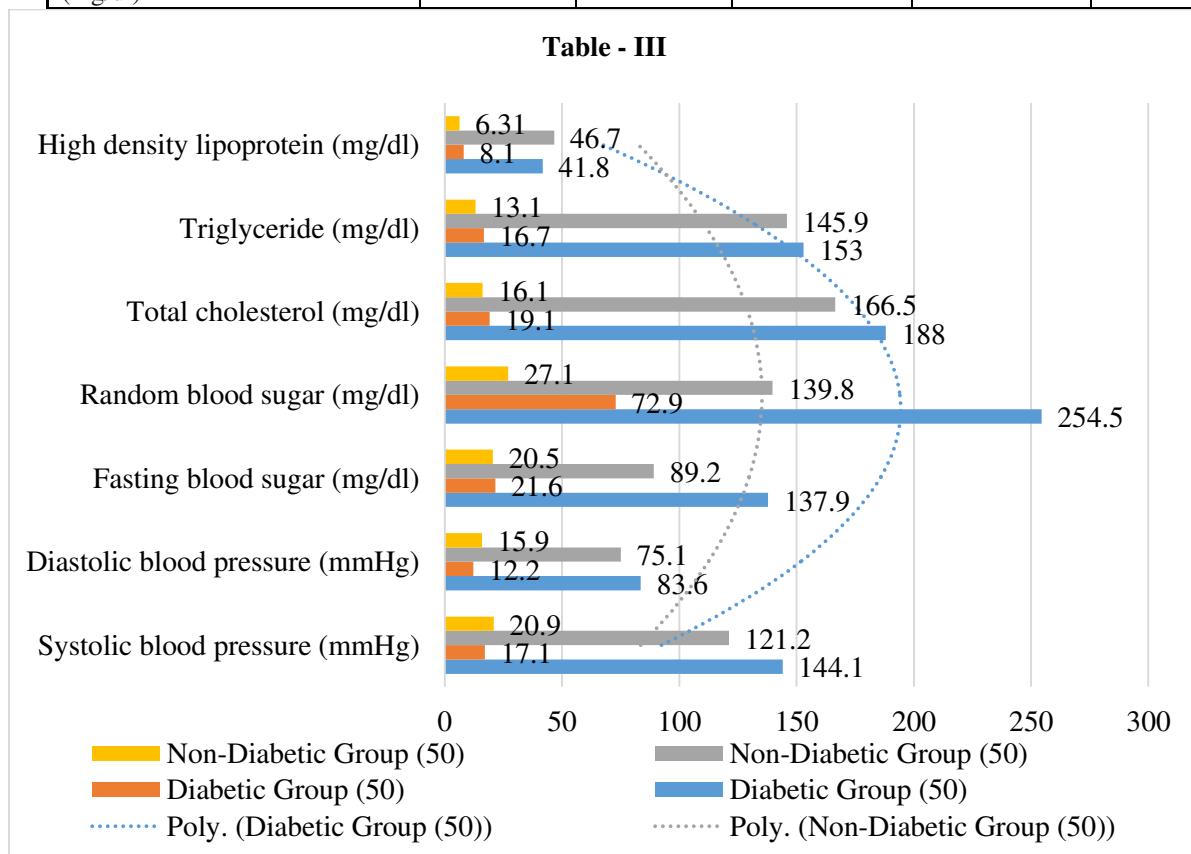


Table – III shows the association of hemodynamic response (HR), blood sugar and lipid profile for both groups. The values for mean systolic BP were higher in diabetic group as compared to other group. Fasting and normal blood sugar was also higher in cases of diabetes than the non-diabetic cases (Diabetic Fasting:  $137.9 \pm 21.6$  mg/dl, Non-diabetic Fasting:

$89.4 \pm 20.5$  mg/dl, Diabetic). Cholesterol level for diabetic patients ( $188.0 \pm 19.1$  mg/dl) was considerably higher than the cholesterol level for non-diabetic patients ( $166.5 \pm 16.1$  mg/dl). The triglycerides levels for both diabetic & non-diabetic patients were ( $41.8 \pm 8.10$ ) & ( $46.7 \pm 6.31$ ) respectively (p-value < 0.001).

