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Research Article

Comparative study of childhood overweight/obesity in urban and rural area of Kota district

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ABSTRACT

Background: Overweight/obesity is a complex disease involving interconnected biological, developmental, environmental, behavioral, and genetic factors; it is a major preventable public health problem. The most common cause of childhood and teenage obesity is an energy balance imbalance; that is, excess calorie intake without adequate calorie expenditure. Therefore, in our study we determine the prevalence of overweight and obese children aged 5 to 14 years in the Kota district, and subsequently compare the lifestyles of overweight and obese children in urban and rural areas.

Methods: We visited schools and identified overweight/obese children using BMI. Subsequently, we had their parents or guardians complete semi-structured questionnaires.

Results: On surveying 3,214 children, we identified a total of 178 overweight/obese children; of which, 152 out of the 1,863 children in urban areas and 26 out of the 1,351 children in rural areas were found to be overweight/obese. This indicates that the prevalence of overweight/obese children in urban areas was significantly higher compared to that in rural areas. We found Male child in urban and rural areas were found to have higher overweight/obesity rates than female child.

Key words: Overweight, Obese, Prevalence.

INTRODUCTION

Introduction: Overweight term refers to excess body weight for a particular height whereas the term obesity is used to define excess body fat. Overweight / Obesity was considered a problem of developed country but now this also occurred in developing country and childhood obesity has reached epidemic proportions in most of the developed countries. In today's time, due to increasing use of mobiles, computers, television and artificial intelligence, the regular outdoor activities of children have

been restricted (1). Due to which children are adopting a sedentary lifestyle which was not there in children 10 to 15 years back. This leads to decrease in physical activity and increase in calorie intake in children which further leads to obesity in children (1). In India children with higher-income and urban backgrounds has more chance of develop overweight and obesity, Within the country prevalence varies because of differences in the lifestyle, cultural environment, mainly in the dietary pattern and physical activities (2). Of those children who were obese since their childhood, 50-80% remain obese in adults also (3). Early reorganization as weight starts to increase, proper and adequate treatment of this will prevent the globalization of overweight/obesity.

Aims and objective: Prevalence of childhood overweight/obesity in urban and rural areas.

Materials and Methods

Study area- Kota district, Rajasthan

Study population- School going children of 5–14-year age along with their parents.

Study period- 1 November 2022 to 31 October 2023 (1 year)

Sample population and sample size- according to textbook Park 26th edition 18% of total population are formed by 5 to 14 years age groups. So, we take 18% of Kota district population in our study.

Total population= 21,90,675

5-to-14-year age population= 3,94,321

We used cross sectional method in our study for this Target age group (5 to 14 year). We assumed that all children of this age group were attending schools, so we took schools to find out prevalence of overweight/obesity in the same age group.

Estimated population of Kota district in 2022 was 2190675 (as per Aadhar uidai.gov.in December 2020 data) of which approx 18% children were in 5-to-14-year age group. Kota District has 6 educational blocks (4). So, we took Kota block as representative of urban block. For a representative of rural block, we randomly selected Sultanpur block. We selected a total of 12 schools, including 6 from urban areas and 6 from rural areas.

We surveyed all the eligible children in this age group for the assessment of weight, height and calculation of body mass index (BMI). All parents of those children who were being overweight/obese were called in to be assessed of their perception about overweight/obese.

Inclusion criteria-

- All parents of children in age group 5-14 years, who being overweight /obese.

Exclusion criteria-

- Parents of children with 5-14 years but have normal weight/height and Body Mass Index (BMI)
- Parents not willing to participate in study.

Data collection- We measured height/weight and calculate Body Mass Index (BMI). We used semi structured questionnaire to collect data about overweight/obese children from their parents/guardian. Like age, sex, weight,

height, Body Mass Index (BMI), educational standard, medium of transportation for school, dietary habits, frequency of eating fast food, physical activity, sleeping pattern, socioeconomic status of family, level of education of family, history of obesity and non-communicable disease in family, physical activity by parents, complication during pregnancy, mode of delivery, area of living and what is thinking about overweight and obesity.

