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## The Prevalence Of Metabolic Syndrome In Coronary Artery Disease Patients Presenting To A Tertiary Care Hospital.

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### ABSTRACT

According to estimates, India is home to more than one fifth of the world 's population. India 's economy is currently one of the fastest expanding ones in the world. In present study, patients are enquired for typical history of angina and its duration, previous history of CAD and treatment received for the same. Serial ECGs taken, looking for changes indicating myocardial ischemia and infarction. Vitals parameters, Age, sex and socio-economic status were recorded. Simultaneously venous blood samples are drawn for cardiac enzymes evaluation. Examination of the cardiovascular, respiratory, abdominal, and neurological systems for signs of coronary artery disease complications. There was no appreciable difference in the incidence of central obesity between males and females. Unexpectedly, the prevalence of central obesity increased significantly among patients with early CAD (40 years) and later age groups (40-60 years). The prevalence of hypertension was 67.4% in present study of patients with CAD. Hypertension was seen in 24.9 % of female patients and 42.4 % of male patients, respectively. The prevalence of hypertension was 21.1% overall in the Chennai Urban Population Study (CUPS), which used the JNC 6 criteria to define hypertension. In this Study of 377 patients, The prevalence of components of Metabolic syndrome were as follows: Hypertension 67.4%, Central Obesity 49.9%, Diabetes or Impaired fasting glucose 49.6%, and Low HDL 46.4%, and Hypertriglyceridemia 42.7%. Thus it was found that the prevalence of Metabolic Syndrome and each of its individual metabolic components—central obesity, hypertension, diabetes or IFG, hypertriglyceridemia, and low HDL were high in this population.

**Keywords:** Metabolic syndrome, obesity, cardiovascular disease.

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## INTRODUCTION

According to estimates, India is home to more than one fifth of the world 's population. India 's economy is currently one of the fastest expanding ones in the world. A fast urbanisation is continuing. In the name of modern living, both young and old people are abandoning the healthy Indian lifestyle and culture for western civilization. In the name of globalisation, sedentary lifestyles, meals rich in fat, sugar, and calories have even reached rural India. India is now facing paradox of malnutrition on one hand and epidemic of obesity on the other. Indians are 20 times more likely to die from coronary artery disease (CAD) than native black or white South Africans, and they are three times more likely than Chinese to get CAD [1, 2]. South Asians in Canada had a greater frequency of cardiovascular illness than Europeans and Chinese, according to the SHARE study [3]. Over 50% of cardiovascular disease-related deaths in India, which account for 2.78 million deaths overall, are caused by CAD, making it the deadliest disease in the nation [4]. India is the diabetes capital of the world with about 74 million patients of diabetes [5, 6]. Thus, India is currently dealing with a dangerous dual epidemic of CAD and diabetes. The Metabolic Syndrome is the main cause of both outbreaks [7].

## MATERIAL AND METHODS

A prospective cross sectional study, with analysis of the metabolic parameters for differences in Patients of coronary artery disease who were admitted in the Medicine Ward, ICU were included in study.

- **Trial center:** Tertiary care hospital
- **Ethical Clearance:** Obtained
- **Informed consent:** Obtained

### Criteria for Coronary artery disease

Patients are enquired for typical history of angina and its duration, previous history of CAD and treatment received for the same. Serial ECGs taken, looking for changes indicating myocardial ischemia and infarction. Vitals parameters, Age, sex and socio-economic status were recorded. Simultaneously venous blood samples are drawn for cardiac enzymes evaluation. Examination of the cardiovascular, respiratory, abdominal, and neurological systems for signs of coronary artery disease complications.

### Criteria for Metabolic Syndrome

National Cholesterol Education Program and Adult Treatment Panel III,2001.

Three or more of the following:

Central obesity: waist circumference >102 cm (males), >88 cm (females) For South Asians the cutoffs for waist circumference are  $\geq 90$  cm for men and  $\geq 80$  cm for women.

### Inclusion Criteria

- Patients that were admitted in the Medicine Ward and Medicine ICU with coronary artery disease.
- Patients with age more than 20 years.
- Patients with ECG features indicative of coronary artery disease or significant elevation of cardiac enzymes.

### Exclusion Criteria

- Patients <20 years of age and 60 years and above
- Patient with ECG changes that are not because of myocardial ischemia or infarction.
- Patients on advance life support (ventilators and ionotropes)
- Patients who developed heart failure
- Patient unwilling for giving their written consent.
- Patients with chronic kidney disease, liver parenchymal disease, known autoimmune

conditions.

**RESULTS**

This prospective cross sectional study, was conducted on 377 patients of Coronary artery disease and was analysed for the metabolic syndrome and it's parameters.

