

Childhood and Adolescent Overweight and Obesity – A Public Health Challenge in India

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Abstract

Introduction: Childhood obesity is a growing epidemic globally. A study was conducted in an urban school in the state of Karnataka, India to assess the prevalence of overweight and obesity among school children and to compare the percentage of overweight and obese using Agarwal, Asia Pacific and International Obesity Task Force (IOTF) classification.

Materials and Methods: A cross sectional study was conducted on school children in an urban school in Bangalore, Karnataka. A total of 3851 children from Nursery to 12th standard ranging in the age group of 3 to 17 years participated in the study. Assessment of overweight and obesity was done using three classifications namely Agarwal, Asia Pacific, and IOTF. Data was analyzed based on percentages and proportions and associations were determined between variables and overweight and obesity using Chi square test.

Results: There were 2019 (52.4%) males and 1832 (47.6%) females in the study. According to Agarwal classification 27.1% were overweight and 13.7% were obese. The percentage of overweight children was highest among primary 40.5% followed by secondary 33.3% and obesity was maximum in primary 39.5% followed by kindergarten 35% ($P < 0.01$). The percentage of overweight and obesity was higher among males 54.4% and 65.8% as compared to females 45.6% and 34.2% ($P < 0.01$).

Conclusion: This study highlighted that 40.8% of school children were overweight and obese. Agarwal classification detected overweight and obesity earlier as compared to IOTF and Asia Pacific classification.

Keywords: Overweight, Obesity, School children

INTRODUCTION

Childhood obesity is a growing epidemic globally.¹ Overweight and obesity are risk factors for non-communicable diseases like cardiovascular diseases, hypertension, diabetes, cancers (breast, colon and endometrial), osteoarthritis and fractures and increased risk of breathing difficulties.² Obesity is associated with social stigma among children. Overweight children are teased at school which reduces their self confidence. It is observed that their quality of life is improved with loss of weight.³

In the light of the above, a study was conducted in an urban school to assess the prevalence of overweight and obesity

among school children and to compare the percentage of overweight and obesity using Agarwal, Asia Pacific and IOTF classification.

MATERIALS AND METHODS

A cross sectional study was conducted on school children in an urban school in Bangalore, Karnataka, from October to December 2013. Approval was obtained from the College Ethical Committee and from the Principal of the school. Informed consent was taken from each of the participants before the study and the students were explained about the purpose of the study.

A total of 3851 children from Nursery to 12th standard ranging in the age group of 3 to 17 years participated in the study. All the children who were present during the period of study were included.

Clinical examination was conducted on all the children by a group of trained interns. Anthropometric measurements were recorded. Weight was recorded without shoes and heavy clothing using a weighing scale with an error to the nearest ± 500 gm. The weighing scale was regularly checked with known standard weights. A stadiometer was used for measuring the height (without shoes), with an error to the nearest ± 0.5 cm. Assessment of overweight and obesity was based on Agarwal classification and this was compared with Asia Pacific, and IOTF classifications. Data was analyzed based on percentages and proportions and associations were determined between variables and overweight and obesity using Chi square test.

RESULTS

A total of 3851 school children in the age group of 3-17 years participated in this study. There were 2019 (52.4%) males and 1832 (47.6%) females. Among these children 1158 (30.1%) were studying in kindergarten, 1244 (32.3%) in primary, 1292 (33.5%) in secondary and 157 (4.1%) in pre-university.

According to Agarwal classification 4.4% of children were underweight, 54.8% were normal, 27.1% were overweight and 13.7% were obese. According to IOTF and Asia Pacific classification overweight was 20.7% and 5.9% respectively whereas obesity was 6.8% and 5.2% respectively as shown in Table 1.

Overweight percentage was highest among primary (40.5%) school children followed by secondary (33.3%) and obesity was maximum in primary (39.5%) followed by kindergarten (35%) and this was statistically significant as shown in Table 2.

As shown in Table 3 the percentage of overweight and obesity was higher among males (54.4% and 65.8%) as compared to females (45.6% and 34.2%) and this finding was statistically significant ($P < 0.01$).