Overweight/obesity – Centres for disease control and prevention (CDC) defines Overweight as "A Body Mass Index (BMI) in the 85th to less than the 95th percentile". Obesity as "A Body Mass Index (BMI) at or above the 95 the percentile for children and teens of the same age and sex".

Data analysis- by use of Microsoft excels 2016,

Data presentation- Proportion and appropriate statistical test will be used in analysis. $p < 0.05$ will be taken as significant.

Observation and Results:

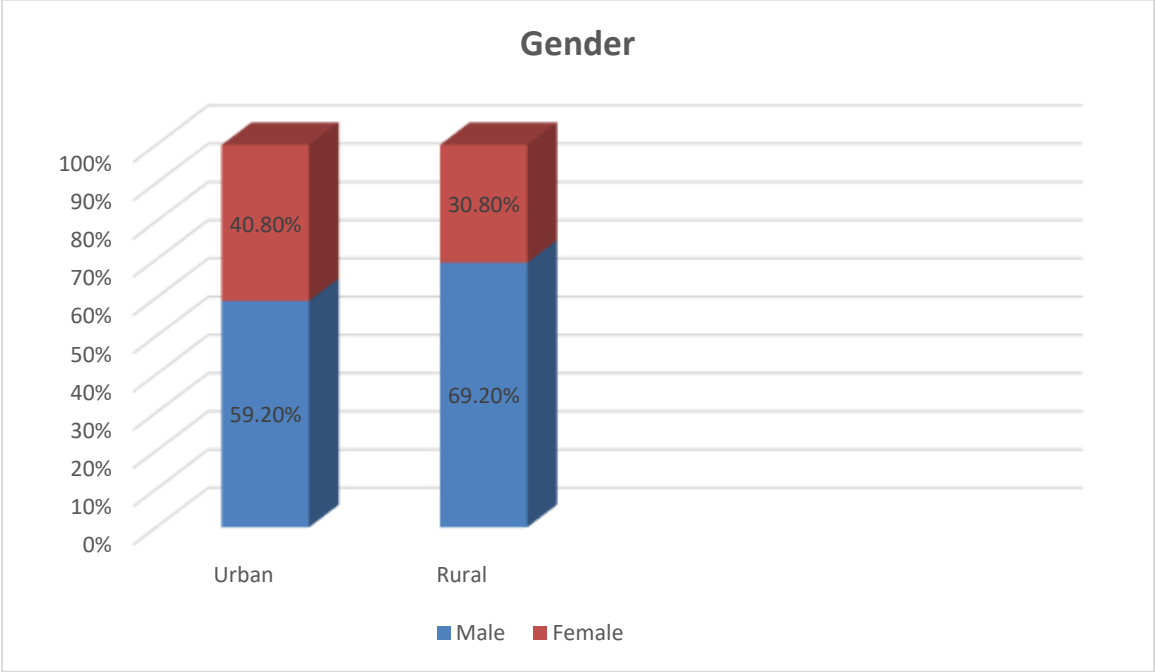
Table 1: Socioeconomic status of urban and rural families.

Variable	Urban (%)	Rural (%)	p Value
1: The Educational qualifications of the heads of families			
Professional degree	46 (30.3%)	00	p=2.98385E-12 (p value <0.05, significant)
Graduate or postgraduate	73 (48%)	6 (23.1%)	
Intermediate or 12th class	29 (19.1%)	3 (11.5%)	
High school certificate or 10th class	4 (2.6%)	6 (23.1%)	
Middle school or below	00	10 (38.4%)	
Illiterate	00	1 (3.8%)	
2: Occupation of head of family			
Professional	15 (9.9%)	00	p=6.36477E-09 (p value <0.05, significant)
Semi-professional	60 (39.9%)	1 (3.8%)	
Clerical, shop owner/farmer	45 (29.6%)	10 (38.5%)	
Skilled worker	16 (10.5%)	3 (11.5%)	
Semiskilled worker	16 (10.5%)	7 (26.9%)	
Unskilled worker	00	5 (19.2%)	
3: Monthly income of family			
<10000	15 (9.9%)	12 (46.2%)	p=1.05216E-10 (p value <0.05, significant)
10000-20000	19 (12.5%)	11 (42.3%)	
>20000	118 (77.6%)	3 (11.5%)	

Table 2: number of children in family, complication during pregnancy or childbirth, weight at birth, gender, and BMI.

