SHORT COMMUNICATION

Mysore Childhood Obesity Study

M PREMANATH*, H BASAVANAGOWDAPPA*, MA SHEKAR†, SB VIKRAM AND D NARAYANAPPA**

*From the Departments of Pediatrics, and *Medicine, JSS Medical College, †Department of Medicine, Mysore Medical College and Research Institute; and ** Vikram Hospital, Mysore, India.*

Correspondence to:
Prof D Narayanappa, Head, Pediatrics, 534, Sinchana, 15th Main, 5th Cross , Saraswathipuram, Mysore 570009, India.
sinchabhi@yahoo.com
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We conducted this study to document the prevalence of obesity, overweight and underweight in the school children aged 5 to 16 years from Mysore. 5 Principal Investigators and 13 Co-Investigators trained the teachers of 139 schools (Private -111, Govt-28) to record the vital statistics of the children studying in their schools. A total of 43152 school children (23527 boys and 19625 girls) were surveyed. 36354 children were from private schools and 6798 children were from Government (Govt) schools. Indian Academy of Pediatrics growth charts were used as reference. The prevalence of obesity, overweight and underweight were 3.4%, 8.5% and 17.2%, respectively. The prevalence of obesity was maximum in the age group of 5-7 years and in those from private schools.

Key words: *Children, India, Obesity, Overweight, Underweight.*

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Obesity has become a worldwide phenomenon cutting across regional and economic barriers. Childhood obesity has emerged as an epidemic not only in the developed countries(1,2) but also in the developing countries(3) that are in rapid epidemiological transition, and India is no exception. School based data in India demonstrates prevalence of obesity in the range of 5.6% to 24% among children and adolescents(4). We attempted to document the prevalence of obesity, overweight, and also underweight in a large sample of schoolchildren from the Mysore city.

METHODS

This school based cross sectional study was conducted in Mysore city between November 2005 and March 2006 on 43152 children between 5 to 16 years. A preliminary survey done in June 2005 revealed that there were around 300 schools (primary and secondary) in the city. We selected 139 schools (69 in North and 70 in South, Mysore) by simple random sampling using shuffled sealed envelope method. Of these, 111 were private schools (56 in North and 55 in South) and 28 were Government-run schools (13 in North and 15 in South). A proforma to collect appropriate data was devised and pretested. Teachers were trained to take anthropometric measurements by 5 principal investigators and 13 co-investigators. Their techniques were corrected and retested until desired level of intra-observer and inter-observer variability reached. A written informed consent was obtained from the head of the institution and parents before training teachers and data collection. The ethical committee clearance was obtained.

Nonstretchable measuring tapes and new spring balance weighing machines (calibrated to 0.5kg accuracy) were used. The anthropometric measurements were taken by the teachers under supervision of co-investigators. Height (to the nearest mm) and weight (to the nearest 100th g) were measured using standard techniques. The age of the children were obtained from school records. Standard charts for BMI for age and sex were used as reference standards(5). Children with body mass index (BMI)

above 95th percentile were considered as obese, those between 85th and 95th percentile as overweight, and those with BMI below the 5th percentile were considered as underweight(5). The results were analyzed statistically using the *t*-test, chi-square test and proportion tests. *P* value <0.05 was considered as significant.

RESULTS

A total of 43152 children in the age group of 5-16 years participated in this study. There were 23527 boys (54.5%) and 19625 girls (45.5%). 36354 (84.2%) children were from private schools and 6798 (15.8%) were from Government schools.

The prevalence of obesity, overweight and underweight is shown in ***Table* I**. Age-wise prevalence of obesity and overweight is depicted in ***Table* II**. Children from private schools were significantly overweight when compared to those from government schools, (9.1% *vs* 5.9%; *P*<0.05), while prevalence of obesity was not different between the two groups (3.6 % vs 2.1%). Prevalence of underweight was more in children from government school (24%) as compared to (15.9%) children from private schools. No consistent pattern was observed between North and South Mysore.

Prevalence of obesity was higher in boys in the age group of 5-7 years as compared to girls (*P*<0.05). Our results also showed decreasing prevalence of obesity in boys and increasing prevalence in girls between 5-7 yr age. The prevalence in boys was 17.1% at 5 years decreasing to 10.6% and 6.4 % at 6 and 7 years, respectively. In female children, the prevalence of obesity was 5.7%, 6.7% and 7.1% at 5th, 6th & 7th year, respectively.

TABLE I PREVALENCE OF OBESITY, OVERWEIGHT AND UNDERWEIGHT

Grade	Boys (*N*=23527)	Girls (*N*=19625)	Total (*N*=43152)
Obesity	862 (3.7)	586 (3.0)	1448 (3.4)
Overweight	2082 (8.8)	1600 (8.2)	3682 (8.5)
Underweight	4029 (17.1)	3171 (16.2)	7424 (17.2)

Figures in parenthesis indicate percentages.

TABLE II AGE-WISE PREVALENCE OF OBESITY AND OVERWEIGHT IN MYSORE CHILDREN

Age (yr)	Total Children	Obesity *n* (%)	Overweight *n* (%)
5	744	90 (12.0)	43 (5.7)
6	3664	320 (8.7)	524 (14.3)
7	3730	252 (6.7)	458 (12.2)
8	4135	146 (3.5)	467 (11.2)
9	4380	127 (2.9)	412 (9.4)
10	4184	97 (2.3)	314 (7.5)
11	4676	88 (1.9)	361 (7.7)
12	3943	59 (1.5)	282 (7.1)
13	4203	77 (1.8)	260 (6.1)
14	4455	105 (2.3)	261 (5.8)
15	3599	65 (1.8)	225 (6.2)
16	1435	22 (1.5)	75 (5.2)

DISCUSSION

Evaluation of obesity in children is important as it provides an opportunity to identify the problem and prevent disease progression in to adulthood(4,6). Most of the earlier studies(7-13) had a small sample size including only adolescents from affluent schools and hence the prevalence of obesity and overweight is expectedly high compared to our study, which has a large sample size of children, includes wider age groups and children from both private and government schools.

Kapil, *et al.*(10) observed that the overall prevalence of obesity was higher in male than female children. In our study, there was no significant difference in overall prevalence between male and female children but in the age group of 5-7 years, prevalence of obesity was higher in boys compared to girls. Another study(9) has shown increase in overweight and obesity as the age advanced from 6-9 years. Our study showed that prevalence of both overweight and obesity decreased as the age advanced from 5 to 16 years. The prevalence observed in our study is far less than reported earlier(8-10,14). The major limitation of this study is its cross sectional design. It is not possible to know how many of these children will continue to have high BMI for age in future.

Our study has shown that the obesity and overweight is prevalent in childhood and early

WHAT THIS STUDY ADDS ?

- Prevalence of obesity and overweight in children of Mysore city was 3.4% and 8.5%, respectively; the prevalence was maximum between 5-7 year of age.

adolescence, but not at an alarming rates as seen in other reports from India. The study has also shown that undernutrition is prevalent at a higher magnitude. Since this study has a large sample size and has compared the difference between private and government schools, and also has wider age range, the results may probably represent a true picture of childhood obesity and overweight in India.

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