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Research Article

PREVALENCE OF OBESITY AMONG DIFFERENT CATEGORY OF MINE WORKERS IN INDIA

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ABSTRACT

Work environment and lifestyle behaviours contribute to the development of obesity. The increased prevalence of obesity is concerning public health problems in India and are the major risk factors for number of diseases. Mining population being considered as an active workforce, the present study was carried out to determine the distribution of obesity among different category of mine workers of western India. Anthropometric measurements such as height, weight and waist circumference of 527 mineral mine workers age ranging from 18 to 60 years were investigated. Body Mass Index (BMI) was calculated as kg/m^2 and categorised as per World Health Organization (WHO) 1998 criteria. Workers were classified into four groups according to International Standard Classification of Occupations (ISCO-88). 96.2% of the mine workers were above 40 years of age group. Waist circumference was used for determination of abdominal obesity which was present among 61.8%. Overall it was observed that 69.8% of mine workers are having one or either i.e., abdominal, generalized or combined form of obesity. Further analysis showed that workers with abdominal only, generalized only and combined obesity were 18.9%, 8.3% and 42.8% respectively. Abdominal obesity and generalized obesity was more prevalent among professional group while combined obesity was more prevalent in Machine operators and Trade workers with elementary group being least affected. This study showed high prevalence of obesity among all categories of mine workers and recommended the need of healthy lifestyle intervention to prevent major risk factors for many diseases.

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INTRODUCTION

Prevalence of obesity is on rise worldwide and has become a global public health problem. WHO reported that one in six adults are obese and each year 2.8 million individuals die due to overweight and obesity having higher rates of mortality and morbidity compared to non-obese individuals.^[1-4] World Obesity Federation also reported that globally one billion adults were overweight and 475 million were obese^[5].

Obesity is an important risk factor that may lead to many diseases and it is one of the leading preventable causes of death worldwide. Obesity is an excessive accumulation of body fat that may have negative effect on health.^[6-11] Obesity can be determined by assessing widely used criteria such as body mass index (BMI), waist circumference, waist-to-hip ratio and skinfold thickness. Obesity is mainly generalized or central (abdominal), BMI and waist circumference are measures for its determination respectively. Various studies documented an

increasing trend of obesity among urban as well as rural population in different states of India.^[12-15] Punjab, Kerala and Delhi states having highest numbers of overweight and obesity with similar trend in other parts of country.^[16] The prevalence of obesity is rapidly increasing shown in successive studies carried out in India, with recent prevalence estimates upwards of 15%.^[17]

Obesity also has been showing its implications in the workplace among workers as various factors such as job stress, shift work and long work hours has been shown to contribute.^[18, 19] Obese employees have been reported to be less productivity compared with those with lower BMI categories.^[20]

Many studies are been carried out regarding prevalence of obesity in general population. It is documented that persons engaged in sedentary occupation are at higher risk of developing obesity. The mining is one of the occupations wherein people are engaged in physical hardship and hence it is

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expected to have less prevalence of obesity. The article deals with evaluation of obesity among mine employees in western part of India.

MATERIALS AND METHODS

Health surveillance data of 527 males mine workers having a different occupational profile was analysed. Mine workers were categorized into 4 major groups by using the International Standard Classification of Occupations (ISCO-88).^[21] A brief history of each mine workers was recorded. The height was measured in centimeters and weight in kilograms by following standard procedures. For the evaluation of overweight and obesity the body mass index (BMI) was calculated by the ratio of weight (kg) to the square of the height (m²).^[22] WC was measured to the nearest 0.1 cm at the narrowest point between the lower end of the rib cage and iliac crest while standing.^[23]

WHO 1998 criteria was applied for categorization for BMI as follows: Normal - 18.5 to 24.9 kg/m², Overweight - 25.0 to 29.9 kg/m², Class 1 obesity - 30.0 to 34.9 kg/m², Class 2 obesity - 35.0 to 39.9 kg/m², Class 3 obesity \geq 40 kg/m².^[24] Abdominal obesity (AO) and generalized obesity was defined as waist circumference \geq 90 cm for men and body mass index \geq 25 kg/m² respectively.^[25,26] Workers were having abdominal and generalized obesity was classified as combined obesity.

Data was entered into Microsoft Excel 2007 and analyzed by using the Epi-Info version 3.3.2 software. Results are shown in percentages and X² test was used for comparison of proportions.

RESULTS

Distribution of mine workers according to occupations and age is shown in table 1. Majority i.e., 67.9% of workers were 51-60 years age group, 28.2% workers were 41-50 years age group while 3.7% were below 40 years of age. 38.7% of the workers were overweight [BMI > 25kg/m² - 29.9 kg/m²]

Table 1 Distribution of mine workers according to occupations and age

Age groups (Years)	Professionals	Machine operators	Trade workers	Elementary occupations	Total
< 40	12	1	5	2	20(3.7)
41-50	20	27	39	63	149 (28.2)
51-60	45	68	69	176	358 (67.9)
Total	77 (14.6)	96 (18.2)	113 (21.4)	241 (45.7 %)	527

Figure in parenthesis indicates percentage

Table 2 shows occupation group in relation to BMI and waist circumference. It was observed 12.1% workers were having generalized obesity i.e., BMI > 30 kg/m² where as 61.8 % workers showed abdominal obesity i.e., waist circumference > 90 cm.

