

Prevalence of Metabolic Syndrome and Associated Risk Factors among Adult Population of Central India

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To the Editor,

Non-communicable diseases are a serious threat to health in both developed and developing countries and deserve to be treated as a global health priority. Metabolic and behavioural risk factors are the most common causes of non-communicable diseases. Metabolic syndrome (MS) is characterized by a cluster of risk factors, which predisposes subjects to an increased risk of diabetes and cardiovascular diseases.¹ In recent years, a lot of work has been done on MS, but most have been confined to hospitals. Here, the prevalence of MS is reported among 911 adults, selected through multistage random sampling, from Jabalpur district of India. This data is a part of a larger community based

study published earlier.² The criteria given by International Diabetes Federation (IDF) was employed for the diagnosis of MS.³ A total of 125 (13.7%, 95%CI; 11.5, 15.9) adults out of 911 were found to have MS. The prevalence of MS among males and females was 13.0% and 14.6%, respectively. The prevalence was significantly higher among residents of urban area (18.4%) as compared to residents of rural area (11.5%). Several studies in India have shown different rates of prevalence in different parts of the country ranging from 9.3-47.5%.⁴ The observed difference could be explained by the fact that all these studies were conducted in different areas, in different group of people and adopted different

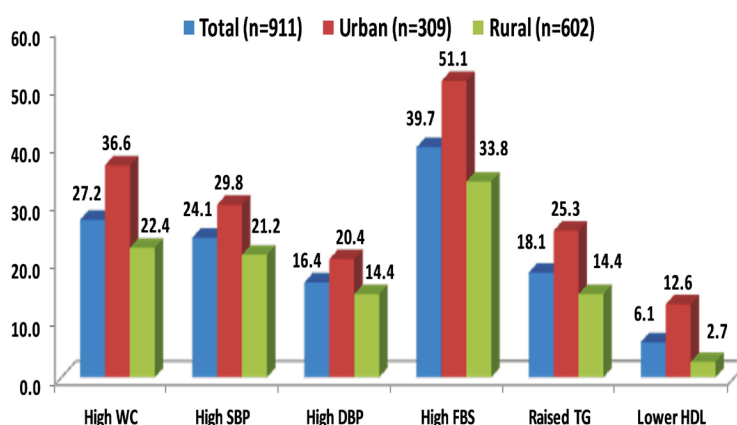


Figure 1: Prevalence of different components of metabolic syndrome as per the definitions of International Diabetes Federation (IDF)

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definitions for MS. In our study, the higher prevalence of MS in urban areas might be due to unhealthy and stressed life style among urban residents, which includes poor dietary habits and low physical activity levels. The prevalence of 11.5% in rural population points towards urbanization and epidemiological transition. As per the IDF criteria,

Table 1: Univariate and multivariate logistic regression analysis to depict risk factors for metabolic syndrome (n=911)

Parameters		Metabolic Syndrome n=125	No Metabolic Syndrome N=786	Univariate		Multivariate*	
				OR (95% CI)	p value	OR (95% CI)	p value
Area of residence, Urban: Rural, n (%)		57 (18.4): 68 (11.3)	252 (81.6): 534 (88.7)	1.78(1.212-2.604)	0.003	Got excluded from the final model [#]	
Age (Years), (Mean ± SD)		50.6 ± 14.1	37.3 ± 13.1	1.064 (1.05-1.08)	<0.001	1.06 (1.04-1.08)	<0.001
Gender, Male: Female, n (%)		64(13.0): 61 (14.6)	428 (87.0): 358 (85.4)	0.88 (0.60-1.28)	0.498	Not included ^{\$}	
Socio economic status, n (%) as per Modified Prasad's classification	Upper Class	3 (17.6)	14 (82.4)	2.42 (0.65-9.05)	0.190	0.95 (0.11-8.51)	0.962
	Upper Middle	15 (26.3)	42 (73.7)	4.026 (1.93-8.38)	<0.001	2.86 (1.38-5.92)	0.005
	Lower Middle	21 (17.2)	101 (82.8)	2.34 (1.23-4.45)	0.009	3.28 (1.35-7.99)	0.009
	Upper Lower	64 (14.4)	381 (85.6)	1.89 (1.14-3.15)	0.014	3.08 (1.01-9.43)	0.049
	Lower Class	22 (8.1)	248 (91.9)	1	-	1	-
Fruit Intake < 3 times a week, n (%)		87 (69.6)	586 (74.6)	0.78 (0.52-1.18)	0.24	Not included ^{\$}	
Vegetable Intake ≤7 times a week, n (%)		66 (52.8)	301 (38.3)	1.77 (1.21-2.58)	0.002	2.01 (1.18-3.42)	0.010
Salt intake, (Mean ± SD) (gm/day)		12.7 ± 5.08	12.1±5.48	1.02 (0.98-1.05)	0.27	Not included ^{\$}	
Current alcohol consumers, n (%)		35 (28.0)	209 (26.6)	1.07 (0.71-1.64)	0.74	Not included ^{\$}	
Current Smokers, n (%)		38 (30.4)	142 (18.1)	1.98 (1.30-3.02)	0.001	2.92 (1.58-5.3)	0.001
Smokeless Tobacco consumption, n (%)		70 (56.0)	322 (41.0)	1.83 (1.25-2.68)	0.002	2.03 (1.20-3.42)	0.008
Body Mass Index, (Mean ± SD) (Kg/m ²)		25.2 ± 4.8	19.9 ± 3.6	1.35 (1.28-1.43)	<0.001	1.37 (1.274-1.47)	<0.001
Waist circumference, (Mean ± SD) (cms)		91.0 ± 12.2	73.4 ± 10.6	1.13 (1.11-1.15)	<0.001	@	@
High WHR (>0.85 for females and >0.90 for males), n (%)		102 (81.6)	252 (32.1)	9.39 (5.83-15.13)	<0.001	4.46 (2.50-7.93)	<0.001
Physical Activity (Mild or Sedentary), n (%)		52 (41.6)	228 (29.0)	1.74 (1.18-2.57)	0.005	Got excluded from the final model [#]	

