Research Article

A study of overweight and obesity among adults in a rural area of Varanasi district

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Received: January 17, 2018; **Accepted:** February 01, 2018

ABSTRACT

Background: Overweight and obesity are increasingly common conditions in India. It is important to assess the trend of obesity in particular geographical location. In this context there was a research question to know the extent of overweight and obesity among adults in a rural area of Varanasi district **Objectives:** The objectives of the study were to determine the prevalence of obesity and overweight among adults in a rural area and the factors associated with it. **Materials and Methods:** A community-based cross-sectional study was conducted in Chiraigaon Development Block of Varanasi District. 201 adults were included in the study. Data were collected by the house to house survey using a predesigned and pretested questionnaire. International cutoff points of body mass index (BMI) was used to classify as overweight (BMI ≥25–30) and obese (BMI >30). Simple proportions were calculated, and χ^2 Chi-square, ANOVA and logistic regression were applied for statistical significance using SPSS version 17. **Results:** 22.9% of the study subjects had BMI more than 25 kg/m^2. BMI was maximum in 45–54 years in male subjects while in females it was maximum in 55–64-years age group. Overall, the prevalence of abdominal obesity was 16.4%. Adults belonging to other backward caste were noticed at a higher risk of obesity. **Conclusion:** The extent of problem of overweight and obesity was high in rural area.

KEY WORDS: Body Mass Index; Central Obesity; Obesity; Overweight

INTRODUCTION

The global epidemic of overweight and obesity - "globesity" - is rapidly becoming a major public health problem in many parts of the world.[1] Obesity may be defined as an abnormal growth of the adipose tissue due to enlargement of fat cell size, or an increase in fat cell number or a combination of both.[2] The distribution, as well as the amount of fat, differs in overweight and obese individuals. The distribution of fat in body affects the risk associated with obesity and its complications. It is useful, therefore, to distinguish between those at increased risk as a result of "abdominal fat distribution" or "android obesity" from those with less serious "gynoid" fat distribution, in which fat is more evenly and peripherally distributed around the body.[2]

Access this article online	
Website: http://www.ijmsph.com	Quick Response code
DOI: 10.5455/ijmsph.2018.0103401022018	

Obesity is a rampant form of malnutrition. As a chronic disease, it is prevalent in both developed and developing countries, and affecting children as well as adults. It is one of the most common contributors to ill health. Body mass index (BMI) increases among middle-aged and elderly people, who are at greatest risk of health complications. Increase in free sugar and saturated fats, combined with reduced physical activity, have led to obesity rates that have risen three-fold or more since 1980 in some areas. A new demographic transition in developing countries is producing rapid increases in BMI, particularly among young. The affected population

has increased to epidemic proportions, with more than 1 billion adults worldwide overweight and at least 300 million clinically obese.[3]

A survey conducted in India, in the year 2007–2008, showed a high prevalence of overweight in all age groups except in 15–24 years age group. Overweight prevalence was higher among females than males and in urban areas than in rural areas.[4]

The increase in obesity calls for accelerating programs that target primary prevention in developing countries, a practice that requires local data on the magnitude of the problem and associated risk factors. At present, there is limited data on the magnitude of overweight and obesity in a rural area and especially in the eastern part of Uttar Pradesh, and this represents a significant gap in knowledge. Keeping this in mind, we contemplated this study with the objectives to study the prevalence of overweight/obesity among adults and to determine the factors associated with it.

MATERIALS AND METHODS

This was a community-based cross-sectional study conducted in Chiraigaon Development Block of Varanasi District in adults aged 18–64 years. The study was approved by Ethics and Research Committee before its implementation.

For this study, multistage sampling technique was used. In the first stage, Chiraigaon development block was identified as the study block. The villages of community development block were stratified according to the distance from the block headquarter. From the first stratum of villages within 5 km, one village was selected by simple random sampling. Adopting the same approach one village was selected from the second stratum. The family selection was based on probability proportional to size technique. 123 families were obtained from the first village (total population −5974, 981 families) and 78 families were obtained from the second village (total population - 3778, 620 families) one male and one female from alternate families were selected. The selection of male or female from the list of eligible in the house was done in a random manner. If required, the household was revisited a second time. In total, 201 subjects were selected for the study.

To assess the sociodemographic variables, a predesigned and pretested questionnaire were used. Weight recording was done using standard hospital adult lever weighing apparatus without footwear and in minimal clothing. Steel anthropometry rod was used for measuring the height of study subjects. Waist circumference (WC) and hip circumference (HC) were measured using a steel measuring tape with an accuracy of 0.1 cm.

Assessment of obesity was made according to the WHO classification. Subjects with BMI ≥25 kg/m^2 but <30 kg/m^2 were considered overweight, whereas subjects with BMI ≥30 kg/m^2 were classified as obese. Males with WC >102 cm were considered to have abdominal obesity, while the corresponding figure for females was >88 cm.

