



## PREVALENCE OF METABOLIC SYNDROME IN LABOURERS

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**ABSTRACT**

**Background:** The metabolic syndrome is identified by a collection of risk factors that increases the risk of cardiac diseases and Type II Diabetes in an individual. The essential constituents of the Metabolic Syndrome are hypertension, glucose intolerance, obesity and dyslipidemia. Many studies have proved that metabolic syndrome is more prevalent in people with sedentary lifestyle, however the profile of metabolic syndrome in labourers who are involved in strenuous physical activity is unknown. This work was intended to study the profile of the metabolic syndrome in labourers.

**Aims & Objectives:** To study the prevalence of Metabolic Syndrome in labourers and to find the association of Metabolic Syndrome with gender, age, diet, smoking and alcohol in labourers.

**Materials & Methods:** 140 labourers were included in the study during the period of 1 year. The following data was obtained: dietary history, history of smoking & alcohol, BP, Pulse, waist circumference, hip circumference, height, weight, FBS, triglycerides and HDL-c.

**Observations:** Out of 140 labourers, 16(11.4%) were found to be suffering from metabolic syndrome. Out of the 16 subjects found to be suffering from metabolic syndrome, 12(75%) were males and 4(25%) were females. The maximum number of metabolic syndrome subjects (68.7%) was found to be in the age group of 31-40 years. Out of the 16 subjects having metabolic syndrome, 12(75%) were non vegetarians and 4(25%) were vegetarians. Out of the 16 subjects suffering from metabolic syndrome, 13(81.2%) were smokers and 10(62.5%) were alcohol drinkers

**Discussion & Conclusion:** On the basis of this study, it was concluded that, Metabolic Syndrome is prevalent even in labourers who are engaged in heavy physical activity and not only a result of sedentary, modern or urban lifestyle. Males were found to be at a higher risk of developing metabolic syndrome rather than females. It was found to be more prevalent in non-vegetarians as compared to vegetarians. Smoking, alcoholism and tobacco chewing might impart the risk of metabolic syndrome but absolute risk could not be predicted since other confounding variables were not ruled out.

**KEYWORDS :****INTRODUCTION:**

The metabolic syndrome (MS) is identified by a collection of risk factors that increases the risk of cardiac diseases and Type II Diabetes in an individual (1). The essential constituents of the Metabolic Syndrome are hypertension, glucose intolerance, overweight and deranged serum lipid levels and it is a major modifiable contributing factor in cardiovascular diseases and type II Diabetes (2). There are several criteria for the identification of metabolic syndrome. Currently, the most commonly used criteria for diagnosing metabolic syndrome is the IDF criteria. As per definition of metabolic syndrome by IDF a person should have Central Obesity (waist circumference  $\geq 90$  cm for men and  $\geq 80$  cm in females). Also they should fulfil 50% of the following four criteria: Central Obesity- Central obesity is considered to be there if BMI is more than  $30 \text{ kg/m}^2$ , and waist circumference measurement can be skipped; Low HDL Levels ( $< 40 \text{ mg/dl}$  in men and  $< 50 \text{ mg/dl}$  in women, OR subject on treatment for high levels of HDL); High Triglycerides levels (Levels  $\geq 150 \text{ mg/dl}$  OR if the person is on therapy for high triglyceride levels); High Fasting Plasma Sugars ( $\geq 100 \text{ mg/dl}$  OR a known case of Type 2 DM on treatment); and finally High Blood Pressure (systolic pressure  $\geq 130 \text{ mmHg}$ , OR Diastolic BP  $\geq 85 \text{ mmHg}$  OR on pharmacotherapy for hypertension) (3). While there is no drug treatment that directly treats the underlying insulin resistance in metabolic syndrome, diet modification and exercise to promote weight loss have been advocated to improve insulin resistance (4).

Many studies have proved that metabolic syndrome is more prevalent in people with sedentary lifestyle, however the profile of metabolic syndrome in labourers who are involved in strenuous physical activity is unknown. This work is intended to study the profile of the metabolic syndrome in labourers.

**AIMS & OBJECTIVES:**

To study the prevalence of Metabolic Syndrome in labourers and to find the association of Metabolic Syndrome with gender, age, diet, smoking and alcohol in labourers.

