

## Original Research

### Assessment of Determinants of Metabolic Syndrome

Bhavna Gupta<sup>1</sup>, Reecha Gupta<sup>2</sup>, Mohit Gupta<sup>3</sup>, Mohan Singh<sup>4</sup>

<sup>1</sup>Senior lecturer, Department of Public Health Dentistry, Swami Devi Dayal Hospital and Dental College, Barwala, Haryana, India;

<sup>2</sup>Professor, Department of Prosthodontics and Dental materials, IGGDC, Jammu, J & K, India;

<sup>3</sup>Consultant Orthodontist, Jammu, J & K, India;

<sup>4</sup>Dept. of Health and Medical Education, Jammu, J & K, India.

#### ABSTRACT:

**Background:** Metabolic syndrome is a combination of individual risk factors that are associated with several serious health conditions. The present study was conducted to assess determinants of metabolic syndrome. **Materials & Methods:** The present study was conducted on 480 subjects of both genders. Physical examination such as weight, height, BMI, waist circumference, hip circumference, waist to hip ratio, systolic and diastolic blood pressure. Results were tabulated and subjected to statistical analysis. **Results:** There were 180 males and 300 females. 260 subjects were obese, 140 were overweight and 80 were normal. The difference was significant ( $P < 0.05$ ). Low HDL was seen in 340, hypertension in 420, increased fasting blood glucose in 385 and hypertriglyceride in 365. There were 265 smokers and 270 were alcoholics. **Conclusion:** Metabolic syndrome is common diseases seen in females. High blood pressure, smoking, alcohol intake, low HDL and obesity are determinants.

**Key words:** Metabolic syndrome, Obesity, Smoking.

Received: 14 March, 2019

Revised: 20 May 2019

Accepted: 22 May 2019

**Corresponding author:** Dr. Bhavna Gupta, Senior lecturer, Department of Public Health Dentistry, Swami Devi Dayal Hospital and Dental College, Barwala, Haryana, India.

**This article may be cited as:** Gupta B, Gupta R, Gupta M, Singh M. Assessment of Determinants of Metabolic Syndrome. J Adv Med Dent Scie Res 2019;7(6): 77-79.

#### INTRODUCTION

Metabolic syndrome is a combination of individual risk factors that are associated with several serious health conditions such as diabetes, cardiovascular disease or stroke. It is diagnosed by the presence of three or more of five risk factors: abdominal obesity, raised blood pressure (BP), raised fasting blood glucose, raised triglycerides and reduced high-density lipoprotein (HDL) cholesterol.<sup>1</sup>

Metabolic syndrome is associated with an excess risk of atherosclerotic CVDs and type 2 diabetes mellitus 2 and variable complications of nonalcoholic fatty liver diseases and obstructive sleep apnea. The prevalence of metabolic syndrome is therefore highly dependent on the cut-off points used for the definition of each single component of metabolic syndrome, and particularly for the definition of

abdominal obesity.<sup>2</sup> There is observed increase in the prevalence of metabolic syndrome in India and other south Asian Countries. The main drivers are lifestyle and socioeconomic transitions consequent to increased affluence, urbanization, mechanization and rural to urban migration.<sup>3</sup>

The National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATPIII) criteria are considered simple and most practical in clinical practice and have been widely used in most parts of the world. It is particularly useful for the health care providers to screen for metabolic syndrome and aggressively intervene to reduce patients' cardiovascular risk.<sup>4</sup> The present study was conducted to assess determinants of metabolic syndrome.

**MATERIALS & METHODS**

The present study was conducted in the Department of Community Dentistry. It comprised of 480 subjects of both genders. Approval from institutional ethical committee was obtained. The patients were recruited in the study after an informed consent.

