

## Frequency of Metabolic Syndrome in cases with Type 2 Diabetes Mellitus

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### ABSTRACT

**Objective:** To determine the frequency of metabolic syndrome in cases with type 2 diabetes mellitus.

**Methods:** A descriptive cross-sectional study was conducted at department of Medicine, Allied Hospital, Faisalabad from February to May 2016. All diagnosed cases of type 2 diabetes mellitus having 30 to 70 years of age of either gender were enrolled. The presence of metabolic syndrome was observed.

**Results:** Out of 150 cases, 79 (52.67%) were males whereas 71 (47.33%) were females. Age distribution shows that 93 (62%) were <50 years of age whereas 57 (38%) patients were >50 years of age (mean age 44.58±6.31 years). The frequency of metabolic syndrome in cases with diabetes mellitus was found to be 117 (78%).

**Conclusion:** The rate of metabolic syndrome is quite higher in cases with type 2 diabetes mellitus.

**Key words:** Metabolic syndrome, Type 2 diabetes mellitus, Prevalence.

*How to cite this article:* Qureshi D, Imtiaz S and Yasmeen I. Frequency of metabolic syndrome in cases with type 2 diabetes mellitus. J Dow Uni Health Sci 2018; 12 (1): 21-23.

### INTRODUCTION

The metabolic syndrome (MS) is known as a cluster of etiological factors for cardiovascular disease (CVDs) and diabetes mellitus (DM) which includes glucose intolerance, dyslipidemia, hypertension, and abdominal obesity.<sup>1</sup> The rate of MS in United States was recorded in more than 25% of adult population. Similarly, it was reported as 23% in seven European countries. South Asian population was also estimated as 20–25% suffering with MS.<sup>2,3</sup>

In our country, exact prevalence of MS is unknown.<sup>4</sup> Increasing prevalence of CVD and factors leading to it are the main reason of attraction towards MS.<sup>5</sup> All metabolic syndrome cases have a fivefold higher risk of diabetes mellitus,<sup>6</sup> which is responsible for a significant higher rate of death, out of which most of the cases are having CVDs.<sup>7</sup>

Obesity, particularly abdominal obesity, is the main reason of resistance to the effects of insulin on peripheral glucose and fatty acid utilization, often leading to type 2 diabetes mellitus (DM).

Insulin resistance, the associated hyperglycemia and hyperinsulinemia, and adipocyte cytokines (adipokines) may also responsible for vascular endothelial dysfunction.

Diabetes and Impaired Glucose tolerance are in diagnostic criteria of Metabolic Syndrome. Higher rates of MS are obvious in Diabetics. Scientific documentation, exact expected prevalence and comparison of Pakistan with region are important. This study was conducted with the aim to determine the MS in cases with type 2 diabetes mellitus and if the frequency of MS is higher in diabetic individuals in our population, we may consider type 2 diabetes mellitus as an indicator of MS and may enable us to easily diagnose MS in diabetic population.

### METHODS

This descriptive cross-sectional study was conducted at department of Medicine, Allied Hospital, Faisalabad from February to May 2016. The age range was 30-70 years of either gender. To diagnose metabolic syndrome we used the following criteria (1) body mass index (BMI) > 30, (2) systolic blood pressure (BP) > 140mmHg or diastolic blood pressure >90 mmHg, (3) fasting triacylglycerol >150mg/dL(1.7mmol/L), high

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density lipoprotein cholesterol (HDL-C) <40mg/dL (1.03 mmol/L) in men and <50 mg/dL (1.29 mmol/L) in women, and (4) fasting glucose =110mg/dL (6.1 mmol/L). All cases with combined use of oral antidiabetic drugs and insulin, hospitalized cases, and pregnant females were excluded.

For the purpose of statistical analysis, SPSS version 17.0 was used. The relationship of MS with age and gender were explored using chi-square test.

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all patients for being included in the study.

## RESULTS

In this study, out of 150 cases, 79 (52.67%) were males whereas 71 (47.33%) were females. (Table No. 1) The mean age of the patients was 44.58±6.31 years. There were 93 (62%) patients with <50 years of age whereas 57 (38%) were presented with >50 years of age.

