ORIGINAL ARTICLE

Socio- demographic correlates of overweight and obesity among adults in rural Meerut

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Citation

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Abstract

Background: Obesity is most common nutritional disorder in developed countries and is assuming significant dimensions in developing countries. **Objectives:** To find out the prevalence of overweight and obesity in adults aged 18 years and above and socio-demographic factors affecting overweight and obesity in rural population of Meerut. To suggest measures for prevention of overweight and obesity in adults population of rural Meerut. **Material and Methods:** In present community based cross sectional study 1382 individuals aged 18 years and above were covered from 400 families spread over 5 villages with the help of systemic random sampling in rural area of Meerut District. The Individuals were interviewed and examined personally using Pre-designed and Pre-tested Questionnaire. **Results:** Out of 1382 individuals 244 (17.7%) were having BMI ≥ 25. Prevalence of obesity in females (22%) was found more than males (13.8%). Prevalence of Overweight and Obesity increased with advancing age, maximum being in age group 50-59 years (22.2%). Maximum numbers of males (19.9%) were overweight in their most productive life (30 -39 years) whereas maximum females were overweight in their menopausal decade i.e. 40-49 years (32.8%). Overweight was more in persons who were married (18.9%), professional/Technical person (33.3%), Savarna upper caste (23.1%), belonging to high standard of living index (21.0%), person living in joint families (18.2%), and Alcoholics (18.6%) while smokers were having lower prevalence of overweight (10.6%). **Conclusion:** The prevalence of Overweight and Obesity is increasing in adult population of rural area. Various socio-demographic correlates are affecting the prevalence of Overweight and Obesity in Rural population.

Key Words

Prevalence; Cross Sectional Study; BMI; Overweight; Rural; Socio-Demographic

Introduction

Obesity is a global public health problem, on an estimate; nearly 100 million of people worldwide are obese [1]. It is a complex condition with serious social and psychological dimensions, affecting virtually all ages and socioeconomic groups. Obesity has reached epidemic proportions globally and is a major contributor to the global burden of chronic diseases and disability [2]. Overweight and obesity are becoming serious problem in India despite the widespread presence of under nutrition [3]. Nowadays obesity has become a chronic disorder affecting the larger population than any other disease in the world [4]. Obesity is not just limited to urban and affluent society but also affect the rural places and persons belonging to the lower socio-economic strata [4] while examining the body mass

index (BMI) distribution various population worldwide, a WHO expert group has observed that as the proportion of population with low BMI decreases, there is an almost symmetrical increase in the proportion with BMI above 25 [5]. As obesity is a key risk factor in natural history of other chronic and non-communicable diseases, the typical time sequence of emergence of chronic diseases following the increased prevalence of obesity is important in public health planning. Obesity lowers life expectancy [6]. The chronic health problems associated with obesity fall into 4 main areas - (a) Cardiovascular problems including hypertension, stroke and chronic heart disease (b) Condition associated with insulin resistance i.e. non-insulin dependent diabetes mellitus (NIDDM) (c) Certain types of cancers especially hormone related and large bowel carcinoma (d) Gall bladder disease [7]. WHO has designated obesity as global epidemic in the changing scenario of morbidity with transition [8]. Increase in BMI is also associated with hypertension [9].

Aims & Objectives

The objectives of this study were to find out the prevalence of overweight and obesity in adults aged 18 years and above and socio-demographic factors affecting overweight and obesity in rural population of Meerut. To suggest measures for prevention of overweight and obesity in adults population of rural Meerut.

Material and Methods

Present community based cross sectional study was done in individuals aged 18 years and above in rural field Practice area of department of Community Medicine, L.L.R.M. Medical College Meerut during April 2005 to Jan 2006. Taking prevalence 25% and relative precision 10% to calculate the sample size by the following formula - "d = 2√Pq/n". Where - n = minimum sample size, d = relative Precision, P = Prevalence, q = (1-P) Thus by the above formula the minimum sample size was calculated as 1200. Population above 18 years is about 50% so total population covered 2×1200=2400, Estimated family size 10 in this rural area is 6, So total number of families covered 2400/6 =400. Villages were enlisted and required numbers of families were selected from each village by systemic random sampling technique. If the sampled family refused to co-operate or the house was found to be locked then the next family was taken as replacement for the purpose of study.

At the time of visit to the selected house hold all the family members were listed and eligible person i.e. aged 18 years and above were interviewed personally for obtaining the required information. The members of the house not available at the time of home visits were contacted later by repeated visits. The subjects were made comfortable and were told the purpose of the study and their co-operation was sought. Then they were interviewed personally using pre-designed and pre-tested questionnaire and information was collected about socio-demographic characteristics supplemented with clinical and anthropometrical examination of individuals. BMI was used to classify the weight status of subjects. It was derived by dividing weight in kilograms by the square of height in meters $(kg/m2)$. The data thus collected, was first coded and transferred to a master chart from which simple as well as co relational tables were prepared, analyzed and statistically evaluated.

