

**Original Research Article****Effect of Life Style on Body Mass Index in Urban and Rural Student Population**

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Email: [ypi7884@gmail.com](mailto:ypi7884@gmail.com)**Abstract**

**Background:** An unhealthy lifestyle among people is a serious and often unnoticed problem. Today however, as a standard of living continues to rise, weight gain & obesity are posing threat to health in countries all over the world. The present Study is effect of life style on body mass index in urban and rural student population in city.

**Methods:** The data were derived from cross-sectional sampling of 525 urban & rural students of age 17-25. Age, gender, height, weight, body mass index (BMI) & waist hip ratio were used to define overweight and obesity.

**Results:** Out of 525 students, 20 were found overweight according to BMI (3.80%) which is not significant but most of them were in urban group. Students who migrated from rural area to urban area (Neourban) have their BMI in between urban and rural students because of less impact of urbanization. Urban group has higher mean waist-hip ratio as compared to Neourban and Rural group. It correlates with increased prevalence of obesity in urban population.

**Conclusion:** Study concludes that there is close association between Lifestyle and BMI. This study showed an increasing in prevalence of overweight and obesity in urban adolescents especially with male gender, calling for an urgent need for immediate and targeted preventive measures.

**Keywords:** Adolescent, Body Mass Index (BMI), Overweight, Obesity.

**Introduction**

Obesity is defined as an abnormal growth of adipose tissue due to an enlargement of fat cell size or increase in fat cell number or a combination of both.<sup>1</sup> Obesity is expressed in terms of body mass index (BMI).<sup>2</sup>

Health problems of youth are very different from those of younger children or adults. It is a time of gradual change from childhood to adulthood. Today's youth especially those living in developing countries like India are under influence of rapid urbanization.<sup>1</sup> However, obese individuals differ not

only in the amount of excess fat that they store, but also in the regional distribution of the fat within the body. It is one of the most significant contributors to ill health. For industrialized countries, it has been suggested that such increase in body weight has been caused primarily by reduced levels of physical activity, rather than by changes in food intake or by other factor. It is extremely difficult to assess the size of the problem & compare the prevalence rates in different countries as no exact figures are available.<sup>3</sup>

The first adverse effect of obesity to emerge in population in transition are hypertension, hyperlipidemia and impaired glucose tolerance, while coronary heart disease and the long term complications of diabetes such as renal failure emerge several years (or decades) later.<sup>4</sup> It is matter of time before same mortality rates or such diseases will be seen in developing countries as those prevailing 30years ago in industrialized countries.<sup>1</sup> Being overweight is associated with a higher risk of diseases particularly if body fat is concentrated around the abdomen. The estimates of attributable mortality and burden due to being overweight and obese have been made using a measure of high body mass index (BMI). BMI was chosen as a simple measurement of body weight in relation to height because it is in principle easier to measure at the population level than body fat. Analysis of the relationship between BMI and mortality and morbidity suggests that the theoretical optimum mean population BMI is around 21 kg/ m<sup>2</sup>.<sup>1</sup>

### Materials and Methods

This study includes total 525 student, male and female of age group between 17-25 yrs, which includes urban students with continuous residence in urban area for at least 10 years, Rural students with

continuous residence in rural area for at least 10 years & Students who after continuous rural residence for more than 10 years are now urban residents for more than one year.

This is **Cross Sectional Study** of 2 ½Years duration.

### Size of sample

According to formula- 175 student in each group.

### Inclusion Criteria

College students from urban and rural area both male and female of age between 17-25 yrs.

### Exclusion Criteria

Symptomatic condition likely to affect Body Mass Index.

Lifestyle questionnaire was prepared based on Type of family, socioeconomic status, type of food consumed every day, various habits, and life style activities. Anthropometric measurements, height measured with the scale fitted to the wall. Weight measurement was carried out with the help of weighing machine; same weighing machine was used throughout the study. Waist and hip circumference recorded with the help of measuring tape. Each measurement was documented after calculating mean of three readings. Medical General Examination and Systemic Examination were done. Socioeconomic status measured with Modified Kuppuswamy Scale. After completion of the study, data was arranged and analysed. Important observations were drawn from the data analysed.

