

Original Research Article

To study the prevalence of overweight and obesity and its associated risk factors in a youth population in an urban slum in a metropolitan city

Shyamal S. Kamble^{1*}, Rujuta S. Hada²

¹Department of Community Medicine, Hinduhridaysamrat Balasaheb Thackeray Medical College & Dr RN Cooper Hospital, Mumbai, Maharashtra, India

²Department of Community Medicine, Topiwala National Medical College & BYL Nair Ch. Hospital, Mumbai, Maharashtra, India

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*Correspondence:

Dr. Shyamal S. Kamble,

E-mail: shyamalkamble95@gmail.com

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ABSTRACT

Background: Obesity, the most prevalent form of malnutrition, affects children and adults alike. A risk factor for Diabetes Mellitus, Hypertension, Cancer, Cardiovascular diseases, and entity on its own, thereby increasing the morbidity and mortality of individual and community enmasse.

Methods: The study was conducted in the community field practice area of Urban Health Centre of Topiwala National Medical College & B.Y.L Nair Hospital, Mumbai. 210 participants were selected for the study using simple random sampling method. One-to-one interviews were conducted using semi-structured interview schedule. Prevalence of overweight and obesity was calculated based on the obtained anthropometry information.

Results: The study found the overall prevalence of overweight/ obesity to be 17.2% in 15 to 24 years' age group. The prevalence of overweight was 14.3% and of obesity was 2.9% in the study population based on BMI. The study also found 13.3% adult study participants to have high Waist to Hip Ratio (WHR) which signified abdominal fat deposition. Interestingly, all the participants with high WHR were females. The study found significant association between sex of the participant and overweight and obesity.

Conclusion: The study concluded that the prevalence of overweight was 14.3% and obesity was 2.9% in the youth population of an urban slum in a metropolitan city. The study found high WHR among 13.3% of adult study population. Among the sociodemographic risk factors, sex of the participant was found to be of significant association for predisposition of overweight/obesity in the current study.

Keywords: Obesity, Overweight, Urban slum, Youth

INTRODUCTION

Obesity is defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyperplastic obesity) or a combination of both.¹ Obesity is often expressed in terms of body mass index (BMI).² BMI is commonly used to classify overweight and obesity in

adults and is defined as a person's weight in kilograms divided by the square of his /her height in meters (kg/m²). For adults, a BMI >25 is considered overweight and >30 is considered obese. For adolescent aged between 15–19 years, a BMI-for-age greater than 1 standard deviation is considered overweight and BMI-for-age greater than 2 standard deviations is considered obese. Obesity is perhaps now the most prevalent form of malnutrition.³

Overweight and obesity are the fifth leading risk of global deaths. Worldwide, obesity has more than doubled since 1980. In 2016, more than 1.9 billion adults, 18 years and older, were overweight.

Of these, over 650 million were obese.⁴ In the same year, more than 41 million children under 5 years of age were overweight or obese. Once considered a problem of high-income society, overweight and obesity are now rising in low- and middle-income countries, particularly in urban settings.⁵ At least, 3.4 million adults die each year as a result of being overweight or obese. In India, 44 percent of the diabetes burden, 23 percent of ischaemic heart disease burden and between 7 to 41 percent of certain cancer burden are attributable to overweight and obesity.⁶ In Maharashtra, 28.9% males and 29.6% females in urban areas were either overweight or obese to that of 21.3% males and 18.3% females in rural areas respectively.⁷

The main cause of overweight and obesity is an imbalance of energy between calories consumed and expended. Increased intake of energy dense food, lack of physical activity, increase in sedentary lifestyle and dietary changes as per environmental and societal changes are some of the causes of weight gain. Obese individuals differ not only in the amount of excess fat that they store, but also in regional distribution of fat. Abdominal fat distribution “android obesity” is associated with increased risk against the less serious type of “gynoid” fat distribution, in which fat is more evenly and peripherally distributed around the body. There is good evidence that abdominal obesity is associated with development of insulin resistance, and in the metabolic syndrome (hyperinsulinemia, dyslipidaemia, glucose intolerance, and hypertension) that link obesity with CHD.⁸

Obesity is primarily associated with an unhealthy lifestyle and hence it is prudent as public health experts to advocate for lifestyle modifications and healthy living to thwart the onset or decrease the health implications caused by it. Lifestyles are often formed at a younger age and hence it is important to direct preventives strategies to younger people for them to make informed choices and be made aware of the advantages of healthy living. It is to note that such preventive strategies can be found to be very effective at this stage. Primordial prevention can be done by spreading awareness in the community through IEC activities and by running awareness programmes with the help of popular mass media like radio and television and in print media through newspapers and health posters. Primary prevention can be targeted at opportunistic screening of individuals through various established NCD clinics.

