

Assessment of obesity and its determinants among adults – A Cross-sectional study

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ABSTRACT

Introduction: Obesity is the most prevalent form of malnutrition and its prevalence in India is 12.6% in women and 9.3% in men. Obesity has been identified as the known risk factor for many non-communicable diseases. Because of industrialization and urbanization the dietary habits and life style of the people have changed leading to increased risk of obesity.

Aims and Objectives: To find out the prevalence of obesity among adults of age group 30 years and above and to determine the factors associated with obesity.

Materials and Methods : A cross-sectional study was conducted among adults of age group 30 years and above in the field practice area of tertiary care teaching hospital during the period from August 2017 to October 2017. The households in the field practice area were surveyed. Individuals who were non-diabetic and non-hypertensive and who were willing for screening for diabetes and hypertension were selected. A pre designed and pre tested semi-structured questionnaire was used for collecting the data. A total of 96 study participants were studied after taking informed consent. The data was analyzed using SPSS software version 22.

Results and Conclusion : Out of 96 study participants, 23 (23.9%) were obese and 25 (26.1%) were pre obese. Similarly, 27 (28.2 %) and 48 (50%) of individuals were hypertensive and pre hypertensive respectively. Majority of individuals of age \geq 50 years, 26 (59.1%), females, 30 (61.2%) and housewives, 24 (61.5%) and individuals belonging to class I socio-economic status, 18 (66.7%) were found to be pre-obese/obese (BMI \geq 25 kg/m²) as compared to other groups.

Keywords: Body Mass Index, Obesity, Determinants, Hypertension.

INTRODUCTION

Obesity is the most prevalent form of malnutrition¹ and it is defined as “an abnormal or excessive accumulation of

body fat, which may impair health”.² Obesity is a condition that affects all age and socioeconomic groups and about 13% of the adult population of the world were affected with obesity in 2014.³ The prevalence of obesity in India is 12.6% in women and 9.3% in men.⁴ Obesity has been identified as the known risk factor for many non-communicable diseases such as metabolic syndrome, high cholesterol, type 2 diabetes mellitus, high blood pressure, and cardiovascular disease which are of main public health concern in recent days. Because of industrialization and urbanization the dietary habits and life style of the people have changed leading to increased risk of obesity.²

OBJECTIVES

1. To find out the prevalence of obesity among adults of age group 30 years and above.
2. To determine the factors associated with obesity.

MATERIALS AND METHODS

A cross-sectional study was conducted among adults of age group 30 years and above in the field practice area of tertiary care teaching hospital during the period from August 2017 to October 2017. The households in the field practice area were surveyed. Individuals who were non-diabetic and non-hypertensive and who were willing for screening for diabetes and hypertension were selected. A pre designed and pre tested semi-structured questionnaire was used for collecting the data. A total of 96 study participants were studied after taking informed consent. Socio-demographic characteristics, lifestyle factors were studied and the anthropometric measurements such as height, weight were measured. Body mass index (BMI) was calculated by dividing the weight (in kilograms) with the square of height (in meters). Based on the BMI, the individuals were classified as underweight (BMI < 18.50), Normal (BMI 18.50-24.99), pre-obese (BMI 25-29.99) and obese (BMI \geq 30).¹ Blood pressure of the participants was measured using the standardized sphygmomanometer. Two separate readings were taken at an

interval of fifteen minutes and the average of the two readings was considered for assessing hypertension. Based on the Systolic & Diastolic Blood Pressure in mm Hg the individuals were classified as Normal (SBP < 120; DBP < 80), Pre-hypertensive (SBP 120-139 or DBP 80-89) and Hypertensive (SBP ≥ 140 or DBP ≥ 89).¹

Individuals who were at risk for diabetes and those who were found to be hypertensive were referred to the health center for further management. The data was analyzed using SPSS software version 22. Data was analyzed by calculating the Frequency, Percentages, Mean and Standard deviation. Pearson's Chi-square test was used as a test of significance and p value of < 0.05 was considered as statistically significant.

