Prevalence of childhood obesity and its determinants among rural children of B G Nagara

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Abstract

Introduction: India is witnessing under nutrition as one of the major public health problem, however there exists a significant magnitude of overweight and obesity among children and adolescent. Childhood obesity has emerged as one of the global health problems as a result of high intake of calorie rich foods and low level of physical activity. Most of the studies are conducted at metropolitan cities with limited information on prevalence of childhood obesity in rural area.

Aim and Objective: To determine the prevalence of obesity among school children in the age group of 6-12 years in rural Mandya.

Materials and Methods: A cross sectional survey was conducted among 1328 students in the age group 6-12 years. The body mass index (BMI) for age charts were used to assess weight in relation to height as recommended by Centers for Disease Control and Prevention. The 85th-95th percentile and $\geq$ 95th percentile specific for age and sex were used to define overweight and obesity respectively in children.

Results and Conclusion: Data from 1288 students were included for analysis with the overall response rate of 96.98%. Out of 1288 participants 777 (60.3%) were boys, 511 (39.7%) were girls. The prevalence of underweight, overweight and obesity was 54.9% (n=707), 1.8% (n=24) and about 1% (n=12) respectively. The prevalence was more towards pubertal age (10-12 years) than in early childhood. Childhood obesity was not associated with parental obesity or junk food consumption in children. To conclude, even though prevalence of childhood overweight /obesity was about 2.8%, it necessitates immediate action as it is accompanied by many non-communicable diseases such as diabetes, hypertension and cardiovascular disease.

Keywords: Prevalence, Childhood obesity, Overweight, School children, BMI, Junk food.

Introduction

Even though, India is witnessing under nutrition as one of the major public health problem, there exists a significant magnitude of overweight and obesity among children and adolescent. Childhood obesity has emerged as one of the global health problems[1] as a result of high intake of calorie rich foods, low level of physical activity[2] and due to effects of genetic and environmental factors. The dramatic rise in the prevalence[3,4] of over nutrition resulting in overweight and obesity among children have been accompanied by alarming increase in non-communicable diseases such as diabetes mellitus[5,6] hypertension[7] and cardiovascular disease.[8]

Most of the reports addressing childhood obesity are from studies conducted at metropolitan cities with limited information on prevalence of childhood obesity in rural areas. Hence the present study was designed to determine the prevalence of overweight and obesity among school children of rural area.

Materials and Methods

A cross sectional survey in a rural based school was carried out among school children aged 6 to 12 years. A total of 1328 students were included in the study. Students absent on the day of visit, suffering from chronic illness, whose exact date of birth and not willing to participate were excluded. The school authority was informed well in advance and provided all the information about the study. Consent was obtained after explaining the purpose of the study in the local language. The study was conducted in accordance to the principles of Institutional ethical committee and ethical clearance was obtained.

The questionnaire was framed in simple language so that the participants could answer them easily. It elicited the information regarding demographic details, parent's education level, number of siblings, diet pattern, physical activity, television viewing time, use of electronic gadgets, consumption of junk foods and family history of non-communicable disease such as obesity, diabetes and hypertension.

A digital weighing scale and stadiometer were used to measure weight (nearest to 0.1 kg) and height (nearest to 0.5cm) respectively with bare foot, arms hanging by the sides, heels together for each study participants. The body mass index (BMI) for age charts were used to assess weight in relation to height as recommended by Centers for Disease Control and Prevention. The 85th-95th percentile and $\geq$ 95th percentile specific for age and sex was used to define overweight and obesity.[9]

Statistical Analysis

The data was coded and managed in excel spread sheet. All the entries were double checked for any possible transcription error. The variables were expressed as frequency, percentage, and percentile. The study participants were categorized into normal, overweight and obesity depending on the BMI percentile cutoff values.[9] Chi square test was employed to check the association between categorical variables. P value less than 0.05 was considered statistically significant.

Results and Discussion

A total of 1328 students were invited to participate in the study and data from 1288 students were included for analysis. The overall response rate was 96.98% (n=1288). The 40 non-responders included children absent on the day of visit, not willing to participate, chronic illness and whose exact date of birth was not available. Out of 1288 participants 60.3% (n=777) were boys, 39.7% (n=511) were girls, parents of 72 (5.6%) children were illiterate and 1019 (79.1%) were graduates. Majority of the students (61.1%) belonged to nuclear type of family. Among 1288 children, 84.9% were on mixed type of diet, 8.6% and 17.84% of students consumed daily carbonate drinks and bakery/ fast foods respectively.

The prevalence of underweight, overweight and obesity was 54.9% (n=707), 1.8% (n=24) and about 1% (n=12) respectively. 61.1% of obese children were in the pubertal age group (10-12). More than half of obese children's parents (64%) were obese and 94% of obese children were indulged in consumption of junk foods, but neither parental obesity nor consumption of junk foods was associated with childhood obesity.