General information such as name, age, race, socioeconomic status, occupation, smoking, drug history,

past history, family history etc. was taken. Physical examination such as weight, height, BMI, waist circumference, hip circumference, waist to hip ratio, systolic and diastolic blood pressure. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

**RESULTS**

Total- 480		
Gender	Males	Females
Number	180	300

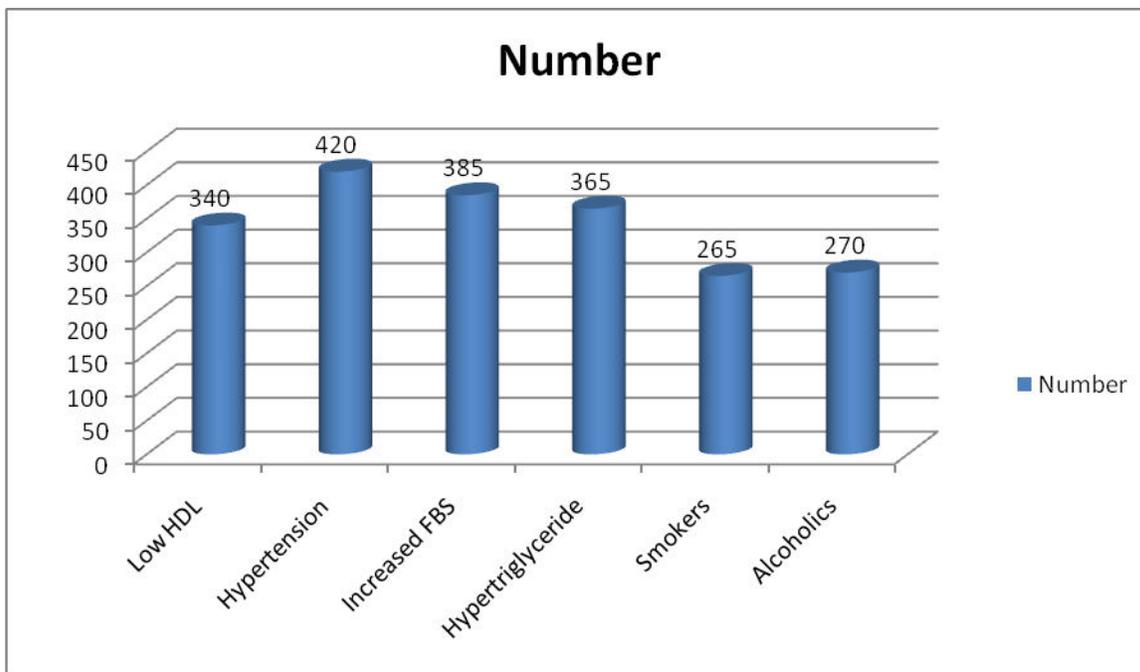
Table I shows that there were 180 males and 300 females.

**Table Determinants of metabolic syndrome**

BMI	Number	P value
<23	80	0.01
23-24.99 (overweight)	140	
25 or more (obese)	260	

Table II shows that 260 subjects were obese, 140 were overweight and 80 were normal. The difference was significant (P< 0.05).

**Graph I Other determinants in subjects**



Graph I shows that low HDL was seen in 340, hypertension in 420, increased fasting blood glucose in 385 and hypertriglyceride in 365. There were 265 smokers and 270 were alcoholics.

## DISCUSSION

Metabolic syndrome was defined according to the IDF criteria. It combines several individual risk factors including raised fasting blood glucose ( $\geq 100$  mg/dL or taking diabetes medication), raised BP (systolic BP  $\geq 130$  mm Hg or diastolic BP  $\geq 85$  mm Hg, or taking anti-hypertensive medication), raised triglycerides ( $\geq 150$  mg/dL), reduced HDL cholesterol ( $< 40$  in men or  $< 50$  mg/dL in women) and central obesity defined as waist circumference with ethnicity specific values.<sup>5</sup> The present study was conducted to assess determinants of metabolic syndrome.

We found that there were 180 males and 300 females. Esteghamati et al<sup>6</sup> in their study, in total, 291 participants were analyzed, of whom 216 (74.2%) were females. The mean age of the total population was 50.1 ( $\pm 11$ ) years. The overall prevalence of metabolic syndrome was 27.1% (n=79), with no significant difference between the sexes (female =29.6%, males =20%). A triad of central obesity, low high-density lipoprotein-cholesterol, and elevated blood pressure constituted the largest proportion (38 [13.1%]) of cases of metabolic syndrome, followed by a combination of low high-density lipoprotein, elevated triglycerides, central obesity, and elevated blood pressure, with 17 (5.8%) cases. Independent determinants of metabolic syndrome were antihypertensive use and increased waist circumference.

We observed that 260 subjects were obese, 140 were overweight and 80 were normal. Low HDL was seen in 340, hypertension in 420, increased fasting blood glucose in 385 and hypertriglyceride in 365.