RESULTS

Out of 201 study subjects, 88 were males while females were 113 in number. 7% of the subjects were in the age group 15–44 years. 26.9% of the subjects had received no formal education while 39.8% of subjects had a total year of schooling more than 10 years. As much as 56.7% of the subjects belonged to OBC category while 32 were of scheduled caste. 78.8% of the females were engaged in domestic work whereas 15.9% of males were unemployed/ not engaged in productive work. 7% of the subjects belonged to social Class 1, and at the same time, 52.2% of the subjects belonged to Class 4 and 5 categories (modified BG Prasad) [Table 1].

Forty-six subjects had BMI more than 25 kg/m^2. Nine of the subjects were obese [Table 2]. BMI was maximum in 45–54 years male subjects (23.31 ± 4.53), while in females this was maximum in 55–64-year age group. [Table 3]. Abdominal obesity was to the extent of 11.4% in males and 20.4% in female subjects [Table 4]. WC/HC ratio was more than 0.85 in 35–64-year age group female. It was maximum in 55–64 years [Table 4]. The ANOVA showed that the mean WC and WC/HC ratio of male and female subjects in different age group were statistically significant ($P < 0.01$).

A binary logistic regression model was fitted into the data to observe the odds for sociodemographic variables to an individual being overweight and obese. The model was suitable with 79.6% of corrected predicted frequencies. The subjects of age group below 35 years and between 35 and 54 years were at lesser risk of overweight/obesity than with subjects with age of more than 54 years. In comparison to SC/ ST, subjects of OBC and other caste category were noticed at higher risk of obesity/overweight. The higher social class people were found to have a lower chance of obesity in comparison to lower class. However, subjects of middle class showed a higher chance of developing obesity/overweight. The chance of developing obesity/overweight was 2 times higher in illiterate subjects in comparison to subjects with higher education [Table 5].

DISCUSSION

Developing countries are undergoing various types of transitions-epidemiological, socioeconomic, demographic and nutritional. Earlier developing countries had a high prevalence of undernutrition, but this era of transition has also brought a double burden of undernutrition and overnutrition in these countries.

Table 1: Sociodemographic characteristics of study subjects

Variables	Frequency, *n* (%)	
	Male	Female
Age group (years)		
15–24	18 (20.5)	19 (16.8)
25–34	18 (20.5)	29 (25.7)
35–44	12 (13.6)	26 (23)
45–54	17 (19.3)	24 (21.2)
55–64	23 (26.1)	15 (13.3)
Total years of schooling		
No formal education	13 (14.8)	41 (36.3)
1–10 years	23 (26.1)	44 (38.9)
>10 years	52 (59.1)	28 (24.7)
Work status		
Government/nongovernment employee	16 (18.2)	8 (7.1)
Self employed	44 (50.0)	4 (3.5)
Non-paid and student	14 (15.9)	11 (9.7)
Homemaker	0 (0)	89 (78.8)
Unemployed	14 (15.9)	1 (0.9)
Caste		
SC/ST	32 (15.9)	
OBC	114 (56.7)	
Others	55 (27.4)	
Type of family		
Nuclear	66 (32.8)	
Joint	135 (67.2)	
Social class		
Class 5	28 (13.9)	
Class 4	77 (38.3)	
Class 3	55 (27.4)	
Class 2	27 (13.4)	
Class 1	14 (7.0)	

Table 2: BMI of study subjects

BMI	*n* (%)		95% CI
	Male	Female	
<18.5	21 (23.9)	25 (22.1)	17.1–28
18.5–24.99	44 (50)	65 (57.5)	47.3–61.1
25–29.99	18 (20.5)	19 (16.8)	13.0–23.7
≥30	5 (5.6)	4 (3.5)	1.6–7.4

Test of significance χ^2=1.329, df=3, *P*=0.72, CI: Confidence interval, BMI: Body mass index

Our study shows that more than 22.9% of adults are overweight while 4.5% are obese. This result was slightly lower than urban slum of Mumbai which showed the prevalence of overweight and obesity to be 32.8% and 8.6%.[5] Contrary to our expectation, we did not observe significant male-female (sex) differences in the prevalence of overweight, which was found to be 26.1% and 20.3%, respectively. No gender difference in obesity was also seen in a study conducted in Gujarat.[6]

Table 3: Distribution of subjects according to their WC

Particulars	*n* (%)	95% CI
Male		
≤102 cm	78 (88.6)	84.2–92.9
>102 cm	10 (11.4)	7.0–15.8
Female		
≤88 cm	90 (79.6)	74.0–85.2
>88 cm	23 (20.4)	14.8–88.7
Overall		
Within normal range	168 (83.6)	78.5–88.7
>normal	33 (16.4)	11.3–21.5