Aim

To study the prevalence of overweight and obesity and its associated risk factors in a youth population in an urban slum in a metropolitan city.

Objectives

To assess the prevalence of overweight and obesity in youth population (15-24 years) on basis of sex specific BMI for age. To assess the socio demographic profile of youth population in an urban slum. To study the association between overweight and obesity between the abovementioned epidemiological factors.

METHODS

Study design

The study design was a cross-sectional observational study.

Study place

The study was conducted in the field practice area of Community Medicine Department, Shahji Nagar Urban Health Training Centre of Topiwala National Medical College & BYL Nair Ch, Hospital, Mumbai.

Study duration

The study period was from December 2020 to October 2022.

Protocol review and approval for the study by Ethics Committee for Academic Research Project (ECARP) was taken. After obtaining the Ethics Committee Approval, the Study Proposal was submitted to the University and necessary approval for the conduct of the study was obtained from the University.

The sampling unit was youth population in the age group of 15–24 years residing in the said field practise area.

Inclusion criteria

Participants of age between 15–24 years on age of interview with consent were included in the study.

Exclusion criteria

Participants who had observed any kind of fasting or feasting the previous day were excluded from the study. In a previous cross sectional observational study done for nutritional determinants amongst adolescents in a semi urban area, the prevalence of obesity was found to be 15%.⁹ Thus, by the formula $n = \frac{4 \times pq}{l^2}$, where n=sample size, p=prevalence, q=100-p, e=absolute error 5%, n=204. Rounding off, so the sample size for the present study was taken as 210. Simple Stratified sampling technique was used for this study. The urban slum with population of 92596 (2011 census), consisted of total 11 sectors with 13975 houses together. The study sample of 210 was divided between 11 sectors, and 19-20 study participants were interviewed from each sector until the total was reached. A light pole which was first seen in the sector

was identified as a landmark and serially all houses beginning from the right of the pole were included. If any house was locked or inclusion criteria was not fulfilled, then the consecutive house was targeted until a sample size of 210 was attained. From each house one participant was selected. If in any house, there were two or more than two eligible participants, the elder participant was selected.

Study procedure

Data collection was done by house-to-house visit. Written Informed consent was taken from all study subjects. The purpose of the study was fully explained to all participants of the study. People fulfilling the inclusion criteria were included in the study after obtaining consent from them. Sociodemographic details of the study subjects were obtained first followed by anthropometric measurements and was done according to WHO STEPS protocol by means of a measuring tape.

BMI for participants between 15-19 years was calculated based on sex-specific BMI-for-age and was plotted on the graph. A BMI-for-age greater than 1 standard deviation was considered overweight and BMI-for-age greater than 2 standard deviations was considered obese. BMI of participants above 19 years was calculated by Quetelet's Index wherein weight in kilograms was divided by square of height in meters. Participants were classified as overweight or obese based on BMI according to WHO BMI classification for adults. Waist measurement was taken from the mid-point between the lower border of the rib cage and the iliac crest and was taken at the end of normal expiration. Hip measurement

was taken around the widest portion of the buttocks. Waist to Hip Ratio was calculated for all participants above 18 years of age. A WHR >1.0 in males and >0.85 in females was considered as High WHR. Data was collected using interviewer schedule

Data analysis

Microsoft Excel version 2021 was used for data entry and Statistical Package for the Social Sciences (SPSS) version 23 was used for statistical analysis. Qualitative data was represented in the form of frequency and percentage. Quantitative data was represented using Mean±SD. Results were graphically represented where deemed necessary. Descriptive statistics was used to analyse sociodemographic factors by SPSS version 23. Association between different variables was done by Chi-Square test for all 2×2 tables. In presence of small counts in tables with more than two rows and/or columns, adjacent row and/or column, data was pooled and Fisher Exact Test was applied if criteria of Chi Square test was not met.

RESULTS

The total sample size for the study was 210. Figure 1 shows the distribution of sociodemographic factors among study participants. Among the 210 study participants, 126 (60%) were females and 84 (40%) were males. Thus, the number of females were more in representation.