- Total 377 patients with coronary artery disease participated in the study.
- It showed 233 (61.8%) patients were males and 144 (38.2%) patients were females.
- Age groups were near normally distributed.
- Maximum number of cases (200) were in the age group 40 – 60 years.
- Youngest patient is 25years old and oldest patient is 59 years old

**Table 1: Characteristics of Metabolic Syndrome Patients <sup>a</sup>**

Characteristics	Metabolic Syndrome - Present (180)	Metabolic Syndrome - Absent (197)	P value
<b>Age</b>	40.8(±10.19) Years	41.0(±10.87) Years	0.807
<b>20 – 39 years</b>	84 (22.3%)	93 (24.7%)	0.916
<b>40 – 60 years</b>	96 (25.5%)	104 (27.6%)	
<b>Sex</b>			
<b>Male</b>	116 (30.8%)	117 (31.0%)	0.313
<b>Female</b>	64 (17%)	80 (21.2%)	
<b>Socio Economic Class (SEC)</b>			
<b>SEC I</b>	41 (10.9%)	42 (11.1%)	0.834
<b>SEC II</b>	101 (26.8%)	103 (27.3%)	
<b>SEC III</b>	19 (5%)	26 (6.9%)	
<b>SEC IV</b>	12 (3.2%)	16 (4.2%)	
<b>SEC V</b>	7 (1.9%)	10 (2.7%)	
<b>Waist Circumference</b>	97 (±7.66) cm	97.07 (±8.35) cm	0.980
<b>Central Obesity</b>	89 (23.6%)	99 (26.3%)	0.875
<b>Systolic Blood Pressure</b>	134.08 (±13.3) mm Hg	134.51 (±13.4) mm Hg	0.756
<b>Diastolic Blood Pressure</b>	75.14 (±8.81) mm Hg	76.82 (±8.74) mm Hg	0.082
<b>Hypertension</b>	120 (31.8%)	134 (35.5%)	0.779
<b>Fasting Blood Sugar</b>	99.38 (±8.50) mg/dl	99.20 (±8.08) mg/dl	0.838
<b>Diabetes Mellitus</b>	87 (23.1%)	100 (26.5%)	0.638
<b>Triglyceride Level</b>	150.97 (±18.31) mg/dl	143.47 (±14.83) mg/dl	<b>0.001</b>
<b>Hypertriglyceridemia</b>	98 (26%)	63 (16.7%)	<b>0.001</b>
<b>HDL Level</b>	50.80 (±18.85) mg/dl	42.93 (±16.08) mg/dl	<b>0.001</b>
<b>Low HDL Level</b>	67 (17.8%)	108 (28.6%)	<b>0.001</b>

This study thus depicted that the Mean Age of the population having metabolic syndrome (180 patients) is 40.8 (±10.19) Years, and Mean age of population Not having Metabolic syndrome (197patients) is 41.0(±10.87) Years.

In this study, Hypertension was present among 120(31.8%) patients out of the total 180 patients of metabolic syndrome.

Hypertriglyceridemia was present among 98(26%) patients out of the total 180 patients of metabolic syndrome in the study

The study showed that Central obesity was present in 89 (23.6%) of patients out of 180 patients of Metabolic syndrome.

Out of 180 patients of Metabolic syndrome, Diabetes or IFG was present in 87(23.1%) of patients.

This study depicted that 67(17.8%) patients out of total 180 patients of Metabolic syndrome had Low HDL

**Table 2: Metabolic Syndrome and Coronary Artery Disease**

Distribution of subjects per Metabolic Syndrome and Coronaryartery disease						
Coronaryartery disease	Metabolic Syndrome - Present		Metabolic Syndrome - Absent		Total	
	No.	%	No.	%	No.	%
<b>Total(377)</b>	180	47.7%	197	52.3%	377	100%

**p value = 0.121 (No significant difference)**

P value is estimated by using chi square test.

Thus, this study of 377 CAD patients depicted that 180 (47.7%) patientswith CAD had metabolic syndrome.

### DISCUSSION

This prospective, cross sectional, observational study was conducted on total 377 patients of Coronary artery disease. These patients were evaluated for Metabolic syndrome and it's parameters. The observations are compared with other similar studies. The observations are as follows: In present study the sample's mean age is 40.93 years. 200 (53.1%) CAD patients were present in the 40-50 years age group and 177(46.9%) CAD patients were in the 20-39 years age group. According to a study conducted by Wannamathee S Gaya , Asian Indians experience CHD earlier and with more severity than people from other ethnic groups [8]. Asian Indians have been found to have a startling propensity for early myocardial infarction and premature coronary arterydisease [8].

Another study by Siwach SB, Singh H, et al. depicted that an Asian Indian patient experiencing a myocardial infarction is just 50 years old on average and In this population, under-40s account for 25% of all Mis [9].

In present study, the total number of CAD patients were 377, out of which 233 (61.8%) patients were male and 144(38.2%)patients were female . It showed that 116 (30.8%) male patients and 64 (17.0%) female patients had metabolic Syndrome, respectively. Obesity was present in 188(49.9%) of CAD (54.7%) patients. Our study found that obesity(49.9%) is more common in people with CAD . This is notably higher than the 13.9% obesity prevalence discovered in a study of migrants living within their own country in urban slums [9]. Even among men (48%) and women (52.7%), obesity prevalence is significantly higher than the corresponding figures from the Nutrition Foundation of India, where the prevalence of obesity is 1% for men and 4%for women in slums while corresponding figures for the middle socioeconomic class were 32.2% and 50%, respectively. According to EGIR standards, more than 35% of males in the middleincome group and 13% in the low-income group in the Chennai Urban Population Study (CUPS) were obese. The corresponding figures for females were 33% and 24% [10].

