Original Research Article

Prevalence of overweight and obesity and its epidemiological determinant: a cross sectional study, in Maharashtra, India

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ABSTRACT

Background: India has >135 millions obese individual at present. Overweight and obesity are fifth leading cause of global deaths. This study was undertaken to study prevalence of obesity and overweight and to find out predictors for obesity.

Methods: This cross-sectional study was carried out among adult individuals (aged 18-55 years) belonging to Akola district of Maharashtra during July 2022 to December 2022. The study was a hospital based undertaken in the Nutritional OPD under the community medicine department, Government Medical College Akola.

Results: Maximum respondent were male 205 (64.5%) Overall prevalence obesity 108 (34%) with maximum number of male 76 (24%) and very less females 32 (10%). However overall prevalence of overweight was 58 (18%) in the study population out of which 44 (13.8%) were male and 14 (4.2%) were females. Prevalence of obesity increases with age, in the present study 19% prevalence were seen in 36-55 years age group. Overall respondents from upper class as per (modified BG Prasad classification) were 153 (48.25%) among which 59 (19%) were more obese as compare upper middle, and middle class. 28 (9%), 10 (1%) respectively. This difference was found statically significant (χ^2; p value= 0.01 and 0.002).

Conclusions: Suitable health care strategy and intervention programs along with health education is needed to reduce the impact.

Keywords: BMI, Gender, Obesity, Occupation, Overweight, Place of residence, Socioeconomic status

INTRODUCTION

Obesity is a condition characterized with an increase in the size and amount of fat cells in the body. It is a chronic disorder that is officially classified as a disease by the World Health Organization (WHO). Adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical and psychosocial health consequences."[1,2] According to the WHO, obesity is a major risk factor for noncommunicable diseases such as heart disease, stroke, type 2 diabetes, certain cancers (endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and colon, and osteoarthritis. The worldwide prevalence of obesity is reaching pandemic proportions. The WHO had estimated that in 2016, more than 1.9 billion adults worldwide (39%) were overweight, and over 650 million (13%) were obese.[1]

Obesity is an intricate condition, with severe social and psychological extensity, that influence nearly all ages and socio-economic groups and endanger to devastate both developed and developing countries. In the course of Millennium Development era from 1990 to 2015, India witnessed a rapid transformation in its population's lifestyle. Obesity and overweight remains the world's fifth cause of mortality i.e. every year 2.6 million people die due to this disorder. Additionally, obesity and overweight attributed to 44% of diabetes cases, 23% of ischemic heart diseases and 7-41% of cancers.[2]

Epidemiological studies have empirically demonstrated that obesity is a risk factor for a range of chronic diseases, including cardiovascular diseases, diabetes, chronic kidney disease, certain types of cancers and musculoskeletal disorders. Youth- Asians in particular are at increased risk of cardiometabolic diseases at a lower body mass index (BMI) and younger age relative to Caucasians.[3] In spite of this, federal budgeting to address obesity and nutrition-related non-communicable diseases

During the last few decades, the incidence of obesity has been accelerating at an alarming rate in both the developed and developing countries. The prevalence of obesity is now being considered to be a major public health concern in many of the urban regions of the world. Even in India, which is typically known for its high prevalence of undernutrition, a considerable prevalence of overweight and obesity now co-exist among the populations. A steady increase in the prevalence of overweight obesity has been reported from different Indian populations.[4]

METHODS

Subjects and area of study

This cross-sectional study was carried out among adult individuals (aged 18-55 years) belonging to Akola district of Maharashtra during July 2022 to December 2022. This district covers an area of 10,434 km^2 with a total population of 965,280 individuals. All the individuals were residents of the rural and urban areas of Akola district. The study was a hospital based undertaken in the nutritional OPD under the community medicine department, Government Medical College Akola. The study was conducted July 2022 to December 2022 for period of 6 months.

All ages 20-55 years were included in the study verbal and written consent was taken from the respondent before collecting the information. The questionnaire schedule was included information about A) identification data: family information, socioeconomic condition. B) Information regarding individual person, their lifestyle. The interview was conducted in local language Marathi. The care was taken to ensure privacy and confidentially of interview as a part of study objective of the study was explained to the respondents.

All anthropometric measurement were taken using WHO steps guidelines.[5] BMI: The BMI was calculated using the following formula: BMI (kg/m^2) =weight (kg)/ height (m^2). The WHO had proposed a redefined criterion for overweight and obesity among Asian populations and this was used to evaluate the prevalence of overweight and obesity in the present study. The BMI cut-off points utilized for the assessment of overweight and obesity were ≥23.00 kg/m^2 and ≥25.00 kg/m^2 respectively. For combined overweight-obesity, the cut-off point was ≥23.00 kg/m^2.