Frequency of metabolic syndrome in cases with diabetes mellitus was recorded as 117 (78%) whereas 33 (22%) had no findings of MS.(Figure 1)

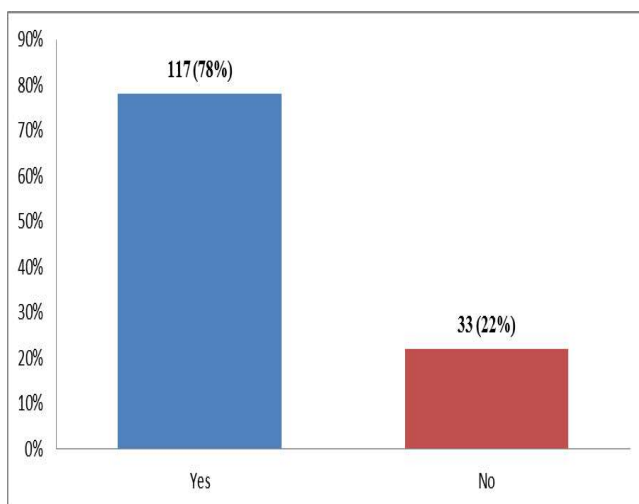


Figure : Frequency of metabolic syndrome (n=150)

Table 1: Comparison of Metabolic Syndrome with Baseline Characteristics (N=150)

Age (in years)	Metabolic Syndrome		P value
	Yes (%)	No (%)	
<50	72 (77.4)	21 (22.6)	0.826
>50	45 (78.9)	12 (21.1)	
Gender			<0.001
Male	52 (65.8)	27 (34.2)	
Female	65 (91.5)	6 (8.5)	

All data presented as number (%)

Comparison of metabolic syndrome with baseline characteristics showed that metabolic syndrome were insignificantly higher among patients with >50 years of age (n=45, 78.9%) as compared to <50 years of age (n=72, 77.4%) (p-value 0.0826). However, metabolic syndrome were significantly higher in females (n=65, 91.5%) as compared to males (n=52, 65.8%) (p-value <0.001). (Table 1)

## DISCUSSION

Metabolic syndrome in addition to a predictor of CVD is associated with type 2 diabetes mellitus.<sup>8</sup> In this study we evaluated the rate of MS in cases presenting with type 2 diabetes mellitus.

Our results revealed that majority of the patients with type 2 diabetes had metabolic syndrome. These statistics are in agreement with Ahmed N and colleagues<sup>9</sup> who found somewhat similar number of cases with metabolic syndrome.

Our results are similar to other studies, where the prevalence of 70% to 80% among Caucasian type 2 diabetics<sup>10</sup> and more than 75% among Chinese population having type 2 diabetes mellitus.<sup>11</sup>

We found metabolic syndrome more commonly in female subjects as compared to male participants. Similar to our finding, Ahmed N et al<sup>9</sup> also revealed that the frequency of MS was higher in females. Various studies revealed quite varied results regarding gender on the occurrence of metabolic syndrome in various populations. In United States, MS was found generally higher in males than that of females.<sup>12</sup> Other studies from Korea, India, Nigeria and Oman, Kinmen and Iran have reported that female ratio is higher as compared to males.<sup>13-17</sup>

However, considering our results in agreement with various other studies, it may consider that type 2 diabetes mellitus is an indicator of MS and enable us to easily diagnose MS in type 2 diabetic patients and by controlling MS may help in controlling diabetes mellitus. Various studies have reported that the risk of type 2 diabetes is higher in metabolically unhealthy individuals.<sup>18-20</sup>

The finding of this study could be observed in the light of limitation that this study is a descriptive cross-sectional study, therefore, temporal association could not be explore. Moreover, our study failed to give information regarding the important confounding variables like BMI, family history of type 2 diabetes, smoking status, socioeconomic status and physical activity. Further, large scale multicenter studies are recommended that can assess the presence of MS in type 2 diabetes patients taking above mentioned variable as well.

## CONCLUSION

The rate of metabolic syndrome is quite higher in cases with type 2 diabetes mellitus. However, it is suggested that every type 2 diabetic patient should be screened for metabolic syndrome.

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