**Table – III:** Comparison of hemodynamic response, blood sugar level and lipid profile between diabetic and non-diabetic groups

Hemodynamic response, Blood sugar level & Lipid variables	Diabetic Group (50)		Non-Diabetic Group (50)		P-value
	Mean	± SD	Mean	± SD	
Systolic blood pressure (mmHg)	144.1	17.1	121.2	20.9	0.001
Diastolic blood pressure (mmHg)	83.6	12.2	75.1	15.9	0.004
Fasting blood sugar (mg/dl)	137.9	21.6	89.2	20.5	<0.001
Random blood sugar (mg/dl)	254.5	72.9	139.8	27.1	<0.001
Total cholesterol (mg/dl)	188	19.1	166.5	16.1	0.015
Triglyceride (mg/dl)	153	16.7	145.9	13.1	0.001
High density lipoprotein (mg/dl)	41.8	8.1	46.7	6.31	<0.001

**DISCUSSION:**

Metabolic Syndrome prevalence is closely related to the obesity and increasing in all parts of the world. In this set-up, WHO criteria based on waist to hip ratio & BMI was used for the determination of Metabolic Syndrome. Current study delivered that the Metabolic Syndrome prevalence was 60% in diabetic cases and 28% in non-diabetic patients. The results are significantly different for both groups with increased waist perimeter. This finding confirms that the

Metabolic Syndrome prevalence in diabetic cases with increased waist is higher (Study hypothesis). The findings of this study are similar to the studies by Elabbassi WN, Ilanne-Parikka P and conflicting with the findings of the study of Vanhala MJ [17 – 19].

The gender distribution in relation to Metabolic Syndrome is observed in different countries. In USA (White population) and Taiwan, the prevalence of syndrome was higher among males as compared to

females [20] which is comparable with the findings of our study. The conflicting results were seen in other populations such as (American blacks, Mexicans, Iran, India, Oman, Korea and Kinmen [12, 21-24].

A major study of 1209 subjects conducted at Finland [19] delivered that the prevalence of Metabolic Syndrome increased to double causing the mortality rate to increase due to heart and other diseases. In the Botnia Study, the sample of 4483 men and women free from CVD were analyzed. The death rate increased two fold after development of Metabolic Syndrome in light of the criteria defined by WHO [25]. We found more hypertensive patients in diabetic group as compared to non-diabetic group. The mean systolic pressure was higher in diabetes patients as compared to the rest of the sample. This shows that the high BP is closely related to the high blood sugar. In the ARIC study by Liese AD, 10% subjects were diagnosed with the combination of hypertension and abnormal lipid profiles [26].

The relationship of Metabolic Syndrome with other diseases such as CHD, MI and stroke was 3 times higher as described by a Scandinavian study [27]. Obesity and hypertension along with dyslipidemia increases the risk factor in diabetes patients. The Cholesterol level for diabetic group was considerably greater than non-diabetic patients. Same pattern was observed for triglycerides which further validates the hypothesis of our study. The lipid profiles in diabetics were more disturbed as compared to non-diabetic patients.

It was observed that the diabetes patients are more likely to be effected by macro and micro vascular indications. Most of them can develop high BP and disturbed lipid routines [29].

Metabolic Syndrome is closely related to corpulence. Healthy physical activities and reduction in body weight can help to fight this condition. Patients suffering from DM and heart diseases can be given drugs to control all at the same time.

#### CONCLUSION:

The study suggests to control weight, hyperglycemia and hyperlipidemia by walking and exercise. The study concluded that the Metabolic Syndrome prevalence was higher in diabetes cases and their circumference of the waist was also increased.

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