An Observational Descriptive Cross-Sectional Study Evaluating Prevalence of Overweight and Obesity and its Determinant

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Abstract

Aim: The aim of the present study was to assess the 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) in the Department of Community Medicine, for period of 12 months. All the individuals were residents of the rural and urban areas.

Results: Most of the participants were males 200 (66.66%) and 100 (33.34%) were female. Out of total study subject 264 (88%) were resident of urban area and 36 (12%) from rural area. Maximum number of participants was non worker 125 (41.66%). Socioeconomic status assesses most of them from upper class category 170 (56.66%). The age specific prevalence of obesity 55 (18.33%) in 36-55 years and 46 (15.33%) in 18-35 years, however the prevalence of and overweight was 35 (11.66%) in 18-35 years and 20 (6.66%) in 36-55 years. it was found to be statistically significant. Prevalence of obesity and overweight among males was 76 (25.33%) and 47 (15.66%) and among females 28 (9.33%) and 14 (3.33%) respectively. it was found to be statistically significant. 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±3.14 kg/m2) as compare to females (22.8±3.67 kg/m2). The overall prevalence obesity (≥25 kg/m2) was 105 (35%) and overweight (≥23 kg/m2) 58 (16.66%). The prevalence of obesity was observed higher among males 75 (25%) and 30 (10%) female. However, the prevalence of overweight was also higher among the males 40 (13.33%) than female 10 (3.33%).

Conclusion: Suitable health care strategy and intervention programs along with health education are needed to reduce the impact. These results suggested that overweight and obesity may be serious public health problems. It is important to carry out further studies in order to explore the potential relationship between overweight and obesity on the one hand, and behavioral variables, such as smoking and alcohol consumption, on the other.

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

Introduction

Obesity has become a critical public health problem for the health of populations worldwide. It has been treated as a disease. [1,2] Adipose tissue dysfunction and abnormal fat mass physical forces, resulting in adverse metabolic, biomechanical and psychosocial health consequences." [3,4] 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.

Obesity, which broadly refers to excessive body fat, is a significant public health concern and its

occurrence has reached an epidemic proportion in both developing as well as developed countries. [5] Obesity tends to impact more than one third of the population around the world. Globally, obesity is estimated to cause more than 2.8 million mortalities, 4% of YLL i.e. Years of Life Lost, and at least 35.8 million worldwide DALYs i.e. Disability-Adjusted Life Years. [6] In 2015, according to World Health Organization (WHO), 107.7 million children and 603.7 million adults were reported to be obese globally, with a prevalence of 5.0% and 12.0%, respectively. [7] The WHO had estimated that in 2016, more than 1.9 billion adults worldwide (39%) were overweight, and over 650 million (13%) were obese. [3] The prevalence of obesity has doubled in 73

countries since 1980 and continues to increase in most countries. [7,8]

Nowadays, obesity has become a chronic disorder affecting the larger population than any other disease in the world. It mostly affects the adult population but children and adolescent are also prone to develop obesity. [9] Changes in the life style made life easier and marked the beginning of certain chronic ailments such as osteoarthritis, cardiovascular disorders, hypertension and obesity. [10] 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.[4] 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. [11] Obesity is also associated with unemployment, social disadvantages, and reduced socioeconomic productivity. [12]

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. [13]

The aim of the present study was to assess the prevalence of obesity and overweight and to find out predictors for obesity.

Materials and Methods

This cross-sectional study was carried out among adult individuals (aged 18-55 years)in the Department of Community Medicine, Skmch,Muzaffarpur, Bihar, India for period of 12 months. All the individuals were residents of the rural and urban areas.

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 was taken using WHO steps guidelines.[5] BMI: The BMI was calculated using the following formula: BMI (kg/m2) =weight (kg)/ height (m2). 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 $\geq$23.00 kg/m2 and $\geq$25.00 kg/m2 respectively. For combined overweight-obesity, the cut-off point was $\geq$23.00 kg/m2.