DISCUSSION

The study done by Bharati et al showed that overweight was 3.1% and obesity 1.2% and in another study by Prasanna et al 10% of school children were overweight and 5% obese.^{4,5} Our study revealed that 27.1% were overweight and 13.7% were obese. It has been observed that heart diseases appear

Table 1: Overweight and Obesity according to different classifications

Categories	Classification		
	Agarwal	IOTF	Asia Pacific
Overweight	27.1%	20.7%	5.9%
Obese	13.7%	6.8%	5.2%

Table 2: BMI according to various sections of school children

Sections	Agarwal classification							
	Underweight		Normal		Overweight		Obese	
	No.	%	No.	%	No.	%	No.	%
Kindergarten	108	63.2	630	29.9	236	22.6	184	35.0
Primary	30	17.5	583	27.6	423	40.5	208	39.5
Secondary	28	16.4	800	37.9	348	33.3	116	22.1
Pre-University	5	2.9	96	4.6	38	3.6	18	3.4
Total	171	100	2109	100	1045	100	526	100

P value=0.00

Table 3: Relationship of BMI with gender

Gender	Agarwal classification							
	Underweight		Normal		Overweight		Obese	
	No.	%	No.	%	No.	%	No.	%
Male	118	69.0	987	46.8	568	54.4	346	65.8
Female	53	31	1122	53.2	477	45.6	180	34.2
Total	171	100	2109	100	1045	100	526	100

P value=0.00

5-10 years earlier in Indians as compared to populations worldwide.⁶ The present study reveals that Agarwal classification helps in early detection of overweight and obesity as compared to IOTF or Asia Pacific classification. Using Agarwal classification will enable early detection and management of overweight and obesity among Indian school children, so that long term complications of non-communicable diseases can be averted.

In the present study prevalence of overweight and obesity among kindergarten children according to Agarwal classification was 22.6% and 35% respectively. In a study done in South India the prevalence of overweight and obesity was 4.5% and 1.4% respectively.⁷ In a Chinese study this prevalence was 10.7% and 4.2%.⁸ The low percentage in these studies was probably because IOTF classification was used.

The study by Preetam M et al revealed that 4.98% of primary school children were overweight and 2.24% were obese using CDC classification.⁹ However, in our study it was found that 40.5% were overweight and 39.5% obese.

Prevalence of overweight among secondary and pre-university children was 36.9% in our study as compared

to the study done in Hyderabad where it was only 7.2% and in the study done in South Karnataka it was 9.9%.^{10,11} These studies had also used IOTF classification. Studies done by Kapil U et al and Shashidharan K et al showed that 7.4% and 4.8% of secondary school children were obese whereas in our study it was 25.5%.^{11,12}

Several studies done in India and Vietnam have shown that prevalence of overweight and obesity was more among boys than girls which corroborates with the present study.¹³⁻¹⁵ Where 28.13% of boys were overweight and 17.13%. However, the study by Shruti S showed that it was more among girls.¹⁶

The risks are higher that obese children also tend to continue as obese adults. Overweight and obese children may not get back to healthy weight without intervention and therefore may develop weight related health problems in adulthood. Therefore early detection and management is essential to prevent non communicable diseases and a host of other diseases.¹⁷

CONCLUSION

This study highlighted that 40.8% of school children were overweight and obese.

Agarwal classification detected overweight and obesity earlier as compared to IOTF and Asia Pacific classification. Primary prevention is the need of the hour in schools to educate the children on healthy lifestyle with regard to diet and physical activity to prevent overweight and obesity and thereby prevent the risk of a web of non communicable diseases.

Schools play a critical role in supporting healthy behaviors in the form of healthy eating and promoting physical activity in the form of games and sports.

At the family level parents need to be role models by living a healthy lifestyle.

ACKNOWLEDGEMENT

We are thankful to the management of Vydehi Institute of Medical Sciences and Research Centre for the facilities

provided for this project. We are grateful to the Principal of the school and all the school children who participated in the study.

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How to cite this article: Chaitali G, Mangala S, Hemalatha AJ, Pradeep C, Subrahmanyam G. Childhood and Adolescent Overweight and Obesity - A Public Health Challenge in India. *Int J Sci Stud* 2014;2(4):17-19.

Source of Support: Nil, **Conflict of Interest:** None declared.