In present study, there was no appreciable difference in the incidenceof central obesity between males and females. Unexpectedly, the prevalence of central obesity increased significantly among patients with early CAD (40 years) and later age groups (40-60 years). The prevalence of hypertension was 67.4% in present study of patientswith CAD. Hypertension was seen in 24.9 % of female patients and 42.4 % of male patients, respectively. The prevalence of hypertension was 21.1% overall in the Chennai Urban Population Study (CUPS), which used the JNC 6 criteria to define hypertension [11].

Another study discovered that intracountry migrants who reside in urban slums have a hypertension prevalence of 11.7% [11]. Nearly all blood pressure studies, including those done in India, have shown that blood pressure rises with age in both sexes [12]. According to a study by, women in the

urban Indian population are more likely than men to have high blood pressure. In present study Diabetes or IFG was present in 49.6% of cases. 18.8% of female patients and 30.8% of male patients, respectively, had diabetes or IFG in our study. Patients with CAD had considerably greater rates of central obesity, hypertension, dyslipidemia and diabetes/IFG. Therefore, a patient with CAD will experience a more severe condition if these risk factors are present.

The clustering of these metabolic risk variables causes these patients CAD to manifest early. Asian Indians experience CHD earlier and with more severity than people from other ethnic groups [11]. Asian Indians have been found to have a startling propensity for early myocardial infarction and premature coronary artery disease [1, 12]. These findings, which are consistent with the research stated above, could be explained by an increased prevalence of metabolic syndrome and associated risk factors.

### CONCLUSION

In this Study of 377 patients. The prevalence of components of Metabolic syndrome were as follows: Hypertension 67.4%, Central Obesity 49.9%, Diabetes or Impaired fasting glucose 49.6%, and Low HDL 46.4%, and Hypertriglyceridemia 42.7%. Thus it was found that the prevalence of Metabolic Syndrome and each of its individual metabolic components—central obesity, hypertension, diabetes or IFG, hypertriglyceridemia, and low HDL were high in this population.

### REFERENCES

- [1] Balarajan R. Ethnic differences in mortality from ischemic heart disease and cerebrovascular disease in England and Wales. *BMJ* 1991; 302: 560- 4
- [2] Mckeigue PM, Miller GJ, Marmot MG. Coronary heart disease in South Asians overseas: a review. *J Clin Epidemiol* 1989; 42: 597-609.
- [3] Anand SS, Yusuf S, Vuksan V, et al. Differences in risk factors, atherosclerosis, and cardiovascular disease between ethnic groups in Canada: the Study of Health Assessment and Risk in Ethnic groups (SHARE). *Lancet* 2000; 356: 279-84.
- [4] World Health Organization. The world health report 2002: reducing risks, and promoting healthy live. Geneva: WHO; 2002.
- [5] Montazerifar F, Bolouri A, Mozaffar MM, Karajibani M. The prevalence of metabolic syndrome in coronary artery disease patients. *Cardiology Research*. 2016;7(6):202-8.
- [6] Jameson, J.L., Kasper, D.L. and Longo, D.L. (2022) *Harrison's principles of Internal Medicine*. New York ; Chicago ; San Francisco: McGraw Hill Education.
- [7] Enzi G, Busetto L, Inelmen EM, Coin A, Sergi G. Historical perspective: visceral obesity and related comorbidity in Joannes Baptista Morgagni's 'De Sedibus et Causis Morborum per Anatomen Indagata'. *Int J Obes Relat Metab Disord* 2003; 27: 534-5.
- [8] Wannamathee S Goya. Commentary: prevention of coronary artery disease in South Asian-containing the physical inactivity epidemic. *Int J Epidemiol* 2004; 33: 1-2.
- [9] Siwach SB, Singh H, Sharma D, Katyalk VK. Profile of young acute myocardial infarction in Harayana. *J Assoc Physicians India* 1998; 46:424-6.
- [10] Mohan V, Shanthi Rani S, Deepa R, et al. Intra-urban differences in the prevalence of the metabolic syndrome in southern India-The Chennai Urban Population Study (CUPS -4). *Diabet Med* 2001; 18: 280-7.
- [11] Shanthi Rani CS, Rema M, Deepa R, Premalatha G, Ravikumar R, Anjana Mohan, Sastry NG, Ramu M, Saroja R, Kayalvizhy G, Mohan V. The Chennai Urban Population Study (CUPS)-Methodological Details (CUPS Paper No.1). *Int J Diab Dev Countries* 1999; 19: 149-57.
- [12] Whelton PK. Blood pressure in adults and elderly In: *Handbook Of Hypertension*, vol.6: Epidemiology of Hypertension, Bulpitt CJ (Ed.) Amsterdam: Elsevier, 1985; 51-69