Based on these results, the BMI was calculated using the following formula: BMI= weight [kg]/ (height [m])<sup>2</sup>

Association between BMI and Lifestyle in Urban/Rural / neo-urban was done. Analysis was done by ANOVA (F) and Chi-square test. In chi-square test if p<0.05 then that Test is significant. ANOVA Test is used for more than 2 groups.

### Results

**Table 1:** Type of family wise distribution of students in study groups

Type of family	Rural (%)	Urban (%)	Neo-Urban (%)	Total (%)
Joint	23 (4.38)	29 (5.52)	32 (6.09)	84 (16)
Nuclear	140 (26.67)	113 (21.52)	129 (24.57)	382 (72.76)
Separated	12 (2.29)	33 (6.29)	14 (2.67)	59 (11.24)
Total	175 (33.33)	175 (33.33)	175 (33.33)	525 (100)

In our study we distributed students according to type of family in which 72.76% (382) students belong to nuclear type of family and distribution

and trend is similar in all three study groups. Majority of the students belong to Nuclear family type.

**Table 2:** Type of food consumed every day in study groups

Type of food	Rural (%)	Urban (%)	Neo-Urban (%)	Total (%)
Home	71 (13.52)	49 (9.33)	52 (9.90)	172 (32.76)
College mess	67 (12.76)	65 (12.38)	86 (16.38)	220 (41.90)
Hotel	2 (0.38)	4 (0.76)	0 (0)	6 (1.14)
Pvt. Mess	35 (6.67)	57 (10.86)	37 (7.05)	129 (24.57)
Total	175 (33.33)	175 (33.33)	175 (33.33)	525 (100)

Table 2 shows students eat food from college mess (41.90%) mainly from neourban, homemade (13.52%) from rural area, hotels (0.76%) and private mess (10.86%) from urban area. Urban students smoked very frequently 5.14% ( 9), tobacco

chewing is common in rural group 1.71% (3), Consuming beer and alcohol common in urban students 6.29% (11), 6.89% (12) respectively. While habits of drugs is common in urban students.

**Table 3:** Table showing comparison of lifestyle activities

Activities	Rural (%) (n=175)	Urban (%) (n=175)	Neo-Urban (%) (n=175)	$\chi^2$	P Value
Exercise Regularly	36 (20.57)	59 (33.71)	37 (21.14)	<b>10.26</b>	<0.01
Weight Training Activity	6 (3.43)	26 (14.86)	9 (5.14)	<b>18.47</b>	<0.0001
Play Outdoor Sport Regularly	48 (27.43)	43 (24.57)	27 (15.43)	<b>7.89</b>	<0.05

Table 3 shows 33.71% (59) urban students exercised regularly, urban students are doing weight training activities regularly 14.86 % (26) than other groups. Test is significant. An Urban student forms

the major group doing exercise regularly. 27.43% (48) Rural students played outdoor games regularly. Test is significant. Rural students forms the major group followed by urban group.

**Table 4:** Comparison of Body Mass Index in study groups

Particular	Rural	Urban	Neo-Urban	F Value	P Value
	Mean $\pm$ SD (n=175)	Mean $\pm$ SD (n=175)	Mean $\pm$ SD (n=175)		
BMI	21.08 $\pm$ 2.02	20.78 $\pm$ 3.12	20.14 $\pm$ 2.66	5.78	<0.001

Table 4 shows comparison of Body Mass Index in study groups. It shows mean BMI of Rural student (21.08  $\pm$  2.02) is more than Urban (20.78  $\pm$  3.12) and Neourban (20.14  $\pm$  2.66) students. Test is

significant Mean BMI of rural group when compared with other two group is statistically significant (P<0.001)

