A STUDY OF OBESITY AND OVERWEIGHT IN MIDDLE AGE CHILDREN OF RURAL & CITY AREAS OF JAIPUR, RAJASTHAN

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ABSTRACT

Background: Present study was done to determine the condition of overweight and obesity in city & rural middle aged children in Jaipur, Rajasthan. **Methods:** Present study was done in year 2017 and the informations were gathered from children who are studying in government schools. Demographic data like age, gender, weight and height were recorded. BMI was calculated using standard formula. IOTF criteria-2000 (International Obesity Task Force) was used to classify overweight and obesity as per. **Result:** Students chosen for the study were aged between 14-16 years. Student selected from rural schools were 180. Students selected from schools of urban areas were 215. Males were slightly more in study population than female candidates (56% Vs 44%). The overall mean BMI in rural areas was (20.8 + 2.9) which is significantly less than the BMI of urban areas (21.9 + 3.2 Kg/M2). A significant difference was found in the prevalence of obesity in rural and urban areas that is 11.1% and 14.1% respectively (p<0.01). After adjusting for age and gender a statistically significant difference was found in rural and urban areas with regards to obesity. An interesting observation in this study is also noticed that urban male students are having more risk of becoming obese than urban females and rural male and female students. **Conclusion:** Present study successfully illustrated that overweight and obesity in urban students is relatively high and urban males are relatively more affected with these problems.
Keywords: Body Mass Index (BMI), Overweight, Obesity.

INTRODUCTION

The epidemic of childhood obesity is now considered as a major health related issue universally **(1, 2, 3)** especially in developing countries where health services are still weak and inapproachable to majority of people. If we look at age pyramid of developing countries a major proportion of population is still under 15 children. **(4, 5)** these children are very soon will be part of national work force **(6)**. In recent past as economic condition of India improved, people are using more unhealthy fast foods and doing less physical work hence adolescents are getting overweight and obese. **(7, 8)** Cultural factors and nutritional factors such as using high carbohydrate intake and low protein intake of Indian population is also contributing in relatively high percentage of obesity and its associated complications **(9,10)**.

Obesity as a disease syndrome is linked with several

other diseases and its complications such as hypertension, diabetes mellitus type-2, polycystic ovarian disease, deranged plasma lipids and metabolic syndrome. Which are more and more becoming frequent amid children and urban teenagers **(9, 10)**.

Although we are having insufficient data on obesity and its impact in Indian population, because there was less focus on over nutrition since decades and only under-nutrition in kids was taken as important public health problem in India. **(11)** Some recent work in the field of childhood and adolescent obesity suggests that there is an increase in obesity and overweight among this age group **(4, 12)**. As per NFHS -2005 the prevalence of obesity was 9.3% and prevalence of overweight was recorded to be 12.6% in persons age between 15-49 years. **(13)**

This study is a most recent attempt to assess and analyze the overweight and obesity among adolescent of rural and urban origin.

MATERIALS AND METHODS

Selection of study population:

An address list having the names of every government schools situated in Jaipur District & Jaipur City was managed. Out of total schools three government secondary schools from rural locality of Jaipur District & three government secondary schools from urban locality of Jaipur city were randomly chosen for this particular study. Standard 10th and 11th of each selected school was listed for study. Each standard is further divided into sections. There were total 10 sections in rural areas and 11 sections in urban areas in class 10th and 11th. Randomly three sections each in rural and urban area were taken for study. All students of selected sections were enrolled for the study. We approached each and every selected school within the time decided mutually by us and school management. Anthropometric dimensions and other socioeconomical data were carefully noted in 180 in rural and 215 in urban adolescents. Most of data were gathered between august 2017 to October 2017. We measured and recorded required parameters like weight, height etc on predesigned

Performa. All the kids were weighed in simple cloths and heights were measured bare foot (without shoes). Simple spring weight machine of "Harsons and brothers" company was used to weigh all the subjects and wall mounted reverse measuring tape was used to measure height. Subjects who are taking treatment for some illness were not included.

Criteria for obesity and overweight

International Task Force for Obesity criteria (IOTF) of year-2000 was used to define overweight and obesity **(14)**. This is worldwide acclaimed criteria for research and classifying individuals for obesity and overweight.

This criteria is designed and represented 7 countries that is UK, USA, Brazil, Hong kong, Malaysia, Singapore and Netherland in year 2000. This survey included 97, 876 boys and 94,841 girls. The mean BMI of the study subjects were recorded and by age and gender. BMI-for-age $\geq$ 25 and < 30 was considered as overweight and BMI $\geq$ 30 was taken as obesity.

Statistical Analysis

Student t- test and chi square test was used to compare the recorded data. All data are shown as mean and standard deviation. A p-value < 0.05 was considered as significant.

RESULTS

Study population consisted of 180 in rural and 215 in urban 14–16 year old children from government funded schools of Jaipur, India. Male children are slightly higher than females.

As shown in table- 1 there were 101 (56.1%) males in rural and 118 (55.1%) males in urban areas. This difference was statistically non-significant (P value->0.05). Mean age of study populations was 15.2 +/- 1.1 years in rural and 15.1 +/- 1.1 years in urban which is also statistically non-significant (P value->0.05).

Table-2 shows that the mean BMI of rural adolescents are 20.8 +/- 2.9 kg/m2 and urban

adolescents are 21.9 +/- 3.2 kg/m2.

Table -3 shows that presence of overweight increased from 44 (24.4%) in rural to 54 (25.1%) in urban (p=0.451) and obesity prevalence also increased non-significantly from 20 (11.1%) in rural to 31 (14.4%) in urban areas (p =0.612).

