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Original Research Article

An epidemiological study of the prevalence and determinants of overweight and obesity in women of reproductive age (15 to 49 years) group in an urban slum

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ABSTRACT

Background: After comparing data of NFHS-3 and 4, prevalence of overweight and obesity in women of an urban population almost doubled in 10 yr. So, the causes of increasing prevalence need to be studied as public health concern. Objective of the study is to determine prevalence of overweight and obesity among reproductive age group (15-49 years) of women in an urban slum of Mumbai.
Methods: Total 220 women were selected among 11 sectors from A to K by simple random method and data collected by using validated questionnaire. WHO's classification was used to classify as overweight and obese.
Results: Out of 220 women participated in study, 14 (6.36%) were obese, 75 (34.09%) were overweight according to BMI and 17 (7.7%) were found to be obese according to waist to hip ratio. From the present study it was seen that age group of the women, socio economic class, education, history of hypothyroidism, family history of obesity, types of work women do, hours of television watching, calorie and fat intake, had a significant relationship with BMI, whereas physical exercise they used to do and tendency to sleep in the afternoon and hours of sleep in the night had non-significant relationship with BMI.
Conclusions: Obesity and overweight is found to be a growing public health problem and can be preventable. Interventional measures include developing healthy eating habits, regular moderate physical exercise, sleeping habits, health camps for screening of overweight and obesity.

Keywords: NFHS-4 survey (2015-16), Body mass index, WHO's classification obesity and overweight

INTRODUCTION

Obesity and overweight have become a global epidemic now. Obesity and overweight are the fifth leading risk of global deaths, resulting to 3.4 million deaths of adults globally every year.[1]

Obesity is perhaps the most prevalent form of malnutrition. The problem of obesity and overweight is no more restricted to the developed world. Presently, the epidemic poses new challenges in developing countries and urges immediate attention and prevention. These countries are facing double burden of nutritional problems as they are yet to solve the problems of undernutrition and hunger.[2]

As in most developing nations, India is struggling to eradicate the undernutrition and an anemia. Meanwhile, the country already witnessed the overweight and obesity problem. Overweight and obesity is multifactorial having genetic, biological, social, environmental determinants acting independently or collectively. Increasing prevalence is due to shift from traditional diets and lifestyles to western diets and combination of reduced levels of physical activity, transport facilities, better healthcare, and

increasing stress, particularly in the rapidly- growing urban population.[3-5]

Epidemiological transition from communicable to non-communicable diseases for which obesity is an important risk factor. Overweight and obesity are known risk factors for hypertension, diabetes, gall bladder disease, stroke, coronary heart disease, some hormone related cancers, infertility, osteoarthritis, sleep apnea, varicose vein, abdominal hernia, psychological stress particularly during adolescent. Maternal obesity increases the risk of lots of complications including pregnancy, labour and birth for mother and child both. It increases risk of diabetes and hypertensive disorders. As compared with normal weight, maternal overweight is associated with a higher risk of caesarean delivery and a higher risk of anaesthetic and postoperative complications. Low Apgar score, macrosomia and neural tube defects are also more frequent in infants of obese mothers compared with infants of normal weight mothers.[6,7]

According to NFHS-4 (2015-16) prevalence of overweight and obesity in women of an urban population is 31.3 % and in rural population is 15%.[8] Prevalence of overweight and obesity in men of an urban population is 26.3% and in rural population is 14.3%.[8] So, the problem is more acute in women than in men, and in an urban population than in rural population. According to NFHS-3 (2005-06) prevalence of overweight and obesity in women of an urban population is 15 %.[3] So, prevalence of overweight and obesity in women of an urban population almost doubled in 10 year.

High prevalence of malnutrition in people belonging to low socio-economic strata in developing countries led to assumption that obesity will not be a crucial problem in them. Migration of rural population to metropolitan cities exposes them to certain adverse lifestyle and environmental influences. In cities they usually settle down in an urban slum. Most of the researchers neglect slum population, which forms the major chunk of modern India. So, the study will be done in an urban slum population particularly in women of reproductive age group to investigate why prevalence of overweight and obesity is high among them.

METHODS

It is a cross-sectional epidemiological study where women willing to participate in the study >15 year and <49 year were included and pregnant women, women not present at the selected household at the time of visit for at least three visits were excluded. And 220 women were selected among 11 sectors from A TO K by simple random method. The women were interviewed by visiting house to house and pre-structured, validated proforma was filled at their home. Anthropometric and clinical examination was done at their house. When there was no adequate privacy, they were asked to come to urban health centre (hospital) for examination. Approximately 45 minutes were required for examination, counselling and health education was provided to them.

