

PREVALENCE OF METABOLIC SYNDROME IN GRANITE WORKERSP. Srilakshmi¹, D. Swetha², M. Vijaya Bhaskar³, K. Rambabu⁴, M. Madhulatha⁵**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: The prevalence of the metabolic syndrome (MS) has significantly increased over the last few decades and has become a main health challenge worldwide. Prevalence of MS is quickly rising in developing countries due to changing lifestyle. It was considered worthwhile to study MS and its components in granite workers since granite factories are situated in and around Khammam area. Moreover, no studies of MS in granite workers have been reported in literature. **OBJECTIVES:** Aim of our study is to assess the prevalence of metabolic syndrome and its components in granite workers. **MATERIALS AND METHODS:** 210 male workers in the age group of 20-50 working in granite industries located in and around the Khammam town of Telangana State are selected for the present study. Blood pressures (BP), waist circumference (WC) were measured. Fasting blood samples were collected for the estimation of glucose and lipids. **RESULTS:** 69 subjects out of 210 were identified as having MS based on updated National cholesterol education programme- Adult Treatment Panel III (NCEP-ATP III) guidelines. **CONCLUSION:** MS should be identified and remedial measures may be suggested, so that the risk of hypertension, cardiovascular risk, diabetes and the resultant morbidity is minimized and can be delayed.

KEYWORDS: Blood pressure, Central obesity, Blood glucose.

INTRODUCTION: A worldwide alteration in the disease pattern has been observed, where the relative impact of infectious diseases are decreasing while chronic diseases like diabetes and cardiovascular disease (CVD) are increasingly dominating the disease pattern.^[1]

For the last fifteen years, Indian epidemiologists and the world health organization (WHO) has been giving information for quickly raising the burden and consequences of CVD. CVD will be the largest cause of disability and death in India, with 2.6 million Indians predicted to die due to CVD by 2020.^[2,3]

MS primarily characterized by coexistence of of abdominal obesity, high fasting glucose levels, hypertriglyceridemia, low HDL cholesterol (HDL-C) and elevated blood pressure (BP). Is termed as MS. MS also known as syndrome X.^[4,5] MS dominated by clinical representation of one of its components.^[4] MS individuals have twofold risk of CVD and a 5-fold risk of diabetes. Depending up on the components, MS individuals have a 30%–40% possibility of developing diabetes and/or CVD in 20 years.^[6]

The incidence of the MS varies by definitions used for the components and central obesity of the subjects. In the United States, the incidence of the MS in the adult residents was projected to be more than 25%. Similarly, the prevalence of MS in seven European countries was around 23%.^[7,8] Hydrie et al.,^[9] reported that in urban areas of Karachi, Pakistan, showed a high prevalence of the MS – 34.8 and 49% according to the International Diabetes Federation (IDF)

ORIGINAL ARTICLE

definition and modified NCEP- ATP III criteria respectively. It was known that 20%–25% of South Asians have developed MS and many more may be prone to get it.^[7,8] Overall, the prevalence of the MS in immigrant Asian Indians varies from 20 - 32%.^[10] A recent survey in Central India observed an overall MS prevalence as per ATP III criteria to be 5%. When ATP III criteria were modified using WC cut-offs recommended by Asia-Pacific guidelines, MS was seen in 9.3% (8.2% in males and 10.7% in females).^[11] A latest community-based study from eastern India has observed a prevalence of MS of 31.4%, with females having a much higher prevalence (48.2%) than males (16.3%).^[12] A recent population survey in a semi-urban area of South India showed that the prevalence of MS is 29.7% (26.5% in men and 31.2% in women).^[13] Padmavathi et al.,^[14] reported the prevalence of MS is 19.52% in their study.

DEFINITIONS: MS is mainly characterized by if any three of the five parameters present according to modified NCEP ATP III (2004).^[1]

- Elevated Waist Circumference (WC) (≥ 90 cm in men, ≥ 80 cm in women) - for Asian Americans/Indians.^[10,9]
- Elevated Triglycerides ≥ 150 mg/dl (1.7mmol/L).^[15]
- Reduced HDL-C (men ≤ 40 mg/dl (1.03mmol/L and women ≤ 50 mg/dl (1.29mmol/L) – or on treatment.^[15]
- Elevated BP $\geq 130/85$ mmHg or use of medication for hypertension - BP is defined as per the JNC VII criteria.^[16]
- Elevated fasting glucose ≥ 100 mg/dl (5.6mmol/L) or use of medication for hyperglycemia.^[10]

MATERIALS AND METHODS: The study was conducted in the department of biochemistry, Mamata Medical College and General Hospital, Khammam, Telangana State, India. All subjects were informed about the study and written consent was obtained. The study was approved by the institutional ethical committee.