Results

A total of 1382 individuals of 18 years and above were included in the study, out of them 656 (47.5%) were females and 726 (52.5%) were males. Out of 1382 individuals 244 (17.7%) were having BMI ≥ 25 with mean BMI. The Prevalence of overweight and obesity in females (22%) was found significantly higher than males (13.8%). The distribution is shown in [Table 1].

The prevalence of Overweight and Obesity increased with advancing age, maximum being in age group 50-59 years (22.2%). Maximum numbers of males (19.9%) were overweight in their most productive life (30 -39 years) whereas maximum females were overweight in their menopausal decade i.e. 40-49 years (32.8%). The distribution of variables is given in Table 2.

The prevalence of overweight was maximum in married persons (18.9%) followed by widowed/separated persons. The prevalence of overweight & obesity was maximum in professional persons (33.3%) and minimum in post graduate educated (5.3%). The prevalence of overweight & obesity was higher in savarna upper caste (23.1%) followed by 17.8% in Other Backward Classes (OBC) individuals but was much less in Schedule Caste (SC) (4.9%) individuals and this difference was found to be statistically significant (p<.001).The prevalence of overweight & obesity was maximum (21.1%) in high standard of living index (SLI) followed by Medium SLI

(12.3%) and Low SLI (4.8%). The prevalence of Overweight & Obesity in persons belonging to nuclear and joint families was 16.5% and18.2% respectively. [Table 3].

The prevalence of overweight in alcoholic was 18.6% as compared to 17.6% in non-alcoholic and the prevalence was 10.6% in tobacco user as compared to 37.4% in non-users. [Table 4]

Discussion

Prevalence of overweight and obesity is higher than the national average but it is lower than the developed countries. In the present study the prevalence of overweight (BMI≥25) was 17.7%. Overweight and obesity (BMI≥25) was found more in females (22.0%) as compared to males (13.8%). while Kumar *et al* [11] reported the prevalence of overweight (BMI≥25) as 32.2% in females and 25.8% in males.

Age is one of the factor among non-modifiable factor which affects individual's susceptibility to gain body weight and development of obesity. In this study it was observed that prevalence of overweight increased with advancing age. The similar pattern of increasing BMI with advance in age also noticed by Yadava S *et al* [8], Hussain [12]; Singh V [13], Singh NP [14] and National Family Health Survey (NFHS) – III [15]. The decline in the proportion of overweight in the older age group might be due to the decreased body mass with age which might be a consequence of decreased calorie intake as well as decreased absorption from the gut.

Gender is also another factor influences the weight status. This was shown by this study that the prevalence of overweight and obesity is generally higher in females than males and similar findings were observed by Yadava S *et al* [8], Hussain *et al* [12], Singh NP [14] and National Family Health Survey (NFHS) – III [15]. In females, extra energy gets converted into fat. This pattern of energy usage or nutrient partitioning, in females contributes to further energy balance and fat deposition [5].

In this study, overweight status had a positive association with socio-economic status with high significance. Yadava S *et al* [8], Hussain *et al* [12], Singh NP [14] also observed the similar association between obesity and socioeconomic status. Studies have repeatedly shown that the high socioeconomic status is negatively correlated with obesity in developed countries but positively correlated with it in developing countries.

The prevalence of overweight was found to be no significantly maximum in married persons (18.9%) followed by widow/widower and unmarried persons. Yadava S *et al* [8], Hussain *et al* [12], Singh V [13] also reported similar pattern in their studies.

The prevalence of overweight was found in professional (33.3%) followed by high school (21.3%), graduate (21.3%), primary (20.7%), middle (18.0%) and intermediate (10.1%) respectively. While Hussain *et al* [12] and Singh V [13] reported that the prevalence of obesity is higher in subjects of graduation and above.

This study shows that the prevalence of overweight & obesity was highest in savarna - general (23.1%) followed by 17.8% in Other Backward Classes individuals but was much less in Schedule Caste (4.9%) individuals and this difference in overweight & obesity in relation to caste was found to be statistically significant. Singh V13 depicted almost similar decreasing pattern from upper caste to lower caste. While Hussain *et al* [12] noticed reverse pattern from schedule caste to general caste.

In the present study Prevalence of Overweight & Obesity in persons belonging to nuclear and joint families was 16.5% and 18.2% respectively. Hussain *etal* [12] also reported that prevalence of overweight in nuclear families (19%) and joint families (27%). On the contrary, Singh V [13] found higher prevalence of overweight and obesity in joint families in comparison to nuclear families.