Anthropometric measurement (weight, height, waist circumference, hip circumference) was done by WHO STEPS Protocol.[9] BMI and waist/hip ratio calculated.

According to WHO classification, overweight is BMI >25kg/m^2 and obesity is BMI >30 kg/m^2. While waist/hip ratio >0.85 is considered as obesity in women according to WHO.[10]

Dietary assessment was done by using 24-hour dietary recall method. Indian food composition tables were used to estimate the nutrient content of cooked Indian foods.[11]

For fats daily visible fat intake (oil, ghee) were asked and added to total fat intake (1 teaspoon= 5 gm of fat)

Recommended daily requirements of Indian women are:[12]

a. calories- for sedentary work 1,900 kcal/day, for moderate work 2,230 kcal/day, for heavy work 2,850 kcal/day,

b. proteins- 1 gm/kg body weight,

c. fats- 20 to 40 gm/day,

so, considering these values deficiency, adequate, excess of nutrients was calculated.

Data collected was entered in Microsoft Excel Spreadsheet and analysed by using statistical package for social sciences (SPSS) version 20 software. Data was analysed by using appropriate statistical tests. Qualitative data was indicated in the form of frequency and percentage. Association between qualitative variables was evaluated by Chi-Square test, and by Fisher's Exact test for all 2×2 tables where duo to small counts Chi-Square test was not valid.

Data is graphically represented wherever necessary. Witten informed consent by all participants was taken. The study was approved by regional ethics committee.

RESULTS

Prevalence

Prevalence of obesity was 6.36% and overweight was 34.09% according to BMI (Table 1). Prevalence of obesity was 7.7% according to waist to hip ratio. BMI was utilized as a better indicator of obesity as it picked up more obese and overweight subjects. WHR had only two groups of obese and normal, thus masking the overweight women.

As the present study focuses on obesity, thus all the subjects having BMI less than 25 were combined and

considered as a single entity i.e. non-overweight which includes both normal and underweight women.

Table 1: Prevalence of obesity and overweight in the study group.

Indicators of obesity		n=220	%
BMI	≥30 (Obese)	14	6.36
	25.0-29.9		34.09
	(Overweight)	75	
	<25		
	(Not overweight)	131	59.55
Waist to hip ratio	>0.85 in women	17	7.7
(WHR)	(Obese)		
	Normal	203	92.3

Table 2: Determinants of overweight and obesity in the study group (n=220).

Determinants		N
Age in years	15-25	18
	25-35	27
	35-49	175
Education	Illiterate	34
	Primary	37
	Middle	73
	secondary	42
	Higher secondary	21
	Intermediate	10
	Graduate	03
Socioeconomic status (modified B.G.Prasad classification)	I	0
	II	27
	III	130
	IV	42
	V	21

Determinants

Obesity and overweight was more common in age group 35-49 years (Table 2). So, significant association between Age of the women and BMI was found. Most of the women have studied up to primary level and most of the obese and overweight women have studied up to primary level as well. Association between level of Education and BMI is significant. Most of the women belongs to class II, III and IV and there was no woman who belongs to class I. Distribution of obesity and overweight was seen more in class II and III. The significant association between Socio-economic class and BMI was found.

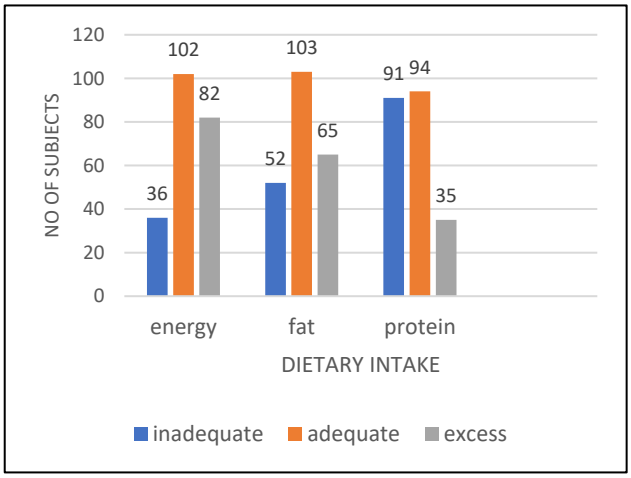

Figure 1: Dietary intake based on 24-hour dietary recall.

Among 16, 4 women having history of hypothyroidism were obese and 10 women having history of hypothyroidism were overweight. The association between the History of hypothyroidism and the BMI was found to be significant.

Among 26, 4 women having family history of obesity were obese and association between the Family history of obesity and the BMI was found to be significant.

