

To Study Association of Obesity with Various Morbidities in a Rural Population of Eastern Uttar Pradesh

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Abstract

Background: Obesity defined as excess of body fat, frequently results in a significant impairment of health. The prevalence of obesity is increasing rapidly; the trend in obesity is especially alarming in children and adolescents. This adds to the obesity epidemic in adults and is a health challenge for the next generation

Method: This descriptive cross-sectional study was carried among 1272 individuals over 15 years of age, in district Barabanki of Uttar Pradesh.

Results: Prevalence of obesity was higher among the respondents who were hypertensive (23.4%) as compared to non-hypertensive (3%), the prevalence of obesity was higher (10.8%) among hyperglycaemic subjects (RBS>160), obesity was 8.83 times higher among those in whom hypothyroidism was present.

Conclusion: Hypertension, hyperglycaemia, hypothyroidism and muscular skeletal pain were significantly ($p<0.05$) associated with the prevalence of obesity.

Key words: Body mass index, obesity, hypertension, hyperglycaemia

1. INTRODUCTION

Obesity defined as excess of body fat, frequently results in a significant impairment of health. Obesity is the result of increase in size or number of fat cells in the body. Worldwide obesity has nearly doubled since 1980. In 2008, more than 1.4 billion adults, 20 years & older, were overweight. Of these, over 200 million men and nearly 300 million women were obese. The prevalence of obesity is increasing rapidly; the trend in obesity is especially alarming in children and adolescents. This adds to the obesity epidemic in adults and is a health challenge for the next generation. The WHO estimates that by 2015, approximately 2-3 billion adults will be overweight and more than 700 million will be obese.

¹ National Family Health Survey NFHS-I NFHS-II, India, observed that the prevalence of both overweight and obesity increases in each age group from 15 years of age to 49 years. NFHS-III (2005-06), the prevalence of overweight (BMI ≥ 25 kg/m²) and obesity (BMI ≥ 30 kg/m²) among Indian females as estimated from 15 years to 49 years of age were 12.6% and 2.8% respectively ². BMI, sedentary lifestyle, family history of excess fat intake was found to be significant risk factors for central obesity. Obesity is associated with disorders such as Cardiovascular Disease, Coronary Heart Disease, Hypertension, Diabetes, Congestive Heart Failure, Stroke and Peripheral Vascular Disease, Gallbladder Disease, Arthritis, Infertility, Sleep Disorders, Hypercholesterolemia, Breast cancer. The health consequences and psychosocial problems associated with obesity often have an adverse effect

on quality-of-life³. Obesity is now known as a public health problem but its exact prevalence is still not known in various parts of Uttar Pradesh. Hence the present study was undertaken to assess the prevalence of obesity and its association with various morbidities in the rural area of Barabanki district in Uttar Pradesh (UP).

2. OBJECTIVES

To study association of obesity with various morbidities in population over 15 years of age.

3. METHODOLOGY

3.1 Study design and setting

This descriptive cross-sectional study was carried among 1272 individuals over 15 years of age, in the Barabanki district of Uttar Pradesh.

3.2 Sample Size

The Sample size for the present study was calculated taking into account the prevalence of obesity as 14% as reported by (Chauhan et al, 2015)⁴, the prevalence of obesity was found to be 14%. The relative precision was taken as 20%. The sample size calculation was done in the following manner.

$$\text{Sample size (n)} = (3.84 * p * q) / l^2$$

where n= sample size

p = prevalence of obesity in community

q = 1-p = 100 - 0.14 = 0.86

l²= allowable error (taken as 20% relative precision for present study)

n = (3.84 * 0.14 * 0.86) / (0.02 * 0.02) = 1156

Considering 10% non-response, the final sample was 1272.

3.3 Sampling technique

In order to recruit the desired study subjects from 16 villages under RHTC, the systematic sampling method was used.

3.4 Data collection

The information pertaining to each subject was collected on a pretested schedule covering socio-demographic characteristics, housing and environment, history & physical examination, clinical examination (blood pressure & random blood sugar) anthropometric measurements (weight, height, waist circumference), history of co-morbidities, diet survey using 24-hour dietary recall and physical activity.

3.5 Data Analysis

All data was compiled on MS Excel with subsequent clean up and proper checks. The Chi-square test was used to compare the categorical variables. To find the strength of association between prevalence of obesity and various factors, the binary logistic regression analysis was carried out. The odds ratio (OR) with its 95% confidence interval (CI) was calculated. The p-value <0.05 was considered significant. All the analysis was carried out on SPSS 16.0 version (Chicago, Inc., USA).