CI: Confidence interval, WC: Waist circumference

Table 4: Average of WC and WC/HC ratio by age and sex

Age group	Mean±SD			
	Waist circumference		WC/HC ratio	
	Male	Female	Male	Female
15–24	74.80±1.13	72.78±5.36	0.85±0.05	0.84±0.04
25–34	83.50±1.29	75.37±8.21	0.91±0.08	0.84±0.06
35–44	80.50±1.30	82.23±1.30	0.89±0.07	0.86±0.07
45–54	90.94±1.13	79.15±1.27	0.97±0.06	0.87±0.09
55–64	87.28±1.15	88.93±9.88	0.96±0.06	0.92±0.07
Total	83.73±1.29	79.12±1.14	0.92±0.08	0.86±0.07
Test of significance	*F*=4.787	*F*=6.570	*F*=9.23	*F*=4.015
	df=(4,83)	df=(4,108)	df=(4,83)	df=(4,108)
	P=0.002	*P*=0.000	*P*=0.000	*P*=0.004

WC: Waist circumference, HC: Hip circumference, SD: Standard deviation

The rate of overweight in our study was higher than the rates reported in Uttar Pradesh in the NFHS 4 report.[7] This shows a variation within a state, as the districts in these surveys might be different.

Our study showed higher central obesity females than in males though the prevalence was less than Gujarat study.[6]

Both mean BMI and WC were highest in 45–54 years age group for men. For women, the mean WC and BMI were maximum in 55–64 years. A similar pattern of BMI and WC was observed in Haryana study.[8]

Fat distribution in the body is very critical. Distinct undesirable metabolic consequences are seen with the abdominal/central obesity. It is a forward planner of non-communicable diseases such as non-insulin-dependent diabetes mellitus, coronary heart disease, and hypertension. Obesity is the preventable prevention of weight gain is much

Table 5: Results of Logistic regression for overweight and obesity

Variables	Odds ratio (95% CI)	*P*
Age (years)		
≤34	0.257 (0.079–0.840)	0.025
35–54	0.686 (0.265–1.755)	0.437
>54	Referent	
Caste		
SC/ST	Referent	
OBC	2.132 (0.488–9.321)	0.314
Others	8.784 (1.757–43.55)	0.008
Total years of schooling		
No education	0.124	2.585 (0.77–8.633)
1–10 years	0.736	0.838 (0.299–2.349)
>10 years	Referent	
Social class		
Upper	0.150	0.466 (0.164–1.320)
Middle	0.191	2.121 (0.687–6.548)
Lower	Referent	
Work status		
Working	0.924	1.049 (0.389–2.832)
Non-working	Referent	
Type of family		
Nuclear	0.064	0.393 (0.146–1.054)
Joint	Referent	
Sex		
Male	Referent	0.624 (0.207–1.879)
Female	0.402	

CI: Confidence interval

easier than treating obesity and its complications. Hence, attempts to reduce abdominal obesity should be a regular component of overweight/obesity reduction program. This is agreement with the common belief, "longer the belt shorter the life." Such measures should be advocated in all age groups more so with advancing age.

CONCLUSION

This study conducted was a cross-sectional study and the sample size was small hence the results of this study cannot be extrapolated to the general population. However, the prevalence of overweight and obese people is on the rise even in rural area. Hence, pertinent steps in the form of awareness programs should be contemplated at grass root level itself.

REFERENCES

1. Mahajan BK, Gupta MC. Textbook of Preventive and Social Medicine. 4th ed. New Delhi: Jaypee Brother's Medical Publisher; 2013. p. 370-2.
2. Park K. Textbook of Preventive and Social Medicine. 23rd ed. Jabalpur: Banarsidas Bhanot Publishers; 2015. p. 397-401.
3. WHO. The World Health Report 2002-Reducing Risks, Promoting Healthy Life. Geneva: WHO; 2002.
4. Park K. Textbook of Preventive and Social Medicine. 24th ed. Jabalpur: Banarsidas Bhanot Publishers; 2017. p. 415-9.
5. Daniel SA, Shenoy GJ. An epidemiological cross-sectional study to assess the socio-demographic profile and to study the prevalence of overweight and obesity among adults in an urban slum of Mumbai. Int J Community Med Public Health 2017;4:2718-24.
6. Bhagyalaxm A, Atul T, Shikha J. Prevalence of risk factors of non-communicable diseases in a district of Gujurat, India. J Health Popul Nutr 2013;31:78-85.
7. International Institute for Population Sciences(IIPS) and ORC Macro. India: National Family Health Survey (NFHS 4), 2014-2015, Mumbai. India: IIPS; 2016.
8. Krishnan A, Shah B, Vivek L, Shukla DK, Eldho P, Kapoor SK. Prevelance of risk factors for non-communicable disease in a rural area of Faridabad district of Haryana. Indian Journal of Public Health 2008;52:115-72.

How to cite this article: Richa, Ahmad S, Mishra CP, Singh GP. A study of overweight and obesity among adults in a rural area of Varanasi district. Int J Med Sci Public Health 2018;7(4):329-332.

Source of Support: Nil,**Conflict of Interest:** None declared.