**Figure 1**

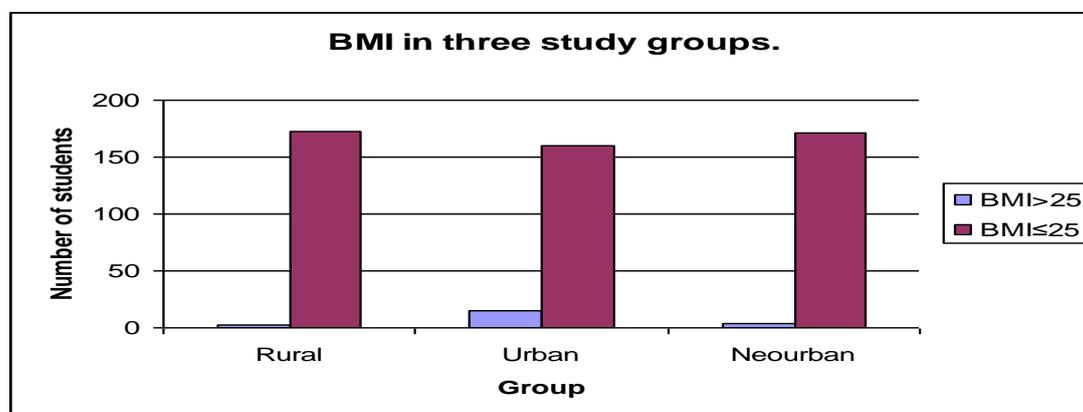


Fig 1 shows that 2.66% (14) urban students are have BMI >25 as compared to Neourban 0.76 % (4) and rural 0.38 % (2) from the total 525 students.

Figure 2

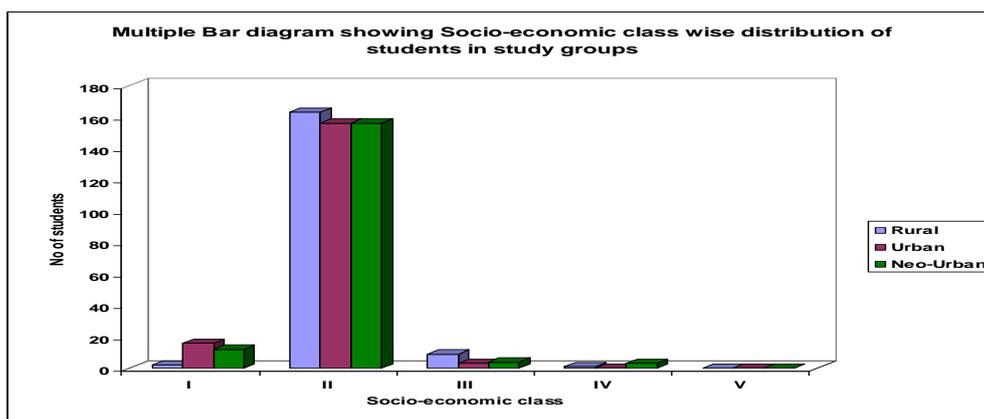
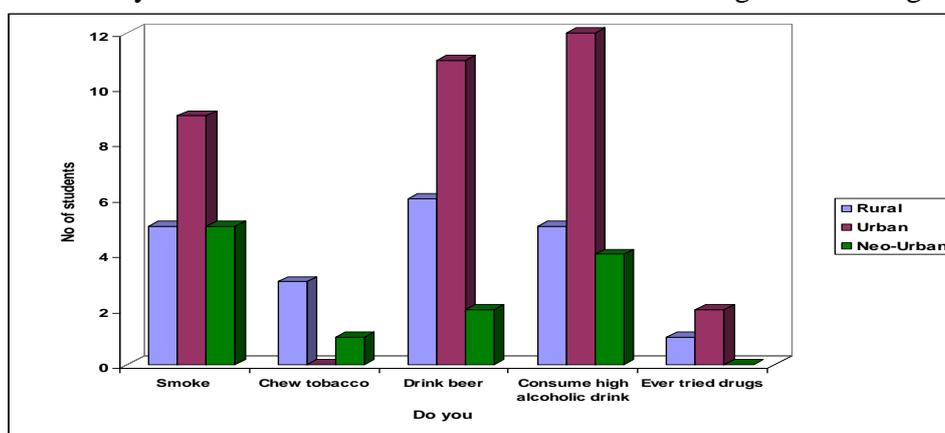


Fig 2 shows out of total 525 students, 90.48 % the students from all three groups are in socioeconomic class II, 5.71 % class I, 3.05 % in class III, 0.76% in class IV. Majority of students are in Socioeconomic class II. Distribution is similar in all three groups.

