

“Correlation between obesity & ABO Blood Group in School going Children in India.”

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Abstract:

Background: We conducted present study to find out prevalence of malnutrition in school going children and to see if there is any correlation between overweight and obesity with ABO blood group.

Methods and Materials: Total 143 school children (91 boys and 52 girls) in age group of 11-14 years from two school of Andhra Pradesh were enrolled in study. Height and weight were recorded using standard guidelines, BMI for Age in Percentile was calculated using software, BMI percentile <5 was taken as underweight, between 5 -85 percentile was taken as normal weight, between 85-95 percentile was taken as overweight and >95 percentile was taken as Obese. Blood group was estimated by slide agglutination method.

Results : overweight and obesity was found to be more prevalent in girls than boys, in total 16% school children were overweight and obese (19 % girls and 14 % boys) the same trend was found in obesity 5% of total children were obese (BMI percentile>95) girls were having a prevalence of 6% while boys had 4%. Underweight/undernourishment was more prevalent (41%) than obesity and overweight. 48% boys and 27% girls were undernourished. In overweight and obese children 13 were having O blood group, 7 were with B blood group and 3 were having A blood group.

Conclusion: prevalence of overweight and obesity is high in school children with more prevalence in girls than in boys. Obesity and overweight was found more prevalent in O blood group children.

Key Words : Overweight, Obesity, School Children, ABO blood groups.

Introduction: Traditionally, a deficiency in macro- and micro nutrients has been the major problem among children in low-income countries. Childhood obesity is recently becoming one of major issue in many developing countries. There has been a rapid rise in the number of overweight and obese children despite a persistently high burden of under nutrition.¹ Most researchers agree that obesity is important modulator of metabolic syndrome which is a cluster of cardiovascular risk factors associated with insulin resistance.² Playing indoor games & computer games, watching TV and sedentary life style leads to energy imbalance between energy intake and work output³. In our recent study we have shown correlation

between BMI and Body fat percentage with pulmonary functions.⁴

Some researchers have proved the relation between the ABO blood groups and pancreatic cancer⁵ and similarly for duodenal ulcer, peptic ulcer. In this study we tried to find out prevalence of childhood malnutrition in 143 children of two schools from Andhra Pradesh in children between 11 to 14 years of age and made an attempt to find if there is any correlation between ABO blood groups and obesity further more we tried to find out.

Methods: This study was done in two schools of Andhra Pradesh. Total 143 students were enrolled out of which 91 were boys and 52 were girls. Research protocol was ethically approved by Institutional ethical committee.

Experimental protocol: Study protocol was explained to the principal of institution and letter of permission for conduction of this study was obtained. The study design was communicated to students and their parents, an given informed consent form was given to 250 students in the age group of 11 & 14 years for their parents consent. 143 students came with parent's consent were

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enrolled in study. All the participants underwent a detailed health checkup and selected on the basis of inclusion and exclusion criteria. Students with cardiovascular and respiratory, neurological or gastrointestinal diseases or receiving active treatment for any disease, having history of any hospitalization in last six months, hypertension and diabetes, congenital anomalies were excluded from the study. Students between age group of 11 to 14 without any obvious disease were included. Height and weight of students was recorded and ABO blood group estimation was done in selected students.

The age was recorded depending on date of birth as registered in school record. Height was measured by wall mounted fiber glass tape with the least count of 0.1 CM. The tape was mounted accurately on the wall perpendicular to the floor. Care was taken that the floor was leveled properly and the wall was also even weight was recorded using weighing machine (KRUPS manufactured by Dr. Beliram & Sons) before meal with light clothes and without footwear to nearest 0.1kg.⁶ instruments were standardized regularly. To avoid inter observer bias height and weight was measured by single investigator.

BMI percentile was calculated using software from internet⁷. BMI percentile >95 was taken as obese, BMI percentile >85 and <95 was taken as overweight, BMI percentile <5 was taken as underweight^{2,3,8}.

