



PREVALENCE OF OVERWEIGHT AND OBESITY AND ITS EPIDEMIOLOGICAL DETERMINANT: A CROSS SECTIONAL STUDY, IN MAHARASHTRA, INDIA

Community Medicine

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ABSTRACT

Obesity is a disease condition that is highly prevalent in both developed and developing countries. Obesity account for 60% cases of diabetes, 40% hypertension and 20% coronary diseases and stroke. Obesity is silent killer world-wide and less focus on the problem so current study was undertaken with the **Objective** of 1) To find out the prevalence of abdominal obesity by measuring waist circumference in adult population 2) To study socio-demographic determinates for abdominal 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. This district covers an area of 10,434 km² 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. The waist circumference was measured at the midpoint between the lower border of the rib cage and the iliac crest by using a flexible inch tape. As per the WHO/IASO/IOTF (2000) the following cut off values of the waist circumference were used to assess the abdominal obesity for Male WC < 90cms – normal and WC > 90- abdominal obesity for women: WC < 80cms – normal and WC > 80 cms- abdominal obesity. **Result:** The prevalence of abdominal obesity was 40%. The female respondent. was more obese (39%) as compare to male (10%). The association between age group and obesity was observed in 36-45 years female respondent 14% (p=; 0.002*) this difference was found statically significant and 46-55 years of age in males respondents 4%, (p= 0.04). Prevalence of obesity was much more in married individual females (p=0.01*) (and 0.02) males this difference was also statically significant (p- <0.001). **Conclusion:** Obesity was more prevalent among female population in the study and responsible for various Non-communicable diseases like diabetes and hypertension, so preventive and promotive strategy is needed to overcome this problems.

KEYWORDS

Abdominal Obesity, Waist Circumference, Age Group, Marital Status. Occupation.

INTRODUCTION:

Excess abdominal fat is an independent predictor of the risk factors and the morbidity of obesity related diseases such as type 2 diabetes, hypertension, dyslipidaemia and cardiovascular diseases. The Waist Circumference (WC) is positively correlated with the abdominal fat. Hence, the waist circumference is a valuable, convenient and a simple measurement method which can be used for identifying the individuals who are at an increased risk for the above mentioned diseases. The evidence to date indicates that the Asian populations have higher body fat for the same Body Mass Index (BMI) values as compared to those in the Caucasian populations. It is the level of the body fat, which is measured by the waist circumference, that is associated with the higher health risks for Non-Communicable Diseases (NCD) in the Asian populations^{1,2}

Obesity has now become an important health problem in developing countries particularly in India, which is currently experiencing a rapid epidemiological transition. However, the consequences of industrialization and urbanization which lead to rise in standards of living, also promote weight gain and obesity rates begin to rapidly rise thus posing a growing threat to the health of the nation³. Obesity-associated cardiovascular disorders (CVD) show variations across regions and ethnicities. However, it is unclear if there are distinctive patterns of abdominal obesity contributing to an increased CVD risk in South Asians⁴.

Obesity, is defined as a body fat content of more than 20% in average adult males and over 30% in females. However, obese individuals vary in the amount of excess fat that they store, the regional distribution of that fat within the body, and the related health consequences differ noticeably amongst these obese persons^{5,6}] Even though most epidemiological studies have only used BMI as a predictor of disease, there is substantiation that subjects with abdominal obesity, as assessed by measurement of waist circumference or waist hip ratio, are at a greater risk of cardio metabolic risk, independently of risk associated with a raised BMI^{7,8}.

Excess abdominal fat is an independent predictor of the risk factors and the morbidity of obesity related diseases such as type 2 diabetes, hypertension, dyslipidaemia and cardiovascular diseases. The Waist Circumference (WC) is positively correlated with the abdominal fat. Hence, the waist circumference is a valuable, convenient and a simple measurement method which can be used for identifying the individuals who are at an increased risk for the above mentioned diseases⁹. It is the level of the body fat, which is measured by the waist circumference, that is associated with the higher health risks for Non-Communicable Diseases (NCD) in the Asian population^{1,10}

MATERIAL AND METHOD:

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 km² 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 18-55 years were included in the study verbal & 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 style. The interview was conducted in local language Marathi. The care was taken to ensure privacy and confidentiality of interview as a part of study objective of the study was explained to the respondents.