SD = Standard Deviation, OR = Odds Ratio, CI = Confidence Interval, HDL = High Density Cholesterol, WHR=Waist Hip Ratio; *Multivariate logistic regression (Stepwise forward method); [#]These variables got exclude from the final model through stepwise forward logistic regression method; [§]These variables were not considered for multivariate analysis as was not significantly associated with metabolic syndrome during univariate analysis. @Waist Circumference was also not included as it is a part of definition of metabolic syndrome.

the prevalence of other components of MS like high waist circumference (≥ 90 cm in males and ≥ 80 cm in females), high systolic blood pressure (≥ 130 mm Hg), high diastolic blood pressure (≥ 85 mm Hg), high fasting blood sugar (≥ 100 mg/dL), raised triglyceride (≥ 150 mg/dL) and lower high density lipoprotein (< 40 mg/dL in males and < 50 mg/dL in females) was 27.2, 24.1, 16.4, 39.7, 18.1 and 6.1 percent, respectively (Figure 1). In this study, multivariate logistic regression analysis found higher age, higher socio economic status, higher body mass index (BMI), high waist hip ratio (> 0.85 for females and > 0.90 for males), tobacco smoking, consumption of smokeless tobacco and less consumption of

vegetables (≤ 7 times per week) were independent risk factors for MS (Table 1). Similar risk factors were documented in a previous study.⁵ MS is a major health problem in the region and proper emphasis should be given on its prevention and control. Its contributory complications demand, screening of individuals in the community at the earliest, so that lifestyle modifications strategies may be adopted. The subjects with the metabolic syndrome should be advised regarding lifestyle modification and weight reduction. Increasing awareness regarding clustering of risk factors and how to prevent them comprehensively should be emphasized in population-wide prevention strategies in India.

REFERENCES

- Srinath Reddy K, Shah B, Varghese C, Ramadoss A. Responding to the threat of chronic diseases in India. *Lancet* 2005; 366(9498): 1744-9.
- Bhadoria AS, Kasar PK, Toppo NA, Bhadoria P, Pradhan S, Kabirpanthi V. Prevalence of hypertension and associated cardiovascular risk factors in central India. *J Fam Community Med*. 2014; 21(1): 29-38.
- International Diabetes Federation. The IDF consensus worldwide definition of the metabolic syndrome. Available from: http://www.idf.org/webdata/docs/MetS_def_update2006.pdf. [Last accessed on 2014 July 14].
- Mangat C, Goel NK, Walia DK, Agarwal N, Sharma MK, Kaur J, *et al.* Metabolic syndrome: A challenging health issue in highly urbanized Union Territory of north India. *Diabetol Metab Syndr*. 2010; 2: 19.
- Kaur P, Radhakrishnan E, Rao SR, Sankarasubbaiyan S, Rao TV, Gupte MD. The metabolic syndrome and associated risk factors in an urban industrial male population in South India. *J. Assoc. Physicians India* 2010; 58: 363-6.