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PREVALENCE OF OVERWEIGHT AMONG SCHOOL GOING CHILDREN: AN EMERGING HEALTH CRISIS?

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ABSTRACT Obesity is a global epidemic with more than one billion overweight adults. Obesity is no longer a disease of adults. The problem of obesity and overweight among children and adolescents are rising gradually. This study was planned to study the prevalence of overweight and obesity among school going children attending pediatric Out Patient Department of a tertiary health care facility of Eastern India. A total of 601 study subjects participated in the study. Anthropometric measurements were taken using World Health Organization (WHO) guidelines. Body Mass Index (BMI) was calculated using standard equation: BMI=weight (kg) / height^2 (meter). BMI was plotted against gender specific WHO growth chart for 5years-19years. Percentiles expressed in Z scores determined the cutoff points for overweight and obesity at 85th and 98th percentiles, or +1 SD and +2 SD, respectively. Data was analyzed using The Statistical Package for Social Sciences for windows (SPSS, version 20.0). Chi-square test was used to show association between categorical variables. All statistical tests was 2-tailed and a p-value of <0.05 was considered significant. Prevalence of overweight and obesity was found to be 14.0% and 7.3% respectively. Younger age, female gender, urban residence and private school enrollment was found to be significant risk factors for overweight and obesity among school going children. In conclusion, there is high prevalence of childhood overweight and obesity among school going children which calls for an urgent intervention and inter-sectoral coordination between different stakeholders and policy makers.

KEYWORDS : Childhood Obesity, Adolescent Obesity, Childhood Overweight, Childhood Overweight, School children

INTRODUCTION:

Globally, there are about 1.2 billion adolescents (10-19 years) and this number is expected to rise through 2050[1]. While adolescents make up to about 16.0%[2] of the global population, more than 50.0% of them live in Asia[3]. Annually about 1.2 million adolescents dies worldwide. Majority of adolescent health issues are either preventable or treatable but adolescents face multiple barriers in accessing health care[4]. The world is going through epidemiological transition due to change in lifestyle and demographic composition. Now, more people die from non communicable diseases (NCDs) than communicable diseases[5]. Obesity can be seen as the first step towards developing a range of NCDs like hypertension, metabolic syndrome, type 2 diabetes mellitus, dyslipidaemia, cardiovascular diseases, musculoskeletal disorders, obstructive sleep apnea syndrome, some types of cancer and in some cases it may cause increased mortality[6]. Obesity is a global epidemic with more than one billion overweight adults[7]. Obesity is no longer a disease of adults. The problem of obesity and overweight among children and adolescents are rising gradually[7]. As per International Obesity Task Force (IOTF), globally about 155 million school age children are overweight and about 30-45 million of them are clinically obese. Global prevalence of overweight and obesity was about 10.0% and 2-3% respectively[8]. In India, the prevalence of overweight and obesity among adolescents ranges from 2.2%-25.8.0% and 0.73%-14.6% respectively[7,9]. India is facing the dual challenge of under nutrition and increasing prevalence of adolescent obesity among both rural and urban residents. Overweight and obesity during adolescent may lead to increase in morbidity and mortality in later life[10]. Timely and simple intervention like adopting healthy eating patterns and increasing physical activities may be more effective if started early in life[7]. Increasing prevalence of overweight and obesity among children and adolescent should be seen as matter of active interventions from all stakeholders (researchers, policy makers at national and local levels, parents and school authorities). This study was planned to study the prevalence of overweight and obesity among school going children attending pediatric Out Patient Department of a tertiary health care facility of Eastern India.

MATERIALS & METHODS:

An Institution based, Observational; Cross-Sectional study was conducted among school going children attending pediatric OPD at IQ City Medical College & Multi specialty Hospital from June-December 2019. A total of 601 study subjects participated in the study. Study was ethically approved by Institutional Ethics Committee, IQ City Medical College.

School going children attending pediatric OPD whose legal guardian consented to participate in study was included in study. Children with any severe disease, endocrinal disorders and with acute medical emergencies were excluded from study. Sample size was calculated as per standard World Health Organization (WHO) guideline[11] using $4PD/d^2$. Considering the prevalence (P) of overweight among school going children as 15.5%[12], Q= (1-P), absolute precision of 5 with 95% confidence interval, 80.0% power of the study and 10.0% non-response rate minimum sample size came to be 601. Systematic random sampling was used to select the study participants. The Average OPD attendance of pediatric OPD of the IQ City Medical College was 600. The estimated total OPD attendance for the study period was 4200. Sample interval of 7 was obtained by dividing estimated OPD attendance with sample size. Every 7th child was included in the study till desired sample size of 601 study participants was reached. A predesigned, pretested semi structured schedule was used to collect socio demographic data. Anthropometric measurements were taken using WHO guidelines[13]. Body Mass Index (BMI) was calculated using standard equation: BMI=weight (kg) / height^2 (meter). BMI was plotted against gender specific WHO growth chart for 5years-19years. Percentiles expressed in Z scores determined the cutoff points for overweight and obesity at 85th and 98th percentiles, or +1 SD and +2 SD, respectively[14].

- **STATISTICAL ANALYSIS:**

Data were codified and analyzed using The Statistical Package for Social Sciences for windows (SPSS, version 20.0). Frequency of overweight, obesity and other clinic-social variables were calculated. Simple bar diagrams were used to show frequency of overweight and obesity. Data were converted in categorical variables and Chi-square

test was used to show association between categorical variables. All statistical tests was 2-tailed and a p-value of <0.05 was considered significant.