**MATERIALS & METHODS:**

The study was conducted in the Department of General Medicine,

Himalayan Institute of Medical Sciences (HIMS), Swami Rama Himalayan University, Swami Ram Nagar, Dehradun, over a period of 12 months. 140 Subjects were selected from the healthy manual labourers working in the vicinity of Himalayan Institute of Medical Sciences. Pregnant females and known cases of hypothyroidism were excluded.

**Type of study:** Cross-sectional study

**Study protocol:** In selected labourers, various anthropometric and biochemical parameters were measured. Subjects were considered to have metabolic syndrome if they fulfilled the criteria as per IDF definition of metabolic syndrome (5).

**OBSERVATIONS:****Table No. 1: Prevalence of Metabolic Syndrome**

|                    |         | Number of subjects (n=140) | Percent (%) |
|--------------------|---------|----------------------------|-------------|
| Metabolic syndrome | Present | 16                         | 11.4        |
|                    | Absent  | 124                        | 88.6        |

**Table No. 2: Association of metabolic syndrome with gender**

| Metabolic syndrome-Gender | Gender          |                   | P value  |
|---------------------------|-----------------|-------------------|----------|
|                           | Male (n=99) (%) | Female (n=41) (%) |          |
| Metabolic syndrome        | Present (n=16)  | 12 (12.1)         | 4(9.8)   |
|                           | Absent (n=124)  | 87 (87.9)         | 37(90.2) |

**Table No. 3: Association of metabolic syndrome with dietary history**

| Metabolic Syndrome-Dietary history | Dietary History    |                       | P value   |
|------------------------------------|--------------------|-----------------------|-----------|
|                                    | Vegetarian (n=50)  | Non Vegetarian (n=90) |           |
| Metabolic syndrome                 | Present (n=16) (%) | 4 (25.0)              | 12 (75.0) |
|                                    | Absent (n=124) (%) | 46 (31.1)             | 78 (69.9) |

**Table No. 4: Association of Metabolic Syndrome with age group**

| Metabolic syndrome- Age |                    | Age group (in year) |           |          |         | P value |
|-------------------------|--------------------|---------------------|-----------|----------|---------|---------|
|                         |                    | ≤30                 | 31 - 40   | 41 - 50  | >51     |         |
| Metabolic syndrome      | Present (n=16) (%) | 0 (0.0)             | 11 (68.7) | 5 (31.3) | 0 (0.0) | 0.001   |
|                         | Absent (n=124) (%) | 59(47.6)            | 44(35.5)  | 15(12.1) | 6 (4.8) |         |

**Table No. 5: Association of Metabolic Syndrome with Smoking**

| Metabolic syndrome- Smoking |                    | Smoking   |           | P value |
|-----------------------------|--------------------|-----------|-----------|---------|
|                             |                    | No        | Yes       |         |
| Metabolic syndrome          | Present (n=16) (%) | 3 (18.8)  | 13 (81.2) | 0.118   |
|                             | Absent (n=124) (%) | 48 (38.7) | 76 (61.3) |         |

**Table No. 6: The association of Metabolic Syndrome with alcohol**

| Metabolic syndrome- Alcohol |                      | Alcohol Drinking |           | P value |
|-----------------------------|----------------------|------------------|-----------|---------|
|                             |                      | No               | Yes       |         |
| Metabolic syndrome          | Positive (n=16) (%)  | 6 (37.5)         | 10 (62.5) | 0.092   |
|                             | Negative (n=124) (%) | 74 (59.7)        | 50 (40.3) |         |

**RESULTS & DISCUSSION:**

The main feature of our study was to identify the subjects affected from metabolic syndrome in a labourer population, who fulfilled the inclusion criteria.