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

Table 1: Characteristics of study population

Variables	Males, n=200; N (%)	Females, n=100; N (%)	Total, n=300; N (%)	χ^2 p value
Age group (years)				
18-35	106 53)	65 (65)	171 (57)	0.198
36-55	94 (47)	35 (35)	129 (43)	
Area of residence				
Rural	30 (15)	6 (6)	36 (12)	0.022
Urban	170 (85)	94 (94)	264(88)	
Marital status				
Married	120 (60)	75 (75)	195 (65)	
Unmarried	70 (35)	20 (20)	90 (30)	0.184
Widowed	6 (3)	5 (5)	11 (3.66)	
Separated	4 (2)	0 (0)	4 (1.34)	
Education				
Illiterate	8 (4)	10 (10)	18 (6)	
Primary	60 (30)	40 (40)	100 (33.34)	0.172
Secondary	50 (25)	10 (10)	60 (20)	
Higher Secondary	40 (20)	15 (15)	55 (18.34)	
Graduate	30 (15)	20 (10)	50 (16.66)	
Post graduate	12 (6)	5 (5)	17 (5.66)	
Occupation				

Non-worker	50 (25)	75 (75)	125 (41.66)	
Labourer	20 (10)	5 (5)	25 (8.33)	
Farmer	24 (12)	5 (5)	29 (9.66)	<0.001
Skilled worker	10 (5)	0 (0)	10 (3.34)	
Service Government	50 (25)	10 (10)	60 (20)	
Service Private	46 (23)	5 (5)	51 (17)	
Socio-economic status				
Upper class	120 (60)	50 (50)	170 (56.66)	
Upper middle	50 (25)	35 (35)	85 (28.34)	
Middle class	15 (7.5)	8 (8)	23 (7.66)	0.540
Lower middle	10 (5)	4 (4)	14 (4.66)	
Lower class	5 (2.5)	3 (3)	8 (2.66)	

Most of the participants were males 200 (66.66%) and 100 (33.34%) were female. Out of total study subject 264 (88%) were resident of urban area and 36 (12%) from rural area. Most of participants were married 195 (65%) followed unmarried 90 (30%) the separated participant was very less in number 4 (1.34%). Maximum number

of participants was non worker 125 (41.66%). Socioeconomic status assesses most of them from upper class category 170 (56.66%).

Table 2: Association BMI with Socio-demographic information

Variables	No of individual (N = 300)	BMI				
		Underweight (<18.5 kg/m2)	Normal (18.5-22.9 kg/m2)	Overweight (23-24.9 kg/m2)	Obese (≥25 kg/m2)	p value
Age (in years)	18-35	20	70	35	46	
	36-55	5	49	20	55	0.01
Area	Rural	5	17	8	6	
	Urban	20	100	45	99	0.1
Sex	Female	10	48	10	28	
	Male	14	67	47	76	0.0
Marital Status	Married	14	74	34	73	
	Unmarried	10	35	20	25	
	Widowed	0	5	1	5	0.48
	Separated	2	2	0	4	
Education	Illiterate	3	4	2	5	
	Primary	6	16	6	15	
	Secondary	12	45	10	18	0.5
	Higher secondary	8	25	10	17	
	Graduate	5	22	10	18	
	Post graduate	0	5	6	6	
Occupation	Non-worker	15	55	19	36	
	Labourer	2	8	5	10	
	Farmer	4	10	7	8	0.1
	Skilled worker	2	4	1	3	
	Service government	3	21	17	19	
	Service private	2	20	10	27	
Socio-economic status	Upper class	7	60	40	63	
	Upper middle	9	38	13	25	0.03
	Middle class	5	10	3	5	
	Lower middle	2	8	1	3	
	Lower class	3	2	2	1	

The age specific prevalence of obesity 55 (18.33%) in 36-55 years and 46 (15.33%) in 18-35 years, however the prevalence of and overweight was 35 (11.66%) in 18-35 years and 20 (6.66%) in 36-55 years. it was found to be statistically significant.