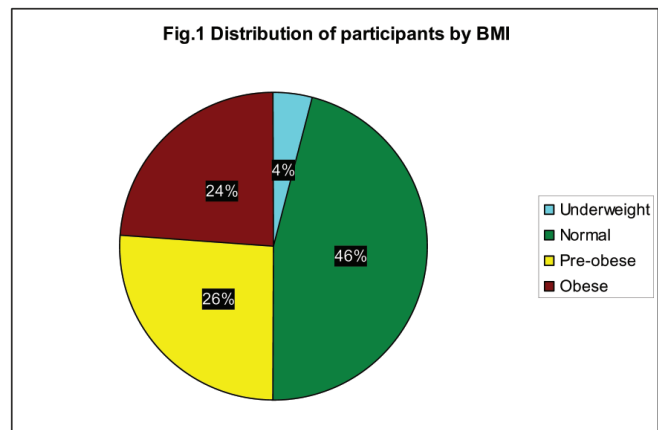
RESULTS

A total of 96 participants were studied and assessed for obesity and its determinants and the results were as follows.

Table 1: Socio- demographic characteristics of study participants

Socio-demographic Characteristics	Frequency (n=96)	Percentage
AGE GROUP IN YEARS:		
30-39	28	29.2%
40-49	24	25%
≥50	44	45.8%
SEX :		
Male	47	49%
Female	49	51%
EDUCATION:		
Illiterate	33	34.4%
Primary	8	8.4%
Middle and High School	19	19.7%
Intermediate and above	36	37.5%
OCCUPATION :		
Professional	21	21.8%
Clerical/Business/Farmer	23	23.9%
Laborer	13	13.6%
Housewife	39	40.7%
SOCIOECONOMIC STATUS:		
Class I	27	28.1%
Class II	30	31.2%
Class III	17	17.7%
Class IV	18	18.8%
Class V	4	4.2%

Table 1 shows that out of 96 study participants, majority 44 (45.8%) were of age ≥ 50 years followed by 30-39 years, 28 (29.2%). The mean age of the study participants was 49.36±13.31. Among them, 47 (49%) were males and 49 (51%) were females. Majority, 36 (37.5%) had completed intermediate/ graduate level education followed by 33 (34.4%) who were found to be illiterate. Most of them were housewife, 39 (40.7%) followed by clerical/business/farmer, 23 (23.9%). The socioeconomic status was assessed by modified B.G.Prasad classification (May-2016)⁵ and it was found that 30 (31.2%) belonged to class II followed by class I, 27 (28.1%).



The prevalence of pre-obesity and obesity was high, 25 (26.2%) and 23 (23.9%) respectively. 4 (4.1%) individuals were underweight and 44 (45.8%) normal (Fig. 1).

Table 2: Socio demographic characteristics and Body Mass Index

Socio demographic Characteristics	Under weight	Normal	Pre-obese	Obese	Total	p-value
Age in years:						
30-39	2(7.2%)	13(46.4%)	7(25%)	6(21.4%)	28	0.3380
40-49	1(4.2%)	14(58.4%)	7(29.1%)	2(8.3%)	24	
≥50	1(2.3%)	17(38.6%)	11(25%)	15(34.1%)	44	
Sex:						
Male	1(2.1%)	28(59.6%)	11(23.4%)	7(14.9%)	47	0.04367
Female	3(6.1%)	16(32.7%)	14(28.6%)	16(32.7%)	49	
Education:						
Illiterate	1(3%)	13(39.4%)	8(24.3%)	11(33.3%)	33	0.7441
Primary	0(0%)	3(37.5%)	4(50%)	1(12.5%)	8	
Middle and High	1(5.3%)	9(47.4%)	4(21.1%)	5(26.2%)	19	
Intermediate and above	2(5.6%)	19(52.8%)	9(25%)	6(16.6%)	36	
Occupation:						
Professional	1(4.8%)	13(62%)	3(14.2%)	4(19%)	21	0.6453
Clerical/Business/Farmer	2(8.7%)	11(47.8%)	6(26%)	4(17.5%)	23	
Laborer	0(0%)	6(46.2%)	4(30.8%)	3(23%)	13	
Housewife	1(2.7%)	14(35.7%)	12(30.8%)	12(30.8%)	39	
Socioeconomic status:						
Class I	1(3.7%)	8(29.6%)	8(29.6%)	10(37.1%)	27	0.01719
Class II	1(3.3%)	20(66.7%)	6(20%)	3(10%)	30	
Class III	1(5.9%)	7(41.2%)	8(47%)	1(5.9%)	17	
Class IV	0(0%)	8(44.4%)	3(16.7%)	7(38.9%)	18	
Class V	1(25%)	1(25%)	0(0%)	2(50%)	4	