In our study, the metabolic syndrome was found in 11.4% of the studied population. 16 out of 140 studied labourers were found to have metabolic syndrome. These findings were comparable to the findings of a research conducted by Pathania et al (6), which reported a prevalence of 9.2% in a rural population but in his study, the maximum (43.6%) individuals suffering from the metabolic syndrome were above 65 years of age and the prevalence was very low (6.4%) in the people aged between 20-34 years. Comparable findings were observed in a study done in rural area of Wardha district, Maharashtra by Kamble et al (7). In his study 9.3% of the population was found to be suffering from the metabolic syndrome. A prevalence of 9.4% was found in another research conducted by Singh et al (8), in rural population of Uttar Pradesh. Higher prevalence of Metabolic Syndrome was found in studies conducted by Mangat et al (9) in urban north Indian population, Pemminati et al (10) in semi urban population and Kaur et al (11) in urban industrial male. Mangat et al (9) study reported a prevalence of 47.5%, Pemminati et al (10) study found a prevalence of 29.7% and Kaur et al (11) 41.3%. Different prevalence rates have been observed in different studies conducted in various parts of India. Study by Ramachandran et al (12) in urban Asian Indian adults reported that Metabolic Syndrome was present in 41.1% of studied population. Another study by Deepa et al (13) in Asian Indians reported a prevalence of 25.8% by IDF and a prevalence of 18.3% by ATP III criteria in a south Indian population. Another study by Kanjilal et al (14) from Bangalore found a prevalence of 40.3% by ATP-III criteria and 34.9% by the IDF definition. In a study conducted by Gupta et al (15), the prevalence in Bhatia community in Rajasthan was found to be 36.2% in males and 47.8% in females by the ATP III definition.

Usually, an increase in the prevalence rate has been observed with increasing age. In our study, Metabolic Syndrome was more prevalent in the age group of 31-40 years, comprising 11 (68.8%) out of 16 metabolic syndrome patients, which was found to be statistically significant ( $p < 0.05$ ). These findings were in contrast to the findings of a study conducted by Pathania et al (6), which recorded that the maximum (43.6%) of the individuals suffering from the metabolic syndrome were above 65 years of age whereas, in the people aged between 20-34 years, only 6.4% had metabolic syndrome. These findings were also different to the results of a study conducted in an African-American population and Bangalore where the highest prevalence was observed in the people aged between 65-74 years and a minimum occurrence was seen in the age group of 21-34 years (16).

In our study, metabolic syndrome was found majorly in males (12/16), rather than females (4/16) which is comparable to a study conducted by Gupta et al (15). These findings are different to the findings of a research done by Pathania et al (6) that reported a higher prevalence in women in comparison to men. Similar findings were observed in other studies conducted by Sidorenkov et al ( ), Parale et al ( ) and Tanaka et al

( ), which found a greater prevalence in females as compared to males. A study conducted by Ramachandran et al (12) also reported Metabolic Syndrome was more prevalent in females (46.5%) than in males (36.4%) and in older people. Surana et al ( ) also observed a greater prevalence of Metabolic Syndrome in females (87.71%) as compared to males (69.33%) in his study. Another study by Kamble et al also reported Metabolic Syndrome was more common in females than males in studied population (7).

The possible mechanism behind the impact of Socio economic status on Metabolic Syndrome may be through individual's unhealthy behaviors, and habits such as consuming alcohol, chewing tobacco or smoking. Smoking and alcohol are more prevalent amongst the people of low socio economic status and are major risk factors for atherosclerosis. Moreover, both smoking and drinking alcohol contribute to the development of cardiovascular diseases, which further aggravates the risk of developing Metabolic Syndrome. In our study, out of 16 subjects suffering from Metabolic Syndrome, 13 (81.2%) were found to be smokers & 10 (62.5%) were found to be alcohol drinkers. The correlation was statistically non-significant for both smoking and alcohol with metabolic syndrome ( $p > 0.05$ ). In studies done by Lohsoonthorn et al ( ) & Canuto et al ( ), similar results were reported, that is, alcohol consumption, and cigarette smoking were not statistically significantly related with Metabolic Syndrome ( $p > 0.05$ ).

Rising prevalence of metabolic syndrome has been observed throughout India. Whereas, earlier it was prevalent mostly in the urban areas. Nowadays, it has been found prevalent in the rural areas and the prevalence in the rural areas is on an increasing trend which can be attributed to changes in the life style of these individuals and decreased physical activity (6). This has also led to change in the dietary habits, with the people tending to over eat. Thus, in India many non-communicable diseases are on the rise and India has emerged as the diabetic capital of the world. In order to reduce the rate of this progression, multi centric studies to assess the national prevalence of Metabolic Syndrome and to start corrective measures need to be conducted (6).

**CONCLUSION:**

Metabolic Syndrome is prevalent even in labourers, who are involved in strenuous physical activity. Males were found to be at a higher risk of developing metabolic syndrome rather than females. Metabolic Syndrome was found to be more prevalent in non-vegetarians as compared to vegetarians and Smoking, alcohol intake and tobacco chewing might impart the risk of metabolic syndrome but absolute risk could not be predicted since other confounding variables were not ruled out

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