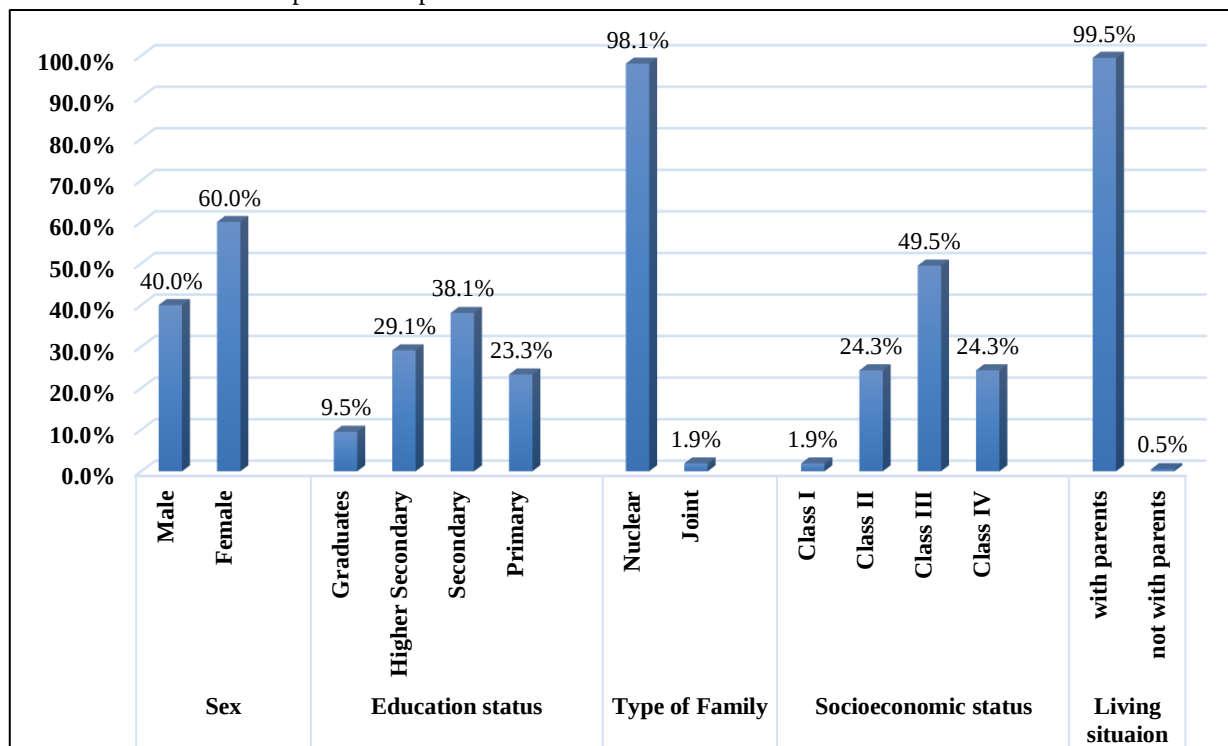


Figure 1: Sociodemographic profile of study participants.