Table -4 shows that males showed a significant increase in presence of overweight among rural and urban areas (24.7% to 27.5%; p=0.041). In females, the prevalence of overweight decreased in urban areas (24.06% to 22.7%; p=0.324)

Table - 5 shows that presence of obesity increased in urban individuals if we compare with rural once (11.1% Vs 14.4%). In males obesity increased significantly in urban areas than rural areas (11.4% to 15.2%; p=0.007). In females obesity increased non-significantly in urban areas than rural areas (11.3% to 13.4%; p=0.751).

DISCUSSION

Obesity is linked with significant number of diseases and deaths worldwide (17). Rising numbers of childhood and adolescent obesity raised the eyebrows of healthcare providers and policy makers in recent past as most of these obese kids will be obese adults in coming years. Now it has been seen and established by many researchers that health problems related with obesity are also equally hazardous in children as well. (18, 19) India which is a country of huge population is now facing dual burden of under nutrition and over nutrition. In recent past availability of food has improved as a part of economic and social development. Hence obesity in kids is rising in India. India is now experiencing change in nutritional, demographic and cultural practices. All these changes are bringing in behavioral shifts resulting in improved diet and less physical activities. (20)

Present study showed that urban adolescents have higher frequency of obesity and overweight. Similarly urban affluent families are more affected with childhood obesity than rural and urban poor.

All non-communicable diseases like cardiovascular

diseases, diabetes and hypertension are on the rise in developing countries including ours. Obesity is important risk factor in causation of all these non-communicable diseases. (21, 22) The national development is being affected by increasing burden of these diseases.

A number of studies on childhood obesity already being published in the country. Most of these studies are cross sectional and done to know the prevalence of adolescent obesity at a point of time. A study from Chennai (2002) by Ramachandran A et al, shows prevalence of obesity in 13-18 year kids is around 3.6%.23 Another study from Karnatka (Mysore) by Premanath M et al shows 3.4% obesity prevalence in children (5–16 years) in year 2009-10 (24).

A continuous trend of increasing obesity noted in past few years. The prevalence of overweight and obesity from 5.1% and 1.31% in year 2003-04 to 6.57% and 1.97% in 2005-06, respectively, in kids aged 6–15 years.

Gupta AK et al and Mohan B et al in their study shows that even north Indian children are more affected with obesity than south Indian. In their study prevalence comes out to be 3.61 and 7.12% respectively (25, 26).

A longitudinal study from Kerala by Raj M et al in year 2007 shows the time trend of childhood obesity. The prevalence of childhood obesity was continuously increasing with time. (27)

Our study shows that children of urban areas are more affected with overweight and obesity than rural areas. Urban male children are relatively more prone to urban females. There may be many factors such as cultural, educational, social and hormonal behind increased presence of obesity in urban males (28). Females are relatively more conscious about their physical appearance hence they try to control their weight as compared to males (29). As we know that females gain more height than males in adolescent age group because of hormonal changes.

Socioeconomic status also play important role in prevalence of obesity and overweight. This has been proved by Kaur S et al and Gupta R et al in their

study **(30, 31)**. Children of higher socioeconomic status study in big and costly schools, they use calorie rich foods and having life style with less of physical activity and more of using electronic gazettes **(32, 33)**.

As like other studies our study is also having some limitations and strengths. Selection bias is important constraint of our study. Although we have taken all students from selected sections of selected standard. Besides this only BMI was taken to estimate prevalence of overweight and obesity. However there are some other newer indices which precisely measure obesity and overweight **(34, 35)**, but still BMI is considered the best and precise measure of obesity in larger studies. **(36, 37, 38, 39)** Waist-hip ratio (WHR) is used more commonly for measuring abdominal obesity.

CONCLUSION

The prevalence of obesity and overweight is more in urban area as compared to rural areas in adolescent school going population. In general male gender, high socioeconomic status and area of living is significantly related with occurrence of obesity and overweight. Hence a targeted nationwide campaign is needed to curb childhood obesity to improve good healthy practices.

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Table: 1 Gender distribution of study population

Category	Rural	Urban
Male	101 (56.1%)	118 (55.1%)
Female	79 (43.9%)	97 (44.9%)
Total	180 (100%)	215(100%)

Table: 2 Comparison of BMI of study population

Category	Rural (Mean$\pm$ SD)	Urban (Mean$\pm$SD)
BMI of Males	19.5$\pm$ 3.5	21.5$\pm$ 3.3
BMI of Females	21.5$\pm$ 4.3	22.5$\pm$ 4.2
Total	20.8$\pm$ 2.9	21.9$\pm$ 3.2

Table: 3 Comparison of weight Status in study population

Category	Rural	Urban	P-value
Overweight	44 (24.4%)	54 (25.1%)	0.451
Obesity	20 (11.1%)	31 (14.4%)	0.612
Total	180 (100%)	215 (100%)	

Table: 4 Overweight in Adolescent in rural and urban areas

	Rural	Urban	P-Value
Male	25 (24.7%)	32 (27.5%)	0.041
Female	19 (24.05)%	22 (22.7%)	0.324
Total	44 (24.4%)	54 (25.1%)	0.458

Table: 5 Prevalence of obesity in rural and urban areas

Category	Rural	Urban	P Value
Males	11 (11.4%)	18 (15.2%)	0.007
Females	9 (11.3%)	13 (13.4%)	0.751
Total	20 (11.1%)	31 (14.4%)	0.614