Prevalence of obesity and overweight among males was 76 (25.33%) and 47 (15.66%) and among females 28 (9.33%) and 14 (3.33%) respectively. it was found to be statistically significant.

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

Variables	Male (n =200)	Female (n=100)	Sex difference (p value)
Weight (kg)	62.8±8.82	55.5±9.91	0.001
Height (m)	1.64±0.06	1.52±0.04	0.001
BMI (kg/m²)	23.7±3.14	22.8±3.67	0.001

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±3.14 kg/m2) as compare to females (22.8±3.67 kg/m2).

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

Excess of adiposity	Male (n =200)	Female (n=100)	Total (n=300)	Sex difference (p value)
Overweight (BMI=23.00-24.99 kg/ m²)	40	10	50	0.020
Obese (BMI≥25 kg/ m²)	75	30	105	0.022
Combine overweight (BMI≥23 kg/ m²)	115	40	155	0.014

The overall prevalence obesity (≥25 kg/m2) was 105 (35%) and overweight (≥23 kg/m2) 58 (16.66%). The prevalence of obesity was observed higher among males 75 (25%) and 30 (10%) female. However, the prevalence of overweight was also higher among the males 40 (13.33%) than female 10 (3.33%).

Discussion

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. [14] 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. [15] 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". [16]

Most of the participants were males 200 (66.66%) and 100 (33.34%) were female. Out of total study subject 264 (88%) were resident of urban area and 36 (12%) from rural area. Most of participants were married 195 (65%) followed unmarried 90 (30%) the separated participant was very less in number 4 (1.34%). Maximum number of participants was non worker 125 (41.66%). Socioeconomic status assesses most of them from upper class category 170 (56.66%). The age specific prevalence of obesity 55 (18.33%) in 36-55 years and 46 (15.33%) in 18-35 years, however the prevalence of and overweight was 35 (11.66%) in 18-35 years and 20 (6.66%) in 36-55 years. it was found to be statistically significant. Fitness is closely intertwined with obesity, and has powerful influences on health and mortality. Data from the Aerobics Center Longitudinal Study show that low cardiovascular fitness accounted for all of the excess all-cause mortality among obese men. [17] Similar data by these researchers have been reported for women. [18] In short, it seems probable that body weight, like height or baldness, is for the most part a proxy for many unmeasured variables. From a public health perspective, the most significant aspect of such a conclusion is that most of these unmeasured variables, especially the lifestyle factors, are more readily modifiable than body mass.

Prevalence of obesity and overweight among males was 76 (25.33%) and 47 (15.66%) and among females 28 (9.33%) and 14 (3.33%) respectively. it was found to be statistically significant. 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±3.14 kg/m2) as compare to females (22.8±3.67 kg/m2). The study conducted by Rai et al [14] conducted study in West Bengal India in (2017) reported 10.1% men and 14.6% women overweight. 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. [3] The overall prevalence obesity (≥25 kg/m2) was 105 (35%) and overweight (≥23 kg/m2) 58 (16.66%). The prevalence of obesity was observed higher among males 75 (25%) and 30 (10%) female. However, the prevalence of overweight was also higher among the males 40 (13.33%) than female 10 (3.33%). The study conducted by Vedera et al [19] in Jamnagar Gujrat in 2010 was reported 5.20% and 22.4% prevalence of obesity and overweight. The study carried out by Jain et al [20] in 2018 in Urban area of Meerut and reported that the prevalence of obesity and overweight 6.9% and 17.4%8 among adolescent. 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. [21-23] Our study finding was almost similar to above study finding.

Conclusion

Suitable health care strategy and intervention programs along with health education are needed to reduce the impact. These results suggested that overweight and obesity may be serious public health problems. It is important to carry out further studies in order to explore the potential relationship between overweight and obesity on the one hand, and behavioral variables, such as smoking and alcohol consumption, on the other.

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