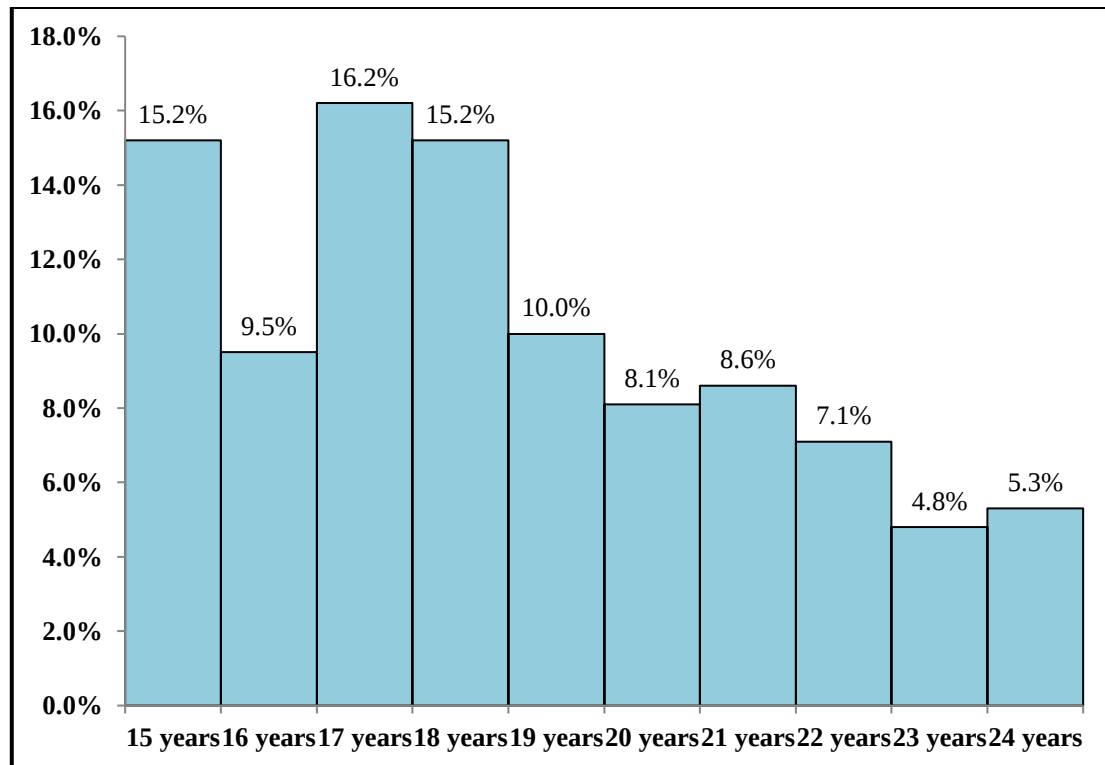


Figure 2: Age wise distribution of the participants.

The education profile of the study participants was assessed with majority among them, 80 (38.1%) having completed secondary level education followed by 61 (29.1%) having completed higher secondary level education, followed by 49 (23.3%) completed primary level and 20 (9.5%) study participants having completed graduation.

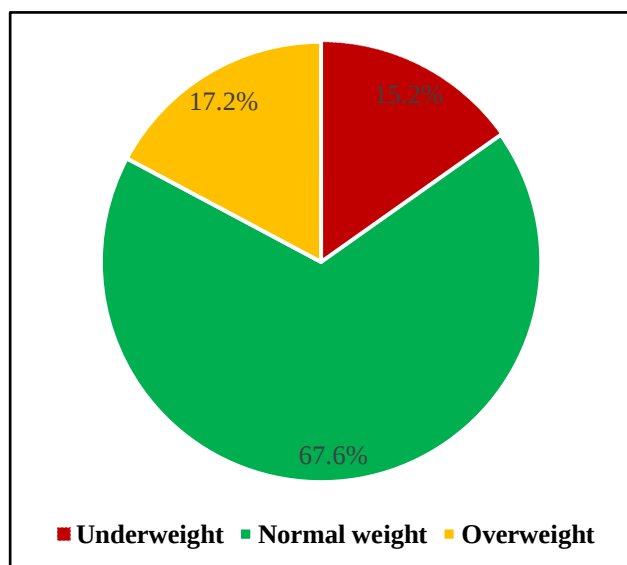


Figure 3: Prevalence of overweight/obesity among study participants.

Majority of the study participants i.e., 204 (98.1%) were living in nuclear families and only 4 (1.9%) lived in joint

families. Almost half of the 210 participants, 104 (49.5%) belonged to Class III as per modified Prasad et al classification in 2022 followed by equal number 51 (24.3%) each in Class II and Class IV, only 4 (1.9%) belonged to Class I and none belonged to Class V. Almost all, 209 (99.5%) participants lived with their parents.

Among the 210 participants, the minimum age was 15 and maximum age was 24. The mean age of the participants was 18.5 with S.D ± 2.7 years.

Prevalence of overweight participants = $\frac{\text{number of overweight participants}}{\text{total number of participants}} \times 100$

$$= \frac{30}{210} \times 100 = 14.3\%$$

Prevalence of obese participants = $\frac{\text{number of obese participants}}{\text{Total number of participants}} \times 100$

$$= \frac{6}{210} \times 100 = 2.9\%$$

The prevalence of overweight was 14.3% and obesity was 2.9% in the study participants. The study participants above 18 years of age were categorized on the basis of Waist to Hip Ratio. All the participants who had high WHR were females.

Table 2 depicts the association between risk factors and overweight/ obesity. It can be seen that sex of the participant is of significant for developing overweight/obesity.

