

Incidence of Obesity among School Going Children of Urban and Rural Area of Moradabad - An Observational Study

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Abstract:

Background: Obesity is one of the major health problems encountered by every age group. Now a days, school going children are more prone to get obese; due to lack of physical activity making them more sedentary. Further it has detrimental effect on their health and quality of life.

Objective: To identify the incidence rate of obesity among school going children of urban and rural area by using anthropometric measurements.

Methods: Overall 300 children (150 from urban & 150 from rural area) of both genders participated in study. Anthropometric measurements namely; BMI, Waist-Hip ratio and skin fold were taken as measurement tool.

Data Analysis: Data was tabulated and Cumulative incidence (CI) was calculated for each Anthropometric measurement.

Results: Out of 150 urban subjects 28.66 % showed higher BMI (more than 24 kg/cm²) in contrast to rural subjects who showed only 5.32%. Overall, 67 % of urban subjects and 5% of rural subjects reflected to be at risk of being obese on basis of Waist-Hip ratio. Further, skin fold scores were found to be higher in urban subjects than rural subjects

Conclusion: Urban subjects showed higher BMI, Waist-Hip ratio and skinfold score than that of their rural counterpart. Henceforth, they are more prone to develop disorders associated with obesity in their later life.

1. Introduction

Obesity is one of the prime risk factor of metabolic syndromes; which is spreading rapidly among people of different age groups [1]. It refers to the collection of excess of body fat that it may result into various associated disorders [2, 3]. Obesity epidemic results in various conditions such as Diabetes, Hypertension, and Coronary Heart Disease, affects the quality of life, health care costs and life expectancy and is now a chief concern of public health [2]. Nutritional deficiencies, lack of physical activities and sedentary life style are the major contributors of obesity in developing countries [4, 5, 6, 7, 8].

In India, a study was conducted in 2015, involving subjects from urban cities (Chennai, Bangalore, Hyderabad, Mumbai, Calcutta and New Delhi) addressing the incidence of obesity among various age groups and found a higher incidence rate of obesity (30%) in urban region than rural [9]

According to WHO, UNICEF & CARE it is one of the most neglected public health problem in recent years [10]. Worldwide it affects one in every sixth individuals and leads to higher mortality rate in developed and developing countries and is more evident in urban than rural communities [11]. This is due to lack of lack of physical activity, unhealthy eating habits and sedentary behavior [12]. Sedentary life style can predispose a person to obesity by the virtue of the increasing hours of inactivity due to television, videogames and computers replacing outdoor games and other social activity [13, 14]. Interactions between genetic, neuroendocrine, metabolic, psychological, environmental and socio-cultural factors are clearly evident in adulthood obesity making the etio-pathogenesis multi- factorial [15, 16].

Anthropometric measurements are widely used for evaluation and assessment of subject's health by using various measurement methods such as Body Mass Index (BMI), Waist – Hip ratio, Skinfold Measurement [17, 18, 19].

Previous studies and measures attempted to evaluate obesity among different age groups, gender and in different population. However, there was a need to study the incidence rate of obesity between urban and rural school children as social and health determinants play a vital role in regulation of incidence rate of NCD's.

2. Methodology

2.1 Inclusion criteria

School going children (10 to 18 years) of both genders with the willingness of their parents or principal in charge.

2.2 Exclusion criteria

Subjects suffering from any disease, deformity, below 10 or above 18 and those who were not willing to participate in study.

2.3 Measuring tools

Body Mass Index (BMI), Waist – Hip Ratio and Skinfold Measurement has been used to evaluate the risk of obesity. [14,17] In this study BMI was used to evaluate the body mass based on the height by (kg/m²) [29], Waist – Hip ratio was used to evaluate the hip and waist circumference (waist girth/ hip girth) and Skinfold measurement was used to evaluate abdominal fat composition.

2.4 Procedure

300 school going children approached & consented to participate in study. Out of which 150 samples were from urban area and 150 samples from rural area. Consent form was filled after explaining the purpose and procedure of the study by the sample, Principal or guardian of the concerned before their participation. Data of BMI, Waist – Hip ratio and skinfold measurement were collected from both groups.

3. Data analysis

All 150 samples of both urban and rural region were analysed and Cumulative incidence of obesity was measured on the basis of BMI, Waist – Hip ratio and Skinfold measurement. Formulae used for calculating cumulative incidence was:

$$CI = \text{Frequency} / \text{Sample Size} * 100$$

4. Results

Table 1 Reflects increase in Cumulative Incidence of BMI of Group A (subjects from urban region) than Group B (subjects from Rural Region).