Study Duration: The study was conducted for 12 months in between November 2013 to October 2014.

Study Design: Cross-sectional comparative study.

Statistical Analysis: Percentage of MS and its components (elevated Blood pressure, Waist Circumference, Triglycerides, reduced HDL-C and elevated glucose) were calculated.

Inclusion Criteria: Subjects in the age group of 20-50 yrs.

Exclusion Criteria:

1. Workers less than 12 months of exposure.
2. Alcoholics and smokers.
3. Subjects with past history of HTN and DM.

Waist Circumference is a measure of abdominal or centralized obesity, and is taken approximately midpoint between the lower margin of last palpable rib and top of iliac crest. BP was recorded in sitting position according to standard guidelines. Average of the two readings

ORIGINAL ARTICLE

five minutes apart was taken. A fasting venous blood sample was obtained after 12 hours of overnight fast for glucose serum triglycerides (TG) and high HDL-C was performed. Glucose was estimated using Glucose Oxidase and peroxidase method, Triglycerides by Glycerol-3-P-Oxidase method and HDL-Cholesterol by Phosphotungstate precipitation method using Tulip fully automated analyzer.

RESULTS: Sixty nine granite workers out of 210 were affected with MS and the percentage was 33. Elevated BP was observed in 85 workers. 61 out of total 210 workers showed elevated Waist Circumference (WC). Elevated glucose was observed in 42 granite workers. Triglycerides was increased in 52 workers and 25 % of workers shown reduced HDL-C. Statistical percentage was done based on the percentage.

Parameters	No. of Granite workers	Percentage
Elevated BP	85	40
Elevated WC	61	29
Elevated TG	52	25
Reduced HDL-C	72	34
Elevated Glucose	42	20
MS	69	33
Prevalence of MS and its components		

DISCUSSION: Similar studies have not been reported in granite workers population in literature so far. The present study shows the prevalence of MS is 33% in 69 out 210 granite workers. Granite workers sit for longer duration during sawing, surface grinding polishing and trimming of granite stone which further causes stress phenomenon. Gohil et al.,^[17] reported that prolonged stress can be an underlying cause of MS by upsetting the hormonal balance of the hypothalamic-pituitary –adrenal axis (HPA-axis). HPA-axis dysfunction may explain the reported risk indication of abdominal obesity and diabetes.^[18] Central adiposity is a key feature of the metabolic syndrome, reflecting the fact that prevalence is driven by strong relationship between WC and increased adiposity.^[19]

The patho-physiology of MS is extremely complex and has been partially elucidated. Most of subjects are obese, sedentary and have a degree of insulin resistance. Stress can also be a contributing factor. The most important factors are weight, genetics, endocrine disorders, aging and sedentary life style. There is debate regarding whether obesity or insulin resistance is the cause of the MS or if they are consequences of a more far-reaching metabolic derangement. It is common for there to be a development of visceral fat, after which adipocytes of the visceral fat increase plasma level of tumor necrosis factor- α (TNF- α) receptor which lead to insulin resistance. The increase in adipose tissue also increases the number of immune cells present within, which play a role in inflammation. Chronic inflammation contributes to increased risk of HTN, atherosclerosis and DM.^[20]

ORIGINAL ARTICLE

CONCLUSION: MS should be identified and beneficial measures should be initiated, so that the risk of hypertension, diabetes and the resultant morbidity and mortality can be delayed.

Strategies: Various strategies have been proposed to prevent the development of MS, which include increased physical activity and a reduced calorie diet. However, if 3-6 months of efforts at remedying risk factors prove insufficient, then drug treatment is frequently required.

Limitations of the Study: The study includes only male workers and need to conduct on more number of granite workers.

Clinical Significance of the Study: The study signifies the presence of MS is 33% of male granite workers.

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ORIGINAL ARTICLE

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