The data was entered in Microsoft Excel (2019 version) and analysis was done Jamovi software (2.3.26 version). Descriptive statistics like percentages, mean and standard deviation were found and in inferential statistics Chi-square test was used to find the significance. P value of <0.05 was observed as statistically significant.

RESULTS

Most of the participants were males (64.5%) and 112 (35.5%) were female. Out of total study subject 284 (89.60%) were resident of urban area and 33 (10.40%) from rural area. Most of participants were married 202 (64%) fallowed unmarried 102 (32.18%) the separated participant was very less in number 3 (0.95%). Maximum number of participants were non worker 119 (37.53%). Socioeconomic status assesses most of them from upper class category 153 (48.25%) (Table 1).

Table 1: Characteristics of study population.

Variables	Males, n=205; N (%)	Females, n=112; N (%)	Total, n=317; N (%)	χ² p value
Age group (years)				
18-35	109 (34.38)	68 (21.46)	177 (55.84)	0.196
36-55	96 (30.28)	44 (13.88)	140 (44.16)	
Area of residence				
Rural	27 (8.51)	6 (1.89)	33 (10.40)	0.029*
Urban	178 (56.15)	106 (33.45)	284 (89.60)	
Marital status				
Married	125 (39.43)	77 (24.30)	202 (63.73)	
Unmarried	72 (22.72)	30 (9.46)	102 (32.18)	0.185
Widowed	5 (1.57)	5 (1.57)	10 (3.14)	
Separated	3 (0.95)	0 (0)	3 (0.95)	
Education				
Illiterate	7 (2.22)	5 (1.57)	12 (3.79)	
Primary	22 (6.94)	21 (6.63)	43 (13.57)	0.178
Secondary	35 (11.04)	17 (5.36)	52 (16.40)	

Variables	Males, n=205; N (%)	Females, n=112; N (%)	Total, n=317; N (%)	χ² p value
Higher Secondary	45 (14.20)	26 (8.20)	71 (22.40)	
Graduate	79 (24.92)	40 (12.61)	119 (37.53)	
Post graduate	17 (5.36)	3 (0.95)	20 (6.31)	
Occupation				
Non-worker	43 (13.56)	76 (23.97)	119 (37.53)	
Labourer	20 (6.31)	5 (1.57)	25 (7.88)	
Farmer	26 (8.22)	5 (1.57)	31 (9.79)	<0.001*
Skilled worker	19 (5.99)	0 (0)	19 (5.99)	
Service Government	35 (11.04)	15 (4.74)	50 (15.78)	
Service Private	62 (19.56)	11 (3.47)	73 (23.03)	
Socio-economic status				
Upper class	103 (32.47)	50 (15.78)	153 (48.25)	
Upper middle	52 (16.39)	36 (11.36)	88 (27.75)	
Middle class	23 (7.25)	13 (4.11)	36 (11.36)	0.532
Lower middle	23 (7.25)	9 (2.84)	32 (10.09)	
Lower class	4 (1.26)	4 (1.26)	8 (2.52)	

Table 2. Association BMI with Socio-demographic information.

Variables	No of individual (N = 317)	BMI				χ²; p value
		Underweight (<18.5 kg/m²)	Normal (18.5-22.9 kg/m²)	Overweight (23-24.9 kg/m²)	Obese (≥25 kg/m²)	
Age (in years)	18-35	23	70	36	48	11.1; 0.01*
	36-55	8	50	22	60	
Area	Rural	4	16	8	5	5.89; 0.1
	Urban	27	104	50	103	
Sex	Female	14	52	14	32	9.39; 0.02*
	Male	17	68	44	76	
Marital Status	Married	16	76	36	74	8.74; 0.46
	Unmarried	14	39	21	28	
	Widowed	0	4	1	5	
	Separated	1	1	0	1	
Education	Illiterate	2	3	2	5	17; 0.3
	Primary	6	16	6	15	
	Secondary	6	23	7	16	
	Higher secondary	10	29	13	19	
	Graduate	7	45	26	41	
	Post graduate	0	4	4	12	
Occupation	Non-worker	14	52	17	36	25.8; 0.1
	Labourer	5	8	4	8	
	Farmer	4	12	7	8	
	Skilled worker	3	5	3	8	
	Service government	3	16	12	19	
	Service private	2	27	15	29	
Socio-economic status	Upper class	7	53	34	59	23.7; 0.02*
	Upper middle	9	38	13	28	
	Middle class	7	16	3	10	
	Lower middle	5	11	6	10	
	Lower class	3	2	2	1	

Table 3: Sex specific descriptive statistics (mean±standard deviation) of the anthropometric variables.