The waist circumference was measured at the midpoint between the lower border of the rib cage and the iliac crest by using a flexible inch tape. As per the WHO/IASO/IOTF (2000)⁴ the following cut off values of the waist circumference were used to assess the abdominal obesity for Male WC < 90cms – normal and WC > 90- abdominal obesity for

women: WC < 80cms – normal and WC > 80 cms- abdominal obesity. The socio-economic status was determined by using the Modified Kuppussamy Classification Scale¹¹. The data entry was made in the Excel software in codes and the analysis was done by using the Statistical Package for Social Science (SPSS), version 11.5. The prevalence was expressed in percentage and the Chi square test was used to find its association with the factors. Results In the study population, the prevalence of the abdominal obesity.

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

Overall, 317 respondents were included in the study, the prevalence of obesity among the study population was (64)20%. was more prevalent in female 44(13.9%) as compare to male 20(6.3%). 4.4% of male were diabetic among abdominal obese respondents where as female was less in number only 1.6% Similar proportion of 4.4% male respondent were Hypertensive among abdominal obese respondents where as only 1.3 respondents female.

Among the hypertensive respondents again 4.4% respondent was were same in both the sexes 5(1.4%), but prevalence of obesity among hypertensive respondents were slightly more in female respondents 4(1.3%) as compare to male 2(0.6%). [table1]. The association between age group and obesity was observed in 26-35, 36-45 and 46-55 years of age in females 13(4.1%) where as only 9(2.8%) obesity was noted in male respondent in 46-55 years age group this difference was found to be statically significant ($p < 0.001^*$)[table2].

We do not found any significant association between education and socioeconomic status [table2,3]. The prevalence of abdominal obesity among non-worker female was 32(10.1%) and in males among the skilled workers this was also highly significant ($p < 0.001$).[Table 4]. Married females were more obese 41(12.9%) as compare to male 15(4.7%) this difference was also statically significant ($p < 0.001$).[table 5].

DISCUSSION:

Excess abdominal fat is an independent predictor of the risk factors and the morbidity of obesity related diseases such as type 2 diabetes, hypertension, dyslipidaemia and cardiovascular diseases. The Waist Circumference (WC) is positively correlated with the abdominal fat. Hence, the waist circumference is a valuable, convenient and a simple measurement method which can be used for identifying the individuals who are at an increased risk for the above mentioned diseases⁹.

Obesity and hypertension are two common and interrelated medical problems world-wide¹². Abdominal obesity is related to increased risk of all cause mortality throughout the range of Body Mass Index (BMI)¹³Obesity has been reported to be associated with higher morbidity and mortality. Central adiposity is known to be associated with abnormal carbohydrate and fat metabolism and increased incidence of coronary artery disease¹⁴.

The prevalence of abdominal obesity on waist circumference among the study population in our study was (40%) including both the sexes. The prevalence of abdominal obesity was more in females (39%) as compare to males (10%). A study from Chennai reported high prevalence of abdominal obesity (31%)¹⁵ among adult population in 1995. Gupta et al. reported the prevalence of abdominal obesity in Rajasthan 32% during 2001¹⁶. D.Shikha et.al reported 53.3% central obesity in Uttarakhand in 1919. We found prevalence rate of abdominal obesity is similar to above studies.

In our study female respondents in 36-45 years age group were tends to have more abdominal obesity 14 % and male 4 % were obese in in 46-55 years age groups. Anuradha R et.al reported 41% of women had abdominal obesity in 40-49 years age group⁹ KR et..De Silva et.al reported 57.8% abdominal obesity in Kalutra district of Sri-Lanka among 45-49 years age group in female respondents¹⁸. A study conducted by Easwaran et.al and reported central obesity among male 16.2% and 30.2% in female students in Madurai Tamilnadu in 2019 among 18-25 years respondents. We found very less prevalence of abdominal obesity in 26-55 yers age group respondents its was found

to be statically significant female ($p=0.002^*$) and for males ($p=0.004^*$) this variation may be due to less no of female was present in the study or may be due to geographical variation so we could not able to match the finding with above studies. We found very less prevaenance of abdominal obesity in our study this may be due to geographical variation, so we could match the finding with above studies.

We could not found any significant association between Education Occupation and socio-economic status for prevalence for abdominal obesity. No significant association between occupation was reported by Anuradha et.al in Chennai in 2012⁹. A negative association was found by education and abdominal obesity in Iranian adults by Hajian -Tilakai in 2012. Our finding similar to above studies. A significant association was found in abdominal obesity and married life in male ($p= 0.02^*$) and female ($p= 0.01^*$) in present study. No significant association was found between abdominal obesity and married life by Anuradha R et.al⁹. Our finding is contract with above finding. variation in our study may be due to above studies are conducted earlier or may be due to dietary pattern and geographical variation.