Figure 3 Comparative study shows that urban students have more smoking and drinking behaviour



Above figure shows urban students smoked very frequently 5.14 % (9), tobacco chewing is common in rural group 1.71 %..(3), Consuming beer and alcohol common in urban students 6.29% (11), 6.89% (12) respectively. While drugs habits were common in urban students. Comparative study shows that urban students have more smoking and drinking behavior.

**Discussion**

The prevalence of overweight and obesity among children and adolescents is rising rapidly worldwide. Obesity can occur at any age, and generally, increases with age.<sup>5</sup> In WHO report 2002, it is quoted that the Obesogenic Environment appears to be largely directed at the adolescent market.

The study group comprised of college students aged 17 to 25. Age wise distribution of students in study groups, showed that among the total 525 students,

47.43%(249) were between age 16-20 and 52.57%(276) between age 21-25.

In a recent, study by Reddy, *et al* found that more than 28% of adult males and 47% of adult females in urban Delhi were overweight by WHO standards.<sup>6</sup>In the same study, the corresponding figures for overweight in a Haryana rural area were 7% in males and 9% in females.

Sex wise distribution of students in study groups shows that 74.29 % (390) students are male and 25.71 % (135) are female. In this study, numbers of male students were more as compared to female.

The recent phenomenon of increasing childhood obesity in various developing countries including India among the poor and middle socio economic groups is a result of social change of shifting from joint families to nuclear families, with increasing disposable income and sedentary lifestyle.<sup>7</sup>Family wise distribution of students in study group's

showed that 72.76%(382) students belonged to nuclear families. This distribution was similar in all three-study groups. In a Delhi school with tuition fees more than Rs. 2,500 per month, the prevalence of overweight was 31%, of which 7.5% were frankly obese.<sup>8</sup>Burden of obesity shifts towards the groups with lower socioeconomic status as the gross national product of the country increases. India appears to be in a stage of nutritional transition, especially in urban areas.<sup>9</sup>Socioeconomic class(SE) wise distribution of students in study group shows that 90.48%(475) students are in SE class II, 5.71%(30) in class I, 3.05% (16) in class III, 0.76%(4) in class IV. Majority of the students from all three groups belonged to socioeconomic class II. Therefore, this study compared mostly upper middle class students.

A study carried out at Delhi shows that Eating Out' is becoming an important part of our urban social activity. Various factors have led to this, notably urban migration, transformation of joint-family systems to nuclear families, institutional education in cities far away from home, popularity of inter-regional food.<sup>10</sup>Bolton-Smith found diets high in carbohydrate but not high in fat content is based largely on grains, vegetables and fruits and are naturally energy dilute and high in fiber. High-carbohydrates diets based on processed foods tend to be relatively high in fat content. An association between dietary fat intake and obesity is well known.<sup>11</sup> Eating outside home had significant correlation with obesity as revealed in studies in Chandigarh.<sup>12</sup>

In present study 41.90% (220) students took food from college mess, 32.76% (172) from home and 24.57 % (129) from private mess.

Number of students who consumed homemade food was higher in rural (13.52%). Number of students who took food from college mess was higher in neourban (16.38%). Number of students who took food from hotel was higher in urban (0.76%), food from Pvt. Mess was higher in urban area (10.86%)

In this study, smoking and drug use common in urban students while chewing tobacco common in rural students.

Alcoholic beverages are beer, whisky, rumetc. Alcohol supplies about 7 kcal per gram. (9gm is equal to one international unit) Therefore it is more energy dense than either carbohydrate or protein and only slightly less so than fat. There is evidence that ethanol and associated food intake increase resting energy expenditure while reducing fat oxidation. These effects may contribute preferentially to lipid storage.<sup>12</sup>

S.G. Wannamethee and co researcher found that higher alcohol consumption ( $\geq 21$ units/week) is positively associated with general and to a greater extent with central adiposity, irrespective of the type of drink and whether the alcohol is drunk with meals or not.<sup>13</sup>Alcohol has fat sparing effect habitual consumption of ethanol in excess of energy needs produces fat gain.<sup>14</sup>

In this study urban students who were found to consume more beer as well as alcohol. However, none of the students in the study found to have alcohol consumption  $>21$  units/week.