Majority of study participants of age 50 and above, 15 (34.1%) were found to be obese. 28 (59.6%) of males were having normal BMI as compared to females, 16 (32.7%). 14 (28.6%) and 16 (32.7%) of females were pre obese & obese respectively as compared to males, 11 (23.4%) pre obese and 7 (14.9%) obese and the difference was statistically significant ($p=0.04367$). The individuals who were having primary level of education, 5 (62.5%) and those who were illiterate, 19 (57.6%) were pre obese/obese as compared to those who had secondary and higher level of education, 9 (47.4%) & 15 (41.7%) respectively. Majority of the housewives were obese, 12 (30.8%) as compared to professionals, 4 (19%) and those occupied in clerical/business work, 4 (17.5%). The socioeconomic status was assessed by Modified B.G Prasad classification (May 2016) and it was found that individuals of class I, 18 (66.7%) followed by class IV, 10 (55.6%) were pre-obese/obese ($BMI \geq 25 \text{ kg/m}^2$) as compared to other groups. A statistically significant difference ($p=0.01719$) was observed between socio-economic status and BMI (Table 2).

Table 3: Life style factors and Body mass index

Life style factors	Under weight	Normal	Pre-obese	Obese	Total	p value
Smokers:						
Yes	0(0%)	11(84.6%)	1(7.7%)	1(7.7%)	13	0.02717
No	4(4.8%)	33(39.8%)	24(28.9%)	22(26.5%)	83	
Alcoholics:						
Yes	1(5%)	10(50%)	7(35%)	2(10%)	20	0.6374
No	3(3.9%)	34(44.7%)	18(23.7%)	21(27.7%)	76	
Diet:						
Vegetarian	1(14.3%)	4(57.1%)	2(28.6%)	0(0%)	7	0.2732
Non vegetarian	3(3.4%)	40(45%)	23(25.8%)	23(25.8%)	89	
Daily exercise:						
Yes	1(4.2%)	11(45.8%)	6(25%)	6(25%)	24	0.9988
No	3(4.7%)	33(45.9%)	19(26.4%)	17(23%)	72	

Table 3 reveals that 11 (84.6%) of smokers were having normal BMI than non-smokers, 33 (39.8%). 24 (28.9%) and 22 (26.5%) of non-smokers were pre obese and obese respectively as compared to only 1 (7.7%) of smokers each pre obese & obese and the difference was statistically significant ($p \text{ value}=0.02717$). 7 (35%) of alcoholics were pre obese as compared to 18 (23.7%) non-alcoholics. Each 23 (25.8%) of non-vegetarians were pre obese & obese. 19 (26.4%) and 17 (23%) of the individuals who didn't do any exercise were pre obese and obese respectively. No statistically significant difference was noted with regard to alcohol intake ($p \text{ value}=0.6374$), dietary habits ($p=0.2732$) and exercise ($p=0.9988$) in relation to obesity in our study.

Table 4: Body Mass Index and Hypertension

BMI classification	Normal	Prehypertension	Hypertension	Total	P value
Under weight	2(50%)	1(25%)	1(25%)	4(4.1%)	0.7415
Normal	10(22.7%)	20(45.5%)	14(31.8%)	44(45.8%)	
Pre-obese	5(20%)	13(52%)	7(28%)	25(26.2%)	
Obese	4(17.4%)	14(60.9%)	5(21.7%)	23(23.9%)	
Total	21(21.8%)	48(50%)	27(28.2%)	96(100%)	

Table 4 shows that 48 (50%) of study participants were pre-hypertensive, 27 (28.2%) were hypertensive and 21 (21.8%) were normal. 14 (60.9%) of obese followed by 13 (52%) of pre obese were pre-hypertensive. 7 (28%) of pre-obese and 5 (21.7%) of obese were found to be hypertensive ($p=0.7415$).

Table 5: Hypertension and Gender

Hypertension Classification	Males n=47	Females n=49	Total n=96	p value
Normal	10(21.3%)	11(22.5%)	21(21.8%)	0.5311
Prehypertension	26(55.3%)	22(44.8%)	48(50%)	
Hypertension	11(23.4%)	16(32.7%)	27(28.2%)	

More number of males, 26 (55.3%) were pre- hypertensive as compared to females, 22 (44.8%) whereas most of the females, 16 (32.7%) were found to be hypertensive than males, 11 (23.4%). But no statistically significant difference was observed with regard to hypertension and gender ($p=0.5311$) (Table 5).