Total 143 blood samples of the students were collected by finger prick method, and blood typing done by slide method using Anti sera- A and Anti sera- B⁹ marketed by Span Diagnostics Ltd. (Spanclove) out of them blood groups 23 of overweight and obese children were taken for analysis.⁹

Results:

Out of 143 students participated in the study, 91 were boys and 52 were girls. As a shown in table/fig1, 41 % participants were underweight and 16% were overweight or obese and 5% were obese. 48 per cent boys were underweight and 14% were overweight and 4% were obese. In girls, 21 percent were underweight and 19% were overweight and 6% were obese. The incidence of boys being

underweight is more than girls, while girls were more overweight or obese than boys (graph no 2)

Blood group estimation was done for overweight and obese children only. Thirteen had blood group O, three were having the group A and seven were group B, nobody had blood group AB.

Discussion:

In present study we found that prevalence of overweight and obesity was 16%, when data for boys and girls was separately analyzed we found overweight and obesity was more prevalent in girls (19%) than boys (14%). Obesity was having a total prevalence of 5%, prevalence of obesity was also more in girls (6%) than boys (4%). We found more prevalence of obesity than Laxmaiah A *et al*¹⁰ who got prevalence of overweight as 6% and that for obesity was 1.6% which is alarmingly high. De Onis M and Blössner M³ reported an increasing trend of obesity in developing countries, according to the survey conducted in year 1992-93 prevalence of obesity was 1.6%. This was the done about 18 years back. India have changed since then dramatically; with increasing industrialization, improved standard of living and approach to fast food etc. so obesity and overweight are bound to increase with time this advocates urgent need for a study with a larger sample size and on a wide geographical area so that we can get a timely picture.

On other side the prevalence of underweight was also very high (41%) in our study group. 48% boys and 27% girls were underweight this explains the bimodal presentation of malnourishment in our study group. Our results are in unison with the results of De Onis M and Blössner M³ where they cautioned not only about obesity but also for underweight or undernourishment. Our results also match with results of Joshi HS *et al* who found more prevalence of underweight in boys than in girls.¹¹

The other aim of this study was to find out if there is any correlation between ABO blood group system and overweight /obesity. There are many studies which found out correlation between ABO blood group and Smoking¹², pancreatic cancer⁵. Sharma G *et al* found more prevalence of lung and oral cancer in males with blood group B, while prevalence of cervical cancer was also more in females with Blood group B. In our study we found that out of 23 students analyzed 13 were having O blood group, 7 were having blood group

Summary of Children's BMI-for-Age			
	Boys	Girls	Total
Number of children assessed:	91	52	143
Underweight (< 5th %ile)	48%	27%	41%
Normal BMI (5th - 85th %ile)	37%	54%	43%
Overweight or obese (\geq 85th %ile)*	14%	19%	16%
Obese (\geq 95th %ile)	4%	6%	5%

*Terminology based on: Barlow SE and the Expert Committee. Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: summary report. Pediatrics. 2007;120 (suppl 4):s164-92.

Figure 1 : Showing distribution of children in four categories sand gender wise distribution in each category.

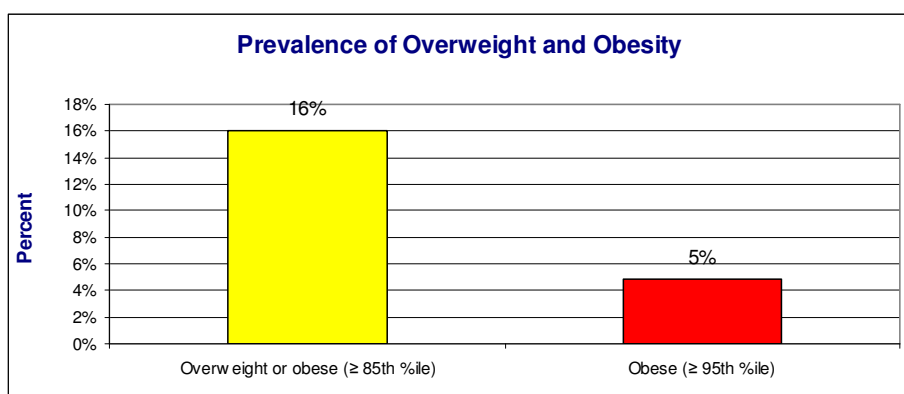


Figure 2 : Prevalence of overweight and obesity.