Out of 133 women who do moderate work, 11 were obese and 43 were overweight. And out of 86 women who do sedentary work, 2 were obese and 32 were overweight. This association between Types of work women do and BMI was found significant.

Out of 125, 6 women who sleeps in the afternoon were obese and 45 women were overweight and 74 were non overweight. Out of 95 women who did not have tendency to sleep in the afternoon, 8 were obese and 30 were overweight and 57 were non overweight. There is no significant association found between Tendency to sleep in afternoon and BMI.

Out of 98 women who sleep for <6 hours in night, 42 had their BMI 25 and above while 56 had their BMI<25. The association is not significant.

Out of 23 women who exercise, none was obese and 12 were overweight. This association was found non-significant.

Out of 141 women who watched television for <2 hours, 6 were obese and 55 were overweight. Out of 76 women who watched television for 2-4 hours 6 were obese and 20 were overweight. Out of 3 women who watched television for >4 hours 2 were obese and none was overweight. This association was found to be significant.

Out of 102 women with adequate calorie intake 3 were obese and 21 were overweight (Figure 1). And out of 82 women with excess calorie intake 10 were obese and 50 were overweight. Whereas out of 36 women with inadequate calorie intake, only 1 was obese and 4 were overweight. There is a significant association between total calorie intake and BMI.

Out of 103 women with adequate fat intake 5 were obese and 33 were overweight. And out of 65 women with excess fat intake 8 were obese and 35 were overweight. Significant association between total fat intake and BMI was found.

Out of 91 women with inadequate protein intake 9 were obese and 42 were overweight. And out of 94 women with adequate protein intake, only 1 was obese and 23 were overweight. Significant association between protein intake and BMI was found.

DISCUSSION

Prevalence of overweight and obesity obtained in study group was found to be similar to study conducted by Girdhar et al which showed that the prevalence of overweight and obesity in the urban population was found to be 29.6% and 12.7% respectively.[13] According to NFHS-4 (2015-16) prevalence of overweight and obesity in women of reproductive age (15-49 years) in Mumbai was 34%.[8]

So, obesity is ongoing epidemic requiring attention and intervention.

These figures of increasing prevalence of overweight and obesity in present study had resemblance with study conducted by Girdhar et al which shows that the prevalence of obesity rose with an increase in age up to 60 years.[14]

Association between level of education and BMI in present study was found to be similar with findings of study Educational inequality in the occurrence of abdominal obesity by Fernandes et al.[15] Both the studies showed that education level is inversely associated with general obesity in both sexes.

Study showed that the distribution of obesity and overweight was seen more in class II and III. This data shows resemblance with the study by Sangeeta Girdhar et al which also showed higher prevalence of obesity among housewives belonging to upper socio-economic strata.[14]

Association between obesity and thyroid dysfunction was found similar to the study conducted by Nyrnes et al.[16]

It is found in present study that prevalence was more in adults who had family history of obesity which is similar to findings of study by Sharma et al.[17]

The study showed that low physical activity at work increases the risk of overweight and obesity which is similar to findings of study conducted by Choi et al.[18]

The study conducted by Goyal et al showed that day time sleep was not significant contributor of overweight and obesity and this finding is similar to present study.[19] Another study conducted by Gangwisch et al observed that prevalence of obesity increases with day time sleep and inadequate sleep during night.[20]

No significant association between sleep duration and BMI was found in present study. The findings are opposite to the study conducted by Patel et al that sleep duration less than 5 hours was associated with higher BMI than those who slept for average of 7-8 hours.[21]

No significant association between exercise and BMI was found. Findings of study are opposite to the study on relationship between exercise or physical activity and other health behaviours by Steven et al. which states that the prevalence of overweight and obesity was higher among individuals with low levels of physical activity as compared to those with high levels of physical activity.[22] Habitual moderate physical activity is necessary to prevent excess accumulation of fat leading to obesity. Among physical activities 120 minutes of brisk walking per week is most beneficial way to reduce obesity and associated co-morbidities.

The study conducted by Anuradha et al concluded that prevalence of obesity increases with increase in the duration of television viewing and the findings are similar to present study.[23]

The study conducted showed significant association between BMI and calorie intake, fat intake, protein intake. The study conducted by Sharma et al found a significant association between calorie intake and BMI.[17] Another study conducted by Vadera et al also found that prevalence of overweight was higher among those who consumed more than recommended calories.[24]

CONCLUSION

Increased prevalence of overweight and obesity signifies the epidemic of overweight and obesity. Adequate intervention measures are required for its prevention with major emphasis on IEC.

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