Gozashti et al<sup>7</sup> found that waist circumference  $\geq 102$  for men and  $\geq 94$  cm for women was the best predictor of the presence of other determinants of metabolic syndrome (raised blood pressure, fasting blood glucose, triglycerides and reduced high-density lipoprotein cholesterol). Using these values, we identified 28% of Qataris with metabolic syndrome, which is considerably lower than the estimate of 37% calculated using the International Diabetes Federation (IDF) criteria. Restricting the analysis to participants without known elevated blood pressure, elevated blood sugar or diabetes 16.5% would be classified as having metabolic syndrome. In a multivariable logistic regression analysis, the prevalence of metabolic syndrome increased steadily with age for those in the age group '30–39', '40–49', '50–59', '60–64' vs '18–29';  $p < 0.0001$ ), decreased with increasing educational attainment for those who attained 'secondary school or more' compared with 'less than primary school';  $p = 0.03$ ) and exercise for those exercising  $\geq 3000$  vs  $< 600$  MET-min/week;  $p = 0.006$ ) but was not associated with smoking or diet.

Metabolic syndrome is a chronic heterogeneous disease and most of its risk factors are interrelated and share the underlying pathogenic factors, including genetic and dietary patterns. In addition, most of its risk factors are

themselves considered components in the definition of the syndrome.<sup>8</sup>

Al-Odat et al<sup>9</sup> found that the age-adjusted rate of metabolic syndrome was 10 per 1,000 person-years. Metabolic syndrome risk increased with age and was higher among black participants and those with less than a high school education. Higher baseline BMI, no alcohol intake (versus one to three drinks per day), higher intake of dietary carbohydrates, and lower intake of crude fiber were each associated with an increased risk for the metabolic syndrome (relative risk [RR] ranging from 1.3 to 1.9), and physical activity was protective. In models adjusting simultaneously for all factors, black participants and women were less likely to develop metabolic syndrome. Risk for metabolic syndrome increased 23% (20–27%) per 4.5 kg (10 lb) of weight gained, whereas regular physical activity over time versus low activity was protective.

## CONCLUSION

Metabolic syndrome is common diseases seen in females. High blood pressure, smoking, alcohol intake, low HDL and obesity are determinants.

## REFERENCES

1. Beltrán-Sánchez H, Harhay MO, Harhay MM, et al. Prevalence and trends of metabolic syndrome in the adult U.S. population, 1999–2010. *J Am Coll Cardiol* 2013;62:697–703.
2. Values of anthropometric variables to predict cardiovascular outcomes: 7.6 years follow-up in an Iranian population. *Int J Obes (Lond)* 2009;33:1437–45.
3. Talaei M, Thomas GN, Marshall T, et al. Appropriate cut-off values of waist circumference to predict cardiovascular outcomes: 7-year follow-up in an Iranian population. *Intern Med* 2012;51:139–46.
4. Mirmiran P, Esmailzadeh A, Azizi F. Detection of cardiovascular risk factors by anthropometric measures in Tehranian adults: receiver operating characteristic (ROC) curve analysis. *Eur J Clin Nutr* 2004;58:1110–18.
5. Gharipour M, Sadeghi M, Dianatkah M, et al. The cut-off values of anthropometric indices for identifying subjects at risk for metabolic syndrome in Iranian elderly men. *J Obes* 2014;2014:907149.
6. Esteghamati A, Ashraf H, Rashidi A, et al. Waist circumference cut-off points for the diagnosis of metabolic syndrome in Iranian adults. *Diabetes Res Clin Pract* 2008;82:104–7.
7. Gozashti MH, Najmeasadat F, Mohadeseh S, et al. Determination of most suitable cut off point of waist circumference for diagnosis of metabolic syndrome in Kerman. *Diabetes Metab Syndr* 2014;8:8–12.
8. Mansour AA, Al-Hassan AA, Al-Jazairi MI. Cut-off values for waist circumference in rural Iraqi adults for the diagnosis of metabolic syndrome. *Rural Remote Health* 2007;7:765.
9. Al-Odat AZ, Ahmad MN, Haddad FH. References of anthropometric indices of central obesity and metabolic syndrome in Jordanian men and women. *Diabetes Metab Syndr* 2012;6:15–21.