In a Study by Gupta and colleagues revealed low levels of physical activity in urban areas as compared with rural.<sup>15</sup> There are other studies that lack of physical activity contribute significantly to obesity.<sup>16</sup>

33.71% (59) urban student exercised regularly. An urban student forms the major group doing exercise regularly.

In this study, more number of students found doing exercise from urban group than rural, this shows awareness about one's health which is more in urban group. Neourban students were in middle as they started getting the effect of urbanization.

About 45-60 minutes of moderate intensity physical activity is needed on every day to prevent unhealthy weight gain.<sup>17</sup>Lobstein et al revealed weight training is found very useful in controlling and prevention of obesity.<sup>2</sup>

14.86%(26) Urban 5.14%(9) Neourban and 3.43%(6) Rural students did weight training regularly. Therefore, in this study significantly more number of students from urban group was found getting weight training as compared to neourban and rural students. This may be due to excellent facilities

available in urban area for weight training. The amount of physical activity has been greatly reduced at home and in school, as well as by increasing use of mechanized transport.<sup>18</sup>

Rural student have large play area as compared to urban and neourban students. Games played by students include cricket, football, volleyball and badminton. Favourite game in both urban and rural is cricket.

In this study, 27.43% (48) Rural, 24.57 % (43) Urban and 15.43% (27) Neourban student played outdoor games regularly. Rural students significantly forms the major group followed by urban group followed by neourban students playing outdoor game.

Together lack of exercise and increased television viewing both are reported in so many studies to be associated with obesity and overweight<sup>1</sup>. There are studies in US showing the effect of television and computer on adults indicating relationship with the obesity.<sup>19</sup>

The study reveals that overweight is widely prevalent in the adult urban Delhi population, whereas underweight is a significant problem in the rural population.<sup>6</sup> As many as 38% of males and 36% of females in the rural area were actually 'underweight' by BMI standards.<sup>20</sup> Such an 'urban, rural divide' has been documented in other Indian studies too.<sup>21</sup> In the study at Delhi, the corresponding figures for overweight in a neighbouring Haryana rural area were 7% in males and 9% in females.<sup>6</sup>

Comparison of Body Mass Index in study groups shows that mean BMI of Rural student ( $21.08 \pm 2.02$ ) is more than Urban ( $20.78 \pm 3.12$ ) and Neourban ( $20.14 \pm 2.6$ ). study shows that Rural and Urban have higher mean BMI as compared to Neourban group.

Mean BMI of rural group when compared with other two group is statistically significant ( $p < 0.01$ ).

Life style of rural group who stayed for 10 years at native place is better and diet habits are better as compared with other group. However, their BMI is below 25.

From the total population 3.80% of the students are overweight. From 20 overweight students, 70% of the overweight students belong to the urban group as compared to 20% Neourban and 10% Rural. Percentage of overweight student is more in urban than neourban and rural.

The study done by Reddy KS and co researcher reveals that overweight is widely prevalent in the adult urban Delhi population, whereas underweight is a significant problem in the rural population. This was noted across all the age groups in both men and women.<sup>6</sup> In this study percentage of urban students found overweight is more as compared neourban and rural students.

### Conclusion

Overweight is a common problem in young adults, with higher prevalence in males. Both overweight & gender influence nutritional habits and physical activity. The lifestyle of young people in the rural and urban areas was slightly different. Urban student are getting more pocket money, play computer /electronic games for long duration, found doing more exercise and weight training as compared to Neourban and Rural student. However, pocket money provided to urban student was spent more on buying fatty food and beverages. Hence, urban students were found more overweight as compared to rural student. A positive aspect of the lifestyle of the young adults in the rural areas was the relatively high level of physical activity and the small effect to stress on excessive consumption.

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