Variables	Male (n =205)	Female (n=112)	Sex difference (χ²- p value)
Weight (kg)	64.7±9.96	54.1±9.94	0.001
Height (m)	1.65±0.07	1.54±0.06	0.001
BMI (kg/m²)	23.7±3.64	22.7±3.76	0.001

Table 4: Prevalence of overweight and obesity among the study population.

Excess of adiposity	Male (n =205)	Female (n=112)	Total (n=317)	Sex difference (χ^2- p value)
Overweight (BMI=23.00-24.99 kg/ m²)	44	14	58	0.025
Obese (BMI≥25 kg/ m²)	76	32	108	0.025
Combine overweight (BMI≥23 kg/ m²)	120	46	166	0.012

Table 2 shows the age specific prevalence of obesity 60 (19%) in 36-55 years and 48 (15%) in 18-35 years, however the prevalence of and overweight was 36 (11%) in 18-35 years and 22 (6.9%) in 36-55 years. it was found to be statistically significant (χ^2; p value =0.01). Prevalence of obesity and overweight among males was 76 (24%) and 44 (14%) and among females 32 (10%) and 14 (4.5%) respectively. it was found to be statistically significant (χ^2; p value =0.02).

It was also observed that prevalence of obesity and overweight was higher 59 (19%), 34 (11%) among socioeconomic status of upper-class individual as compare to upper middle class 28 (9%) and 13 (4%) as per (modified BG Prasad classification it was found to statistically significant (χ^2; p value =0.02).

Table 3 shows the mean weight and height were highly significant among both the sexes. (p<0.001). slightly greater mean of BMI was found among males (23.7±3.64 kg/m2) as compare to females (22.7±3.76 kg/m²).

The overall prevalence obesity (≥25 kg/m²) was 108 (34%) and overweight (≥23 kg/m²) 58 (18%). The prevalence of obesity was observed higher among males (76) 24% than (32) 10% female. However, the prevalence of overweight was also higher among the males 44 (14%) than female 14 (4.5%).

DISCUSSION

Body mass index is promulgated by WHO as the most useful tool to measure the obesity. It is nevertheless a crude index that does not take in to account the distribution of body fat, resulting in variability in different individual and population.[5] Indian also tends to have excess of body fat, abdominal fat and truncal obesity for any given waist and any given fat have increases insulin resistance. This feature has been referred as "Asian Indian Phenotype".[6]

The overall prevalence of obesity and overweight was quite higher in Akola district of Maharashtra 34% and 19% in our study. The study conducted by Vedera et al in Jamnagar Gujrat in 2010 was reported 5.20% and 22.4%. prevalence of obesity and overweight.[7] The study carried out by Jain et al in 2018 in Urban area of Meerut and reported that the prevalence of obesity and overweight 6.9% and 17.4%[8] among adolescent.[8]

Vadodariya et al in reported in 2020 found that the overall prevalence and obesity and overweight was 8.0% and 15% in Science college students in Gujrat among 18-23 age group.[9] A higher prevalence of obesity 22% and overweight 19.50% in West Bengal reported by Rengma Jaydip et al.[4] Our study reported very high prevalence of obesity but prevalence overweight is similar to study conducted in Gujarat by Vadodaria et al.[9]

In the present study we found the prevalence of overweight and obesity among the male was 14% and 24%, and 5% 10% in female. The study conducted by Rai et al conducted study in West Bengal India in (2017) reported 10.1% men and 14.6% women overweight.[3] Venkatrao et al reported that in 2020 obesity was higher among women than men 41% versus 36.67% our study shows almost similar finding with the above study.[1]

In the present study obesity was more prominent in 36-to 55 ages respondents 19% and it was found statistically highly significant (p value 0.001) however, overweight 16% and obesity 32.5% was more prevalent among urban population (p value 0.02) the present study also revealed that high prevalence of overweight 11% and obesity 18.50% among upper class socioeconomic status. The other study's reported that the prevalence of overweight and obesity were significantly higher in middle age individual and belonging to higher socioeconomic status and those living in urban society group lower than p<0.05.[11-13] Our study finding is almost similar to above study finding.

CONCLUSION

The overall prevalence of obesity and overweight was quite higher in Akola district of Maharashtra. Healthy behaviour, dietary modification, physical activity along with early identification and proper intervention like health education is needed to overcome the problems of overweight and obesity.

ACKNOWLEDGEMENTS

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