3.6 Ethical consideration

Institutional Human Ethics Committee of Hind Institute of Medical Sciences Safedabad Barabanki, approval was obtained prior to the start of study. All the subjects were explained the purpose of the study in local language and consent was obtained from them.

4. RESULTS

Table 1: Distribution of respondents by Age and Gender

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
<25	78	39.6	119	60.4	197	14.7
25-34	117	38.4	188	61.6	305	22.7
35-44	122	43.4	159	56.6	281	20.9
45-54	99	43.2	130	56.8	229	17.1
55-64	76	41.8	106	58.2	182	13.6
≥65	75	50.7	73	49.3	148	11.0
Total	567	42.3	775	57.7	1342	100.0

Table 1 shows more than one third (42.3%) of the subjects were males. About one fifth of the subjects were between 25-34 (22.7%) and 35-44 (20.9%) years. The percentage of male subjects was found to be lower in all the groups than females except ≥65 years.

Table 2: Prevalence of Obesity in relation to Age

Age (Years)	No. of subjects	Obese		Non-obese		OR (95%CI)	p-value
		No.	%	No.	%		
<25	197	2	1.0	195	99.0	0.17 (0.03-0.85)	0.03*
25-34	305	5	1.6	300	98.4	0.29 (0.09-0.90)	0.03*
35-44	281	25	8.9	256	91.1	1.70 (0.75-3.88)	0.20
45-54	229	16	7.0	213	93.0	1.31 (0.54-3.15)	0.54
55-64	182	6	3.3	176	96.7	0.59 (0.20-1.75)	0.34
≥65	148	8	5.4	140	94.6	1.00 (Ref)	

Table 2 shows the association of obesity with age. The prevalence of obesity was found to be higher among the age group of 35-44 (8.9%) years than other age groups. The prevalence of obesity was observed to be significantly lower among the age group of 25-34 years than ≥65 years (OR=0.29, 95%CI=0.09-0.90, p=0.03). This was also significantly lower among the respondents of age below 25 years than ≥65 years (OR=0.17, 95%CI=0.03-0.85, p=0.03)

R-Odds ratio, CI-Confidence interval, *Significant

Table 3: Prevalence of Obesity in relation to Gender

Gender	No. of subjects	Obese		Non-obese		OR (95%CI)	p-value
		No.	%	No.	%		
Male	567	14	2.5	553	97.5	0.38 (0.20-0.70)	0.002*
Female	775	48	6.2	727	93.8	1.00 (Ref)	0.03*

OR-Odds ratio, CI-Confidence interval, *Significant

Table 3 shows the prevalence of obesity was found to be significantly higher among females (6.2%) compared to males (2.5%). The prevalence of obesity was observed to be 62% significantly lower among the males than females (OR=0.38, 95%CI=0.20-0.70, p=0.002).

Table 4: Prevalence of Obesity in relation to Hypertension

Hypertension ¹	No. of subjects	Obese		Non-obese		OR (95%CI)	p-value
		No.	%	No.	%		
Present	107	25	23.4	82	76.6	9.87 (5.66-17.18)	0.001*
Absent	1235	37	3.0	1198	97.0	1.00 (Ref.)	

¹SBP≥140 and DBP≥90, OR-Odds ratio, CI-Confidence interval, *Significant

Table 4 shows the prevalence of obesity was higher among the respondents who were hypertensive (23.4%) as compared to non-hypertensive (3%). The prevalence of obesity was 9.87 times higher among hypertensive than non-hypertensive which is very high significance (OR=9.87, 95%CI=5.66-17.18, p=0.001).

Table-5: Prevalence of Obesity in relation to Random Blood Sugar

Random Blood Sugar	No. of subjects	Obese		Non-obese		OR (95%CI)	p-value
		No.	%	No.	%		
≤130	1199	48	4.0	1151	96.0	0.34 (0.15-0.75)	0.008*
140-159	69	6	8.7	63	91.3	0.78 (0.25-2.39)	0.67
≥160	74	8	10.8	66	89.2	1.00 (Ref.)	

OR-Odds ratio, CI-Confidence interval, *Significant

Table 5 shows the prevalence of obesity was higher (10.8%) among hyperglycaemic subjects (RBS>160) as compared to those who had a lower RBS being (8.7%) and RBS≤130 (non-hyperglycaemic) (4%). The prevalence of obesity was significantly lower among RBS≤130 than RBS≥160 (OR=0.34, 95%CI=0.15-0.75, p=0.008).