Variable	Urban (%)	Rural (%)	p Value
1 Children in Family			
1	60 (39.5%)	6 (23.1%)	p=0.23197186 (p value >0.05, not significant)

2	46 (30.3%)	7 (26.9%)	
3	29 (19.1%)	8 (30.8%)	
>3	17 (11.2%)	5 (19.2%)	
2 Complications during pregnancy or childbirth			
Yes	60 (39.5%)	8 (30.8%)	p= 0.3 (p value > 0.05, not significant)
No	92 (60.5%)	18 (69.2%)	
3 Weight at birth			
<2.5 Kg	14 (9.2%)	10 (38.5%)	p=3.83673E-06 (p value <0.05, significant)
2.5 to 3.5 Kg	60 (39.5%)	3 (11.5%)	
>3.5 Kg	47 (30.9%)	2 (7.7%)	
Not known	31 (20.4%)	11 (42.3%)	
4 Gender			
Male	90 (59.2%)	18 (69.2%)	p= 0.32 (p value >0.05, not significant)
Female	62 (40.8%)	8 (30.8%)	
5 BMI			
Overweight	91 (59.9%)	19 (73.1%)	p= 0.19 (p value >0.05, not significant)
Obesity	61 (40.1%)	7 (26.9%)	



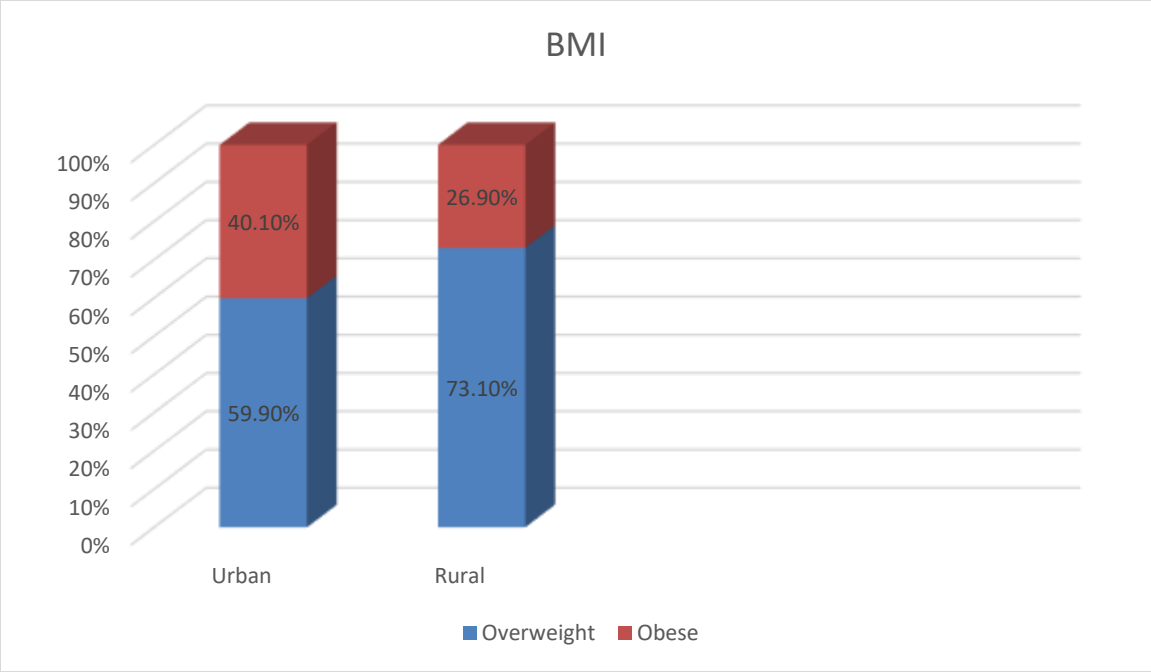


Table 3: comparison of different variable I n urban and rural area.