Developing countries like India are still addressing undernutrition, however in recent years' childhood obesity has emerged as a pandemic problem. There exists a link between childhood obesity and many non-communicable diseases such as diabetes, cardiovascular diseases, hypertension, etc. In the present cross sectional survey conducted among school children of rural area showed 1.8% and 1% prevalence of overweight and obesity respectively. Various studies conducted in different parts of India showed varied prevalence of overweight and obesity among school children. Preetham Mahajan et al,[10] Premanath M et al[11] and Sen Suchithra et al[12] reported 2.12%, 3.4% and 13% prevalence of obesity respectively. A study by Babitha Rexlin G et al[13] reported a prevalence of 4.3% in rural school children and 12% among school children of urban area concluding that place of residence and socioeconomic status has strong association with obesity. Easy availability of junk foods and ready to use premixes at markets and home of children belonging to urban area and high socio-economic status may be the reason for increased prevalence.[12] In this study, prevalence of obesity was higher in children belonging to 10-12 age group when compared to 6-9 years (x^2 =24.38, p value is <0.00001) and was statistically significant. This high prevalence could be due to the hormonal effects which are seen during pubertal age. The study also documented higher prevalence of obesity in males as compared to females, but was not statistically significant. These results are in accordance to other results reported from Punjab[14] and Delhi.[15] However, study by Babitha Rexlin G et al[13] compared obesity status between gender and concluded that gender has no relation with obesity. Analysis of association between childhood obesity and obesity in parents revealed no significant influence. This result is in accordance with results reported by Babitha Rexlin G et al.[13] Childhood obesity is a stronger predictor of obesity during adult life than parental obesity.

Even though, about 95% of obese children in the present study were indulged in consumption of junk foods, obesity was not associated with it. The reason could be due to low frequency of consumption of junk foods in these children and also they are involved in regular physical activity of not less than half an hour every day. Children belonging to high socioeconomic group and urban area are having high prevalence of childhood obesity[13] which highlights the possible influence of life style modifications mainly pertaining to dietary pattern and physical activity.[15]

Limitations

This is cross sectional survey and data except anthropometric measurements are all self-reported responses based on recall.
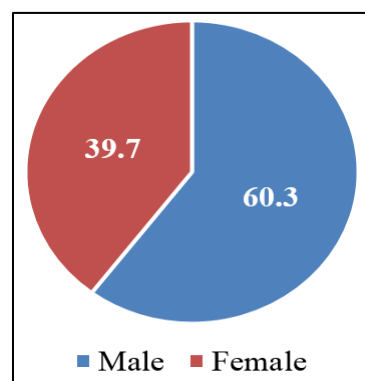
Fig. 1: Gender wise distribution (%) of study participants

Table 1: Prevalence of underweight, overweight and obesity among study participants

BMI Category	Frequency	Percentage
Under-weight	707	54.9
Normal	545	42.3
Overweight	24	1.8
Obesity	12	1.0

Table 2: Age wise prevalence of obesity

Age in years	Obesity N (%)
6	6 (16.67)
7	1 (2.78)
8	3 (8.33)
9	4 (11.11)
10	9 (25)
11	7 (19.44)
12	6 (16.67)
Grand Total	36 (100)

Table 3: Association of age and childhood obesity

Age group (Years)	Non-Obese N (%)	Obese N (%)	Total N (%)	P-value
6-9	144 (91.1)	14 (8.9)	158 (100)	0.0001[*]
10-12	1108 (98.1)	22 (1.9)	1130 (100)	
Total	1252	36	1288	

*HS - Highly Significant

Table 4: Association of gender and childhood obesity

Gender	Non-Obese N(%)	Obese N(%)	Total N(%)	P-value
Male	755 (97.1)	22 (2.9)	777 (100)	0.922[**]
Female	497 (97.2)	14 (2.8)	511 (100)	
Total	1252	36	1288	

** NS - Not significant

Table 5: Association of Parental obesity and obesity in their children

Parental Obesity	Non-Obese child N(%)	Obese child N(%)	Total N(%)	Chi square	P-value
Present	593 (96.3)	23 (3.7)	616 (100)	3.82	0.056[**]
Not present	659 (98.1)	13 (1.9)	672 (100)		
Total	1252	36	1288		

*NS - Not significant

Table 6: Association of consuming junk food and obesity in children

Consumption of Junk food	Non-Obese child N(%)	Obese child N(%)	Total N(%)	Chi square	P-value
Present	1149 (97.1)	34 (2.9)	1183 (100)	0.33	0.56[**]
Not present	103 (98.1)	2 (1.9)	105 (100)		
Total	1252	36	1288		

**NS - Not significant

Conclusion

The prevalence of underweight was high (59.4%) and childhood obesity was low (1%) among study participants. This prevalence rate of childhood obesity is not at an alarming rates as seen in other reports from southern parts of India. However, it necessitates appropriate action as childhood obesity is accompanied by many non-communicable diseases such as diabetes, hypertension and cardiovascular disease.

Acknowledgement

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