CONCLUSION

Obesity in Akola District of Maharashtra is higher among females among in 36-45 years of age group, female respondents and 46-55 years male respondents. We also found more obese respondents were more obese. Preventive and prove intervention is needed to overcome this problem.

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Decleration

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Ethical Approval: Ethical clearance was obtained from Institutional Ethical Committee.

Table 1. Gender wise distribution of abdominal obesity.

Waist circumference	No of individual	Percentages
Male		
<90 cm	185	90.0%
>90cm	20	10%
Female		
< 80cm	68	60.70
>80cm	44	39.30
Total	317	100%

Table 2 Age and abdominal obesity.

Age group	Females waist circumference (cm)		Males waist circumference (cm)	
	< 80 n = (%)	> 80 n = (%)	< 90 n = (%)	> 90 n = (%)
18-25 years	25 (22.50%)	5 (4.50%)	57 (27.80%)	1 (0.20%)
26-35 years	26 (23.20%)	10 (9.80%)	47 (22.90%)	4 (1.10%)
36-45 years	10 (9.80%)	16 (14.20%)	31 (15.12%)	6 (2.18%)
46-55 years	7 (6.20%)	13 (11.80%)	50 (24.40%)	9 (4.60%)
Total	68 (60.70%)	44 (39.30%)	185 (90.20%)	20 9.80%)
Chi-square; p - value	14.617; 0.002*		8.241; 0.04*	

Table 3. Education and abdominal obesity

Education	Females waist circumference (cm)		Males waist circumference (cm)	
	< 80n = (%)	> 80 n = (%)	< 90 n = (%)	> 90 n = (%)
Illiterate	3 (2.70%)	2 (1.30%)	6 (2.90%)	1 (0.10%)
Primary	9 (8.00%)	12 (10.00%)	20 (9.80%)	2 (0.20%)
Secondary	10 (8.90%)	7 (6.10%)	29 (14.10%)	6 (2.90%)
Higher Secondary	18 (16.0%)	8 (7.0%)	42 (20.50%)	3 (1.50%)
Graduate	25 (22.30%)	15 (12.70%)	73 (35.60%)	6 (2.40%)
Post graduate	3 (2.70%)	1(0.30)	15 (7.31%)	2 (0.30%)
Chi-square; p - value	3.974; 0.4		3.051; 0.5	

Table 4 Socioeconomic Status and abdominal obesity

Socio Economic Status	Females waist circumference (cm)		Males waist circumference (cm)	
	< 80 n = (%)	> 80 n = (%)	< 90n = (%)	> 90 n = (%)
Upper Class	32 (28.50%)	18 (16.50%)	91 (44.40%)	12 (5.60%)
Upper middle	21 (18.30%)	15 (13.70%)	49 (23.90%)	3 (1.10%)
Middle class	6 (5.40%)	7 (6.60%)	21 (10.20%)	2 (0.80%)
Lower middle	7 (6.25%)	2 (1.75%)	21 (10.20%)	2 (0.80%)
Lower class	2 (1.50%)	2 (1.50%)	3 (1.50%)	1 (0.50%)
Chi-square; p - value	2.758; 0.59		2.473; 0.64	

Table 5. Occupation and marital status with abdominal obesity.

Variables	Females waist circumference (cm)		Males waist circumference (cm)		Overall Chi-square; p – value
	< 80 n = (%)	> 80 n = (%)	< 90 n = (%)	> 90 n = (%)	
Occupation					
Non – worker	44 (39.30%)	32 (28.70%)	41 (12.90%)	2 (2.10%)	89.3; <0.001*
Labourer	3 (2.70%)	2 (1.30%)	19 (9.20%)	1 (1.80%)	
Farmer	4 (3.50%)	1 (0.50%)	22 (10.70%)	4 (1.30%)	
Skilled worker	0	0	14 (4.40%)	5 (2.60%)	
Service Government	10 (8.90%)	5 (4.10%)	33 (10.40%)	2 (0.60%)	
Service Private	7 (6.20%)	4 (3.80%)	56 (27.30%)	6 (2.70%)	
Chi-square; p - value	1.296; 0.86 (only Female-wise)		3.353; 0.5 (only Male-wise)		
Marital status					
Married	41 (12.50.%)	36 (32.50%)	110 (55.60%)	15 (7.40%)	30; <0.001*
Unmarried	25 (22.30%)	5 (4.70%)	70 (34.10%)	2 (2.90%)	
Widow	2 (1.70%)	3 (2.30%)	2 (0.97%)	3 (1.03%)	
Separated	0	0	3 (1.46%)	0	
Chi-square; p - value	9.134; 0.01*		11.691; 0.002*		

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