6 Mode of transportation for school			
By walking	31 (20.4%)	20 (76.9%)	p=3.60451E-08 (p value<0.05, significant)
By bicycle	53 (34.9%)	6 (23.1%)	
By school bus	51 (33.6%)	00	
By car	17 (11.2%)	00	
7 Time spend in outdoor activity by your child in a day			
No time spend	59 (38.8%)	5 (19.2%)	p=0.01948213 (p value <0.05, significant)
Approx one hour	60 (39.5%)	9 (34.6%)	
More than one hour	33 (21.7%)	12 46.2%)	
8 Duration of sleep for overweight/obese children in one day			
<9 Hours	121 (79.6%)	21 (80.8%)	p=0.924048737(p value>0.05,not significant)
9 to 12 Hours	30 (19.7%)	5 (19.2%)	
>12 Hours	1 (0.7%)	00	
9 Number of hours spent on screen by child in a day			
<6 Hours	107 (70.4%)	26 (100%)	p=0.001365378 (p value <0.05, significant)
6-9 Hours	45 (29.6%)	00	
>9 Hours	00	00	
10 Does your child eat fast food			
Yes	93 (61.2%)	9 (34.6%)	p= 0.01 (p value <0.05, significant)
No	59 (38.8%)	17 (65.4%)	
11 If yes, then Frequency of eating fast food			
Occasionally	52 (55.9%)	9 (100%)	p=0.009202305 (p value <0.05, significant)
Daily	41 (44.1%)	00	

We surveyed total of 3214 children in which 1863 and 1351 children in urban and rural areas respectively in 12 schools (6 schools in Urban and 6 schools in rural area). Total of 178 overweight/obese children found as per BMI. The prevalence of being overweight and obesity

appears to be higher in urban areas (152 Child) compared to rural areas (26 Child). In both urban and rural areas, males have a higher prevalence of overweight and obesity compared to females. We contacted their parents to know some questions about their overweight/obese child. Following are observations from survey.

As in table 1, Urban families exhibited substantially higher educational qualifications compared to rural families. In urban heads of families had at least a graduate-level education, with 30.3% holding professional degrees and 48% being graduates or postgraduates. In contrast, none of the rural heads had professional degrees, and only 23.1% were graduates or postgraduates. Urban heads of families were predominantly engaged in professional (9.9%) and semi-professional (39.9%) occupations, whereas these categories were almost absent in rural areas. A large majority of urban families (77.6%) reported a monthly income above ₹20,000, while only 11.5% of rural families fell into this category.

In table 2, Urban families most had one or two children, while rural families showed a higher proportion with three or more children. A slightly higher proportion of urban parents reported complications compared to rural ones. A significantly higher proportion of rural children had low birth weight (<2.5 kg) and a larger share of unknown birth weights, whereas urban children more often had normal or higher birth weights. The prevalence of overweight and obesity was slightly higher in male children compared to female children. We found prevalence of being overweight is more than obese in both urban and rural area.

In table 3, In urban the primary mode of transportation to school is by bicycle 34.9% while in rural primary mode of transportation to school is by walking 76.9%, and no students in rural areas use school buses or cars to travel to school. In urban areas, 39.5% of overweight/obese children spend approximately one hour per day in outdoor activities, while in rural areas, 46.2% of children play outdoors for more than one hour per day. The data shows that children in rural areas tend to spend more time outdoors than those in urban areas. In majority of children of both urban and rural areas sleep for less than 9 hours per day. There is no statistically significant difference in the duration of sleep between overweight/obese children from urban and rural areas. In rural 100% of children have less than 6 hours screen time while in urban areas, 29.6% of children have 6-9 hours of screen time. In urban areas, 61.2% of children consume fast food, while in rural areas, 34.6% of children consume fast food. This show Children in urban areas are more likely to consume fast food compared to those in rural areas.