Table 2 Occupational group in relation to BMI and waist circumference

Particulars	Professionals	Machine Operators	Trade Workers	Elementary Occupations	Total
BMI > 30 kg/m ²	13 (16.8)	14 (14.5)	18 (15.9)	19 (7.8)	64 (12.1)
Waist Circumference > 90 cm	60 (77.9)	64 (66.6)	81 (71.6)	121 (50.2)	326 (61.8)

Figure in parenthesis indicates percentage

Mine workers with BMI > 30 kg/m² were categorized as per WHO criteria as shown in Figure -1. It was observed that out of 64 obese mine workers, 89% workers had class I obesity, 9.3% had class II while 1.5% had class III obesity.

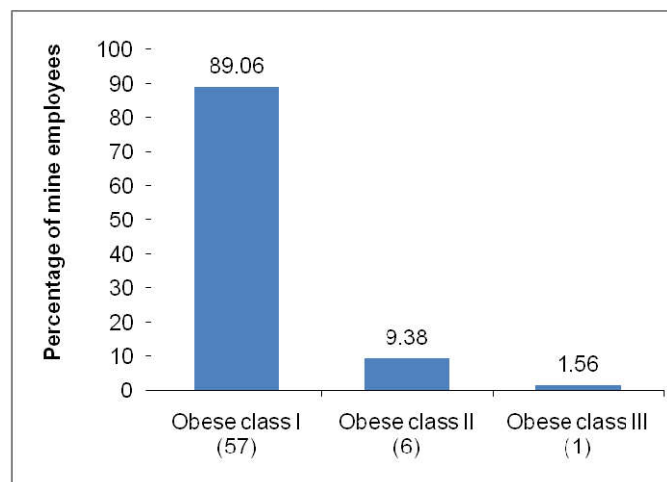


Fig 1 Categorization of obesity among mine workers

Further it was observed workers 18.9 % has only abdominal type of obesity and 8.3 % had only generalized type of obesity, whereas 42.8 % workers had both termed as combined obesity. Table -3 shows different types of obesity in occupational groups. Abdominal and generalized obesity was highest among professionals whereas combined obesity was highest among machine operators.

Table 3 Distribution of obesity among occupational group

Obesity	Professionals	Machine Operators	Trade Workers	Elementary Occupations
Abdominal	25 (32.4)	16 (16.6)	24 (21.2)	35 (14.5)
Generalized	13 (16.8)	04 (4.1)	05 (4.4)	20 (8.2)
Combined	35 (45.4)	48 (50)	57 (47.7)	86 (35.6)
Total	73 (94.8)	68 (70.8)	86 (76.1)	141 (58.5)

Figure in parenthesis indicates percentage

DISCUSSION

There is a constant rise of non communicable diseases among developing countries including India. Obesity is a major contributor which also leads to hypertension, diabetes, cardiovascular diseases, etc. The studies conducted in India on prevalence of obesity in urban and rural population has shown significant rise in the trend. It is also been observed that there is increase in obesity among work force not only in those having desk job but also field work.

Mining being one of the major contributors to GDP of a nation is having a large work force engaged in different operation to extract mineral from mines. The mining activities are physically demanding and hence workers are believed to be less prone to put on excess weight. There are few studies conducted among mine workers on obesity.

The present study was conducted to assess the pattern of obesity among mine workers. The workers were classified according to ISCO classification depending upon their area of work. The BMI was used to assess generalized obesity and it was observed as per BMI 38.7% and 12.1% were overweight and obese respectively. This finding is in line with global health observatory data.^[27] Waist circumference was used for

determination of abdominal obesity which was present among 61.8%. Overall it was observed that 69.8% of mine workers are having one or either i.e, abdominal, generalized or combined form of obesity. Further analysis showed that workers with abdominal only, generalized only and combined obesity were 18.9%, 8.3% and 42.8% respectively. It was observed that the 94.8% of the employees in professional group has one or other type of obesity, followed by trade workers machine operators and least in elementary workers. It can be inferred that the professional group who are mostly engaged in decision making leading a stressful life with more sitting hours and less physical activity might be attributing to such high percentage of obesity. Subsequently the trade workers group and machine operator group who are relatively engaged in some kind of skill labour activities showed obesity of about 70% among them. The elementary group comprising of mostly labours and helpers exposed to high physical demand like handling and use of equipments, moving around the mine more often etc. had the least percentage of obese population among them. However the findings are in line with a study conducted in urban north India (New Delhi) wherein the prevalence of generalized obesity was 50.1% while abdominal obesity was 68.9% but higher as compare to the findings of ICMR-INDIAB collaborative study carried out in general population of four states in India in which the prevalence ranged from 11 to 31% for generalized obesity where as the range was 17 - 36% for abdominal obesity.^[28-29] Similarly Tiwari *et al* reported obesity being more prevalent among people belonging to higher occupation level and higher education status conducted at Gwalior city.^[30] The occurrence of abdominal obesity is alarmingly high and it is well known that person with abdominal obesity are prone for type -2 diabetes. The finding of such high percentage of obesity may be attributed to the factor that 96% of the workers are above 40 years of age.

CONCLUSION

The present study showed high prevalence of obesity among mine workers where it is understood that the job requires high levels of physical activities. The professional group is at high risk followed by the other workers hence there is need of workplace interventions in relation to conducting workshops, awareness programmes to educate them about the importance of nutritious diet, regular exercise and quit addictions of smoking and alcohol and motivating the workers towards achieving healthy lifestyle should be utmost priority.

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