In this study prevalence of Overweight in persons having positive family history of obesity (36.8%) was found significantly more than in persons with negative family history (14.0%). Singh NP [14] reported similar findings in his study.

In present study, the prevalence of overweight in alcoholic was 18.6% as compared to 17.6% in non-alcoholic and the prevalence was 10.6% in smokers as compared to 37.4% in non-smokers. As alcohol cannot be stored in the body so its consumption therefore meets some of the body's energy needs and allows a greater proportion of energy from other foods eaten to be stored and is thus associated with an increased risk of abdominal fat [16]. Smoking causes a marked increase in metabolic rate and tends to reduce food intake compared with that of non-smokers [17]. Hussain *et al* [12] also noticed similar association of BMI with tobacco.

Conclusion

The conclusion of this study that Overweight and Obesity are very much prevalent among 18 years and above as well as in male and female both in rural area. As age advances prevalence of Overweight and Obesity also increases. Various socio-demographic factors like high Standard of living, Marriage, person living in joint Family, Alcoholism and higher castes are responsible for the higher prevalence of Overweight and Obesity. BMI is a very simple and effective method to screen overweight and obesity so that appropriate measures could be taken to prevent the progression of the disease. Awareness about overweight and obesity should be transmitted to the rural are so they could keep them healthy in their life.

Authors Contribution

SK: Data Collection, Drafting of manuscript, SKG: Study design and concept, Finalization of manuscript, JVS, MB & HC: Critical inputs in manuscript finalization, SKB: Data analysis and interpretation.

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Tables

TABLE 1 DISTRIBUTION OF POPULATION BY BMI

BMI	Males		Females		Total	
	No.	%	No.	%	No.	%
>30	18	2.5	36	5.5	54	3.9
25-29.9	82	11.3	108	16.5	190	13.8
18.5-24.9	559	76.9	393	60.0	952	68.9
<18.5	67	9.4	119	18.0	186	13.4
Total	726	52.5	656	47.5	1382	100.0
χ^2=47.14, df=3, P<0.001						

TABLE 2 AGE AND SEX WISE DISTRIBUTION OF OVERWEIGHT & OBESITY

Age Group (Years)	Males			Females			Total		
	Population	Overweight+		Population	Overweight+		Population	Overweight+	
		No.	%		No.	%		No.	%
18-29	207 (28.5)	30	14.5	187 (28.7)	18	9.6	394 (28.5)	48	12.2
30-39	163 (22.5)	26	19.9	141 (21.3)	32	22.7	304 (22.0)	58	19.1
40-49	136 (18.7)	16	11.8	128 (19.5)	42	32.8	264 (19.1)	58	21.7
50-59	97 (13.4)	16	16.5	83 (12.8)	24	28.9	180 (13.0)	40	22.2
≥60	123 (16.9)	12	9.8	117 (17.7)	28	23.9	240 (17.3)	40	16.7
Total	726 (52.5)	100	13.8	656 (47.5)	144	21.9	1382(100.0)	244	17.7
χ^2 (Sex) =15.85, df=1, P<0.001; $\chi2$ (Age) =14.66, df=4, P<0.005									

TABLE 3 WEIGHT STATUS OF STUDY ACCORDING TO VARIOUS SOCIO-DEMOGRAPHIC FACTORS

Factors	Overweight/obese (244)	Non-overweight (1138)	$\chi2$	P value
Marital status			4.92	>0.05
Married	198	1045		
Unmarried	28	207		
Widowed/separated	18	130		
Education Status			11.07	>0.05
Illiterate*	42	324		
Just Literate*	02	28		
Primary	36	174		
Middle	50	278		
High School	54	254		
Intermediate	24	140		
Graduate	26	122		
Post Graduate**	02	38		
Professional**	08	24		
Caste			25.67	<0.001
Savarna (upper caste)	82	355		
OBC	154	863		
SC	08	164		
SLI (score)			27.54	<0.001
High(25-67)	200	950		
Medium (15-24)	38	308		
Low(0-14)	06	124		
Family type			0.65	>0.05
Nuclear	76	461		
Joint	168	921		
* and ** pooled together to calculate χ^2				

TABLE 4 SUBSTANCE ABUSE AND OVERWEIGHT

Substance	Case				Control			χ^2	p
	Total	%	Overweight +	%	Total	Overweight +	%		
Alcohol	118	8.5	22	18.6	1264	222	17.6	0.09	>0.5
Smoking	376	27.2	40	10.6	1006	204	37.4	17.50	<0.001