Discussion:

According to our study, the educational qualification of the head of the family in urban areas was mostly graduate or post graduate (48.0%), whereas in rural areas, the majority was middle school (38.4%), with a value less than 0.05, which is significant. Nemecek et al. study did not find any significant association between parental education level and overweight (5).

According to our study, majority of families in urban areas (39%) had one child, whereas in these rural areas, majority (30.8%) of families had three children. Lumchio L.Murry found in his study 55% of the children were single children (6).

in our study only 110(3.5%) children are overweight, and 68 (2.2%) children are obese out of 3214 children of both urban and rural area of Kota. This shows prevalence of being overweight is more than obese. A study of Jain, et al. The

study of obesity among children of Jaipur, Rajasthan shows the prevalence of overweight 12.5% is higher than the prevalence of obese 5.6% (1). according to Chhatwal et al. report overall prevalences of overweight and obesity among children in Panjab was found to be14.2% and 11.1% respectively (7). Similar pattern also found in study of Nemecek et al. (2017) which shows prevalence 10.7% and 3.2% for overweight and obesity respectively (5)

In our study overweight and obesity was more prevalent in male than female child. Similarly, according to Goyal et al. in 2010 in Ahmedabad prevalence of overweight more in boys than girls which is 14.3% and 9.2% respectively (8) and 2.9% boys and 1.9% girls were obese which indicate overweight/obesity more common boys to girls (8). Singh S et al. suggested a gender-based difference in the prevalence of overweight/obesity among children that is Male children were at a higher risk of being obese and overweight compared to female children (9). But in study of Kumar et al. in 2007 in Davangere (Karnataka) obesity was 4.10% boys and 8.82% in girls (10). Gupta and Kochar in 2009 in Kurukshetra, Haryana, India found in their study that obesity and being overweight was more prevalent in women than men (11).

Our study shows a notable disparity in outdoor activity levels between urban and rural children. Rural children tend to spend more time outdoors, with 46.2% engaging in activities for over an hour daily, compared to 21.7% in urban areas. Conversely, urban children are more likely to spend no time outdoors (38.8%) than their rural counterparts (19.2%). According to study done by Goyal et al. and Kumar et al. also found that overweight/obesity was higher in children with low physical activity (8,10). The key finding was Goyal et al. (2011) conducted in Surat and Ahmedabad, India, that children who did not engage in outdoor games or played games only on a weekly basis were 4.29 times more likely to be overweight or obese (12). in the study of Jain A et al. children who played some outdoor sport daily had a lower obesity rate (11.6%), while those who played some outdoor sport weekly had a higher obesity rate (19.8%) (1). Dasappa H et al. found in there study A child's participation in sports activity at school or outside of school was statistically significantly associated with the prevalence of obesity and overweight (13).

In this study 70.4% and 100% of children in urban and rural areas respectively spend less than 6 hours on screens and in urban areas, 29.6% of children spend between 6-9 hours on screens, while no children in rural areas fall into this category. This study suggested that there is a significant difference in the number of hours spent on screens by overweight/obese children between urban and rural areas. A study by Gupta N et al. conduced in Delhi found a positive correlation between screen time and obesity in children. Children who spent more than 2 hours per day watching television were more likely to be obese (14).

The data suggests that (61.2%) overweight/obese children in urban areas are more likely to consume fast food compared to those in rural areas. In this study data suggests that there is a significant difference in the frequency of fast-food consumption between urban and rural overweight/obese children. In Urban 44.1% children are more likely to consume fast food daily compared to rural children, who tend to consume it occasionally. Jain A et al. conducted a study in Jaipur noted that Children who ate junk food more frequently were more obese and overweight as compared to those who ate such food in low frequency (1).

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