DISCUSSION

The study reveals that 25 (26.2%) and 23 (23.9%) of the study participants were pre obese and obese respectively. A study conducted at Pondicherry also shows more number of individuals (27.7%) having $BMI \geq 25$.⁶ However a study conducted in urban slum of Mumbai showed that 32.30% of study participants and only 8.60% of study participants were pre obese and obese respectively.² We observed that majority of the individuals of age ≥ 50 years were obese, 15 (34.1%) followed by 7 (29.1%) of individuals in age group 40-49 years who were pre obese. A study from West Bengal also shows that more number of individuals of age 40 years and above, 32.52% were overweight with BMI 25-29.99 as compared to those below the age of 40 years.⁷ We found that the risk of obesity and pre obesity was more in females as compared to males as 16 (32.7%) and 14 (28.6%) of the females were obese and pre obese respectively. However 7 (14.9%) of males were obese and 11 (23.4%) were pre obese and the difference was statistically significant ($p \text{ value} = 0.04367$).

Jaydeep Sen, et al and Daniel A.Saji, et al also reported higher prevalence of obesity among females as compared to males.^{8,2} When educational status was compared

with BMI, we found that more number of individuals who were having primary level of education, 5 (62.5%) and those who were illiterate, 19 (57.6%) were pre obese/obese as compared to those who had secondary and higher level of education. But, the difference was not statistically significant ($p=0.7441$). However, study by R. Rajkamal et al found that the prevalence of overweight/obesity increased with the level of education.⁹ Majority of the housewives, 24 (61.5%) were pre obese/obese as compared to laborers, 7 (53.8%) but the difference was not significant ($p=0.6453$). Similar were the findings reported by Rajkamal et al who found that 53.5% of housewives were overweight/obese than individuals in other occupations.⁹

In our study, we observed that more number of individuals belonging to socioeconomic class I were pre obese/obese, 18 (66.7%) followed by individuals belonging to socioeconomic class IV, 10 (55.6%) ($p=0.01719$). Similarly significant association was observed between socioeconomic class and BMI in the study conducted in urban slums of Mumbai.² We observed that 11 (84.6%) of smokers were having normal BMI than non-smokers, 33 (39.8%) and also 24 (28.9%) and 22 (26.5%) of non-smokers were pre obese and obese respectively and the difference was statistically significant ($p=0.02717$). Similar was the observation reported in other studies.^{6,9}

We noted that more 7 (35%) of alcoholics were pre obese as compared to 18 (23.7%), non-alcoholics though the results were not significant statistically ($p=0.6374$). Similarly, 34 (32.1%) of alcoholics were found to be overweight/obese in the study conducted in urban area of Puducherry⁹ and also the study conducted by Jaydeep Sen et al reveals that alcohol intake had a significant effect with obesity ($p<0.05$).⁸ Statistically no significant association was observed with regard to vegetarian and non-vegetarian diet and daily routine exercise in relation to BMI, ($p=0.2732$) and ($p=0.9988$) respectively in our study. Saurabh et al reported greater risk of obesity among non-vegetarians and those who were physically inactive.⁶

In our study, we observed that 14 (60.9%) obese and 13 (52%) pre obese were pre-hypertensive. 7 (28%) of pre-obese and 5 (21.7%) of obese were found to be hypertensive ($p=0.7415$). Most of the overweight and obese were found to be hypertensive in the study conducted by Amrith Prasad.¹⁰ We observed that more number of males, 26 (55.3%) were pre hypertensive than females, 22 (44.8%) whereas most of the females, 16 (32.7%) were found to be hypertensive than males, 11 (23.4%) but the difference was not statistically significant ($p=0.5311$). However, the study conducted at Namakkal and Gujarat showed that the prevalence of hypertension was high in males as compared to females.^{10,11}

CONCLUSION

Nearly, one fourth of the individuals were found to be obese 23.9% and pre obese 26.1%. Similarly, 28.2 % and 50% of individuals were hypertensive and pre hypertensive respectively. Considering the high prevalence of these morbid conditions, immediate measures like life style modifications through Information, Education and Communication as well as early diagnosis and treatment through screening programmes need to be initiated at the community level.

ACKNOWLEDGEMENT

We are grateful to the Department of Community Medicine for their kind support and help in data collection procedure.

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How to cite this article as: Santhoshi Bhavani K, Wilson Vidhya. Assessment of obesity and its determinants among adults – A Cross-sectional study. *Perspectives in Medical Research* 2019;7(1):67-71.

Sources of support: Nil, Conflict of Interest: None declared.