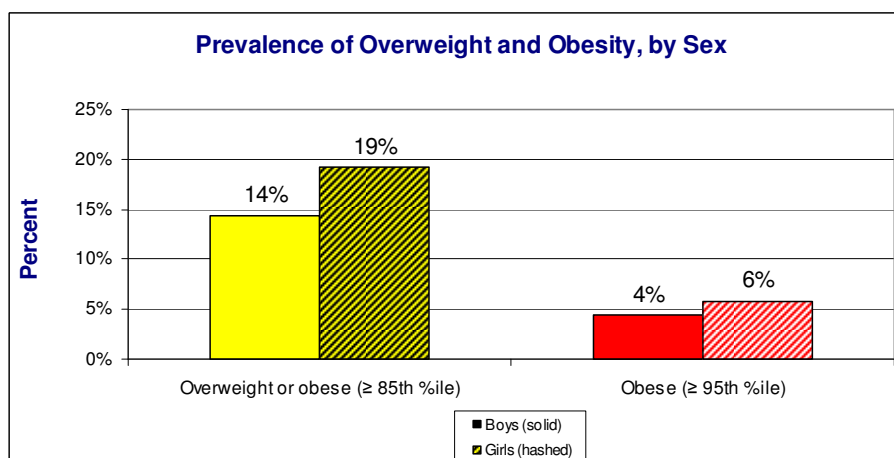


Table 3: Showing prevalence of obesity and overweight in boys and girls.

Blood group	No of overweight and obese children
Blood group-A	3
Blood group-B	7
Blood group-AB	NIL
Blood group-O	13

Table 4: Blood groups of overweight and obese children

and only 3 were having blood group A, nobody had AB blood group. There are no studies done on this as of our knowledge. This was the normal distribution of blood group in Indian population i.e. about 45% Indians will have O blood group. This might be the reason for high prevalence of blood group O in our study population but this study was carried out in small study group a study on larger sample size is advocated .

Rapidly and dangerously increasing trend of overweight and obesity are worrisome and need to be studied immediately and effectively so that we can stop this in time. First we have to limit undernourishment or underweight and on the other hand we have to decrease the uncontrolled weight gain which leads to obesity. we agree with the suggestions made by De Onis M and Blössner M ³ that there is great need of information on dietary pattern and prevalence of weight gain in school going children because these overweight and obese children will become obese adults.

Most of the children will take the dietary and exercise habits from their parents, so routine parents counseling can be conducted by pediatricians, dieticians and school teachers. Parents can be taught about healthy diet and healthy weight, importance of physical activity and outdoor sports. Watching television for longer duration, playing video games or computer games, using internet for longer duration should be strongly discouraged as these are the major causes of childhood obesity^{3,10,12} .

In the schools frequent health checkups should be carried out to diagnose obesity and overweight. Fast-food and snacks should be strongly discouraged. Physical education teachers in schools can be trained to diagnose overweight and

obesity moreover a rigorous exercise schedule for 30 min. at least 3 days a week should be carried out in schools.^{7,13}

Further research is urgently necessary; which should include children from different locality, socioeconomic group, race, and religion and food habits. As India is too diversified a multicentre study in this regard is strongly recommended. In future we plan to do such a study which will include all the above recommendations.

Limitations - this study was a pilot project by an undergraduate Second MBBS student so it is having less sample size so we cannot say anything about the prevalence in a large community and state as well. A bigger sample size in relation to the present prevalence will give the exact problem statement. Same thing is true for second part of study about prevalence of ABO blood group in overweight and obesity.

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