Table-6: Association of Obesity with type of Morbidities (n=749)

Morbidty	No. of subjects	Obese		Non-obese		OR (95%CI)	p-value
		No.	%	No.	%		
Pulmonary tuberculosis	78	1	1.3	77	98.7	1.04 (0.23-4.57)	0.79
Upper respiratory tract infection	55	2	3.6	53	96.4	1.16 (0.21-4.81)	0.81
Skin infection	19	1	5.3	18	94.7	1.24 (0.11-9.12)	0.67
Bronchial asthma	110	2	1.8	108	98.2	0.39 (0.22-2.15)	0.31
Hypothyroidism	34	8	23.5	26	76.5	8.83 (4.11-23.46)	0.001*
Abdominal hernia	13	0	0	13	100	NA	
Cardiovascular disease	9	0	0	9	100	NA	
Muscular skeletal pain	356	37	10.4	319	89.6	8.23 (4.84-13.98)	0.001*
Gallbladder disease	19	2	10.5	17	89.5	3.52 (0.77-16.09)	0.08
Varicose vein	11	1	9.1	10	90.9	2.98 (0.36-24.61)	0.28
Liver disease	45	2	4.4	43	95.6	1.30 (0.30-5.55)	0.72

OR-Odds ratio, CI-Confidence interval, *Significant

Table 6 shows the obesity was 8.83 times higher among those whom hypothyroidism was present. Only hypothyroidism and muscular skeletal pain were significantly (p=0.001) associated with the prevalence of obesity.

DISCUSSION

Obesity causes serious medical complications that impair quality of life and lead to increased morbidity and premature death (Chan et al, 1994) ⁵. The numerous medical complications associated

with obesity extend to nearly every organ system and significantly increase the risk of serious disease and death. In the present study, the prevalence of obesity was higher among the respondents being hypertensive (23.4%) than non-hypertensive (3%). The prevalence of obesity was 9.87 times significantly higher among hypertensive than non-hypertensive (OR=9.87, 95%CI=5.66-17.18, p=0.001). The prevalence of obesity was higher (10.8%) among hyperglycaemic subjects (RBS>160) as compared to those who had a lower RBS (140-159) being (8.7%) and RBS≤130 (non-hyperglycaemic) (4%). The prevalence of obesity was 66% significantly lower among RBS≤130 than RBS≥160 (OR=0.34, 95%CI=0.15-0.75, p=0.008).

Singh et al. (2015) found the prevalence of obesity was 8% in rural area who had RBS in the range of 140-199 mg/dl⁷. In the present, the prevalence of obesity was higher among those whom morbidity was present (8.5%) than whom morbidity was absent (0.9%). The prevalence of obesity was 10.57 times significantly higher among who morbidity was present than whom morbidity was absent (OR=10.57, 95%CI=4.52-24.72, p=0.001). Only hypothyroidism and muscular skeletal pain were significantly (p=0.001) associating the prevalence of obesity in the present study. However, the studies have shown that overweight (BMI > 25kg/m²) and obesity (BMI > 30kg/m²) are correlated with the prevalence of hypertension (Stamler et al, 1978; Despres et al., 1990)⁸, coronary heart disease (Hubert et al, 1983)⁹, certain types of cancers (Garfinkel, 1985)¹⁰, osteoarthritis (Felson et al, 1988)¹¹, gallbladder disease (Diehl, 1991)¹², obstructive sleep apnoea (Loube et al, 1994)¹³ and diabetes (Golay and Ybarra, 2005)¹⁴.

CONCLUSION

Considering obesity as a growing health problem among rural population, there is an urgent need to make necessary health facility readiness to screen and identify these cases at the earliest and manage them appropriately to prevent from further morbidities. Early case detection and prompt management will prevent further complications among these cases. There is also a need to make the rural community aware about the hazards of being obese. National programs for the prevention and treatment of overweight and obesity and related co-morbidities and mortalities should be a public health priority. Because this study is done among people of age >15 years, these findings may not be applicable for childhood obesity. The findings from this study warrants for a large study on obesity in rural settings for better and in-depth understanding of this important problem.

RECOMMENDATION

Sensitization and awareness about obesity & its adverse effects through existing media such as TV, Radio etc should be undertaken so that families can build up a healthy life style which includes a balanced diet and regular physical activity.

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