Table 1

S. No.	BMI Interval	Cumulative Incidence.	
		Urban	Rural
1	18—24(Normal)	27.33%	22.66%
2	24—30(Over weight)	18%	2.66%
3	30 Above (obese)	10.66%	2.66%

Table 2 Reflects that there is increased risk of developing obesity in male urban subjects in comparison to rural subjects on the basis of Waist – Hip Ratio.

Table 2

S.No.	Waist – Hip Ratio	Cumulative Incidence.	
		Urban	Rural
1	<0.85 (Excellent)	18.42%	13.41%
2	0.85 – 0.89 (Good)	14.47%	29.26%
3	0.90 – 0.95 (Average)	57.89%	36.58%
4	>0.95 (At Risk)	7.89%	4.87%

Table no 3 Reflects that there is increased risk of developing obesity in female urban subjects in comparison to rural subjects on the basis of Waist – Hip Ratio.

Table 3

S.No.	Waist – Hip Ratio	Cumulative Incidence.	
		Urban	Rural
1	<0.85 (Excellent)	0%	20.47%
2	0.85 – 0.89 (Good)	6.75%	35.29%
3	0.90 – 0.95 (Average)	32.43%	29.41%
4	>0.95 (At Risk)	60.81%	12.56%

Table 4: Reflects increase in skinfold values of Group A (subjects from urban region) than Group B (subjects from Rural Region).

Table 4

S.No.	Skinfold Measurement	Cumulative Incidence.	
		Urban	Rural
1	Below 12 mm	26%	52%
2	13 – 18 mm	11.33%	18%
3	19 – 30 mm	22%	19.33%
4	Above 30 mm	34%	10.66%

5. Discussion

The study was conducted to observe the incidence of obesity among school going children of urban and rural area, using body mass index, waist hip ratio and skin fold measurement caliper as measurement tools. Data was analyzed for 300 subjects out of which 50% were students from urban region and 50% were students from rural region.

After comparing the values from risk predictors of obesity from both rural and urban subjects; a significant difference was observed between them which may be a result of an interaction between their genetic, neuro-endocrine, metabolic, psychological, environmental and socioeconomic and cultural factor.

Y.S. Saraswath et al. concluded through their study that incidence of overweight and obesity was higher in urban areas as compared to the rural area [21]. They

also quoted that risk of being overweight and obese was higher in girls than boys of both urban as well as rural children^[22]. Result of this study was found to be in accordance to their results. Another study by Bill Munns and Jeff Meldrum declared the pattern of deposition, metabolism and genetics of obesity with reference to common evolutionary ancestry of human. However. Results from this study are also indicative about the effect of environmental, social, nutritional, life style and cultural factors on incidence of obesity^[23]. Studies conducted by various authors such as Anju et.al, Bhave et.al and Kapil et.al discussed that prevalence of obesity was found to be higher in urban school girls^[22,24,25], this study also supported the above mentioned studies. Further studies by Bell et.al and Misra et.al supported the multifactorial causes of obesity including lack of physical activity, urbanization and sedentary behavior^[27, 28] it further supports the incidence of obesity in urban area where children spend more indoor time and this leads to sedentary behavior while in rural region children are more exposed to physical activities that reduces the chances of being sedentary.

Obesity in children is very common and it may be associated with various disorders in late life. During course of study, a major difference was seen in obesity between rural and urban area school children. Overweight refers to weighing more than the standard size for one's height and age, whereas obesity refers to having excessive body fat. BMI, WHR and SFM have been used to measure the incidence of being overweight and obese^[26] and then it was analyzed by using cumulative frequency method (statistics method).

It was found that maximum students from rural region were lean and were having normal body mass whereas students from urban region were overweight or prone to obese. Henceforth. It indicates that school going children of urban region are more at risk of being obese than rural region and may be due to sedentary life style, less physical activities, unhealthy eating habits and more video gaming, computer work and television time.

Future studies are recommended on genetic factors of obesity, prevalence of various disorders in obese children, effect of regular physical activity on health and effect of obesity on core strength.

6. Conclusion

This study concludes that there is higher incidence of obesity or being obese in urban school going children than rural school going children and it can further affect the overall health and may lead to other obesity related disorders in adulthood or later in life.

Further we also found that urban females are more at risk than urban males which makes them more vulnerable to conditions like Osteoarthritis, Diabetes mellitus or coronary artery disease.

7. References

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