Table 1: Distribution of study participants based on waist to hip ratio.

Category		Frequency	Percentage
Normal	Males	48	50.0
	Females	48	50.0
	Total	96	100.0
High WHR	Males	NIL	NIL
	Females	28	100.0
	Total	28	100.0

Table 2: Association between risk factors and overweight/obesity.

Variable		Underweight (%)	Normal (%)	Overweight (%)	Test	Value	DF	P value	Significance
Sex	Male	08 (25.0)	65 (45.8)	11 (30.5)	Chi square	6.311	2	0.043	Significant
	Female	24 (78.0)	77 (54.25)	25 (69.5)					
Education	Graduate	02 (06.3)	15 (10.6)	03 (08.3)	Chi square	2.669	6	0.849	Not significant
	Higher Secondary	08 (25.0)	40 (28.1)	13 (36.1)					
	Secondary	15 (46.9)	54 (38.1)	11 (30.6)					
	Primary	07 (21.8)	33 (23.2)	09 (25.0)					
Socio-demographic class	Class I	01 (03.1)	02 (01.4)	01 (02.8)	Fisher exact	5.561		0.429	Not significant
	Class II	06 (18.8)	33 (23.2)	12 (33.3)					
	Class III	14 (43.8)	75 (52.8)	15 (41.7)					
	Class IV	11 (34.3)	32 (22.6)	08 (22.2)					
Pearson correlation					0.114				
Significance					0.0099				

DISCUSSION

Sociodemographic profile of the study participants, majority of the study participants were females i.e., 126 (60%), in contrast with NFHS-5 survey of Mumbai district where the sex ratio was 939 females per 1000 males and according to 2011 census of Mumbai, sex ratio was 853 females per 1000 males.^{9,10} This can be attributed to the fact that females were present in majority of the houses at the time of interview. The education status was assessed with 80 (38.1%) participants having completed secondary level of education. The socioeconomic class was based on modified BG Prasad classification (2022) with almost half 104 (49.5%) participants belonging to Class III with per capita income being between INR 2465-4109.

The age distribution of study participants. The current study had participants belonging to the youth age group category. The minimum age of the participants was 15 years and maximum age was 24 years. The mean age of the participants was 18 with S.D ± 2.7 years. According to a survey done by Statista India (11) 2022 in more than 10,000 respondents to assess prevalence in different age groups, the prevalence of overweight, obesity and severely obese in persons below 19 years of age was 19%, 9% and 5% respectively. The figures for persons in 0-29 years of age stood at 30% for overweight, 12% was for obese and 2% were severely obese. Classification of

participants based on BMI. The BMI of participants between the age 15-19 years was calculated based on sex specific BMI-for-age and for ages between 20-24 it was based on WHO BMI classification for adults. The overall prevalence stood at 17.2% which is slightly higher than the prevalence of 15% taken for sample size calculation of a previous study. The prevalence of overweight was 14.3% and obesity was 2.9% in the present study.

The present study finding agrees with the double burden of malnutrition present in Indian population, which traditionally considered undernutrition as a major public concern. A systemic review conducted by Poobalan et al found obesity prevalence in the range of 2.3-12%, and overweight prevalence at 28.8%, mostly affecting females.¹² It also found that weight increase in young adult stage of transition is at 1 kg/year than in developed countries. According to Global Obesity Observatory, the prevalence of overweight and obesity in the 15-49 age group stands at 18.7% and 5.5% respectively.¹³

Prevalence of central obesity based on WHR. The study found 28 (22.6%) participants to have high WHR, an approximate index of intra-abdominal fat mass and total body fat. Such individuals are more prone for cardiovascular diseases and also suffer from increased risk of metabolic complications. A systemic review and meta-analysis of 72 prospective cohort studies conducted by Jayedi A et al concluded that WHR, along with other indices of central obesity are all significantly associated

with higher all-cause mortality.¹⁴ It also suggested that these indices along with BMI could be used as a supplementary approach to determine the risk of premature mortality. In the present study 22.6% participants had high WHR which should be a caution to prevent any further metabolic morbidity.

For dietary assessment, 24-hour recall method was used which may not be representative of regular food habits.

CONCLUSION

The study concluded that the prevalence of overweight was 14.3% and obesity was 2.9% in the youth population of an urban slum in a metropolitan city. Among the sociodemographic risk factors, sex of the participant was found to be of significant association for predisposition of overweight / obesity in the current study.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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