RESULTS:

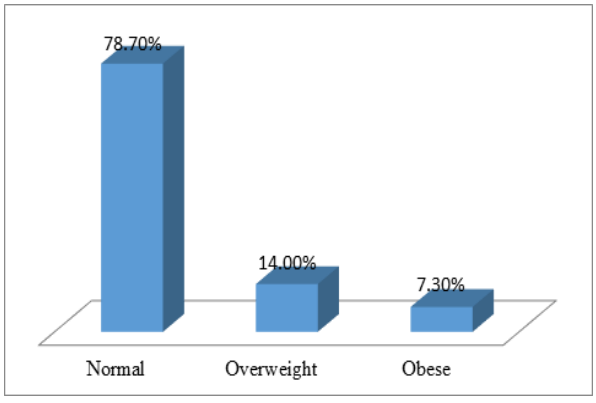
Out of 601 study participants, 334 (55.6%) were female and 276 (44.4%) were male (Table-1). Mean age of the study population was 10.47±2.50 years. 268 (44.6%) of the study participants were in the age group of 13-14 years followed by 219 (36.4%) and 114 (19.0%) were in the age group of 10-12 years and 7-9 years respectively. 359 (59.7%) of them were from urban area and rest were from rural area (Table-1). 361 (60.1%) of study participants were student of private school and 240 (39.9%) were from government school (Table-1).

Table: 1- Clinico-Social Characteristics of Study Population, n=601

Clinico-Social Characteristics	n (%)
Gender	
Male	276 (44.4)
Female	334 (55.6)
Age Group	
6-8 years	114 (19.0)
9-11 years	219 (36.4)
12-14 years	268 (44.6)
Residence	
Urban	359 (59.7)
Rural	242 (40.3)
School	
Private	361 (60.1)
Government	240 (39.9)
BMI	
Normal	473 (78.7)
Overweight (+1SD)	84 (14.0)
Obese (+2SD)	44 (7.3)

473 (78.7%) of the study participants had their BMI in normal range followed by 84 (14.0%) and 44 (7.3%) who were found to be overweight and obese respectively (Figure-1).

Figure-1: Simple bar diagram showing distribution of BMI of Study participants (n=601)



Prevalence of overweight and obesity were less among boys as compared to girls. 17.4% of girls and 9.7% of boys were overweight and 8.0% of girls and 6.4% of boys were obese. Female gender was found to be a significant risk factor for both overweight and obesity (Table-2). Prevalence of overweight was 15.8%, 14.2% and 13.1% in the age group of 6-8 years, 9-11 years and 12-14 years respectively. Prevalence of obesity was found to be 14.0%, 7.8% and 4.1% in the age group of 6-8 years, 9-11years and 12-14 years respectively. A significant decreasing trend in the prevalence of both overweight and obesity was observed with increasing age of the study population (Table-2). 14.8% of urban students and 12.8% of rural students were overweight. High prevalence of both overweight and obesity among urban study participants were found to be statistically significant (Table-2). Study participants from private school were significantly more overweight and obese than their government school counterparts (Table-2).

Table: 2- Chi-Square test Showing association between BMI and socio-demographic characteristics (n=601)

	Body Mass Index			Total (%)	χ^2 (df)	p value
Gender	**Normal (%)**	**Overweight (%)**	**Obese (%)**			
Male	224 (83.9)	26 (9.7)	17 (6.4)	267 (100.0)		
Female	249 (74.6)	58 (17.4)	27 (8.1)	334 (100.0)		8.42 (2) 0.015
Age Group						
6-8 years	80 (7.2)	18 (15.8)	16 (14.0)	114 (100.0)		
9-11 years	171 (78.1)	31 (14.2)	17 (7.8)	219 (100.0)		
12-14 years	222 (82.8)	35 (13.1)	11(4.1)	268 (100.0)		12.94 (4) 0.012
Residence						
Urban	272 (75.8)	53 (14.8)	34 (9.5)	359 (100.0)		
Rural	201 (83.1)	31 (12.8)	10 (4.1)	242 (100.0)		6.99 (2) 0.030
School						
Private	272 (75.3)	56 (15.5)	33 (9.2)	361 (100.0)		
Government	201 (83.7)	28 (11.7)	11 (4.6)	240 (100.0)		6.91 (2) 0.032

DISCUSSION:

A Cross-Sectional study was conducted among school going children attending pediatric OPD of a tertiary health care facility of Eastern India. Data were collected from 601 study participants. Prevalence of obesity and overweight was found to be 7.3% and 14.0% respectively. Slightly higher 15.5% prevalence of overweight was reported by Tharkar S et al[12]. Few other studies reported a lower prevalence of overweight and obesity among school going children. Laxmaiah et al reported 7.2% and 1.3% prevalence of overweight and obesity respectively[15]. 9.9% prevalence of overweight and 4.8% prevalence of obesity were reported by Kotian et al[16]. High prevalence of overweight and obesity in our study may be due to study setting as tertiary level health care facility is bound to get high risk study participants.

Significantly higher prevalence of overweight and obesity among girls were found in our study. A similar finding was reported by Tharkar S et al[12]. However, many other studies reported male predominance of overweight and obesity[16-19].

Younger age group had significantly higher prevalence of overweight as 15.8% of 6-8 years old were overweight followed by 14.2% and 13.1% in the age group of 9-11 years and 12-14 years respectively. Prevalence of obesity was also higher among younger age group. Almost similar significant decrease in the prevalence of overweight and obesity with increasing age till 14 years of age was reported by Whitaker et al.[20], Peckham et al[21]. and Chhatwal J et al[22].

Study participants from rural area had significantly lower prevalence of overweight (12.8% Vs 14.8%) and obesity (4.1% Vs 9.5%) than their urban counterparts. A study from South India reported significantly higher prevalence of overweight and obesity among rural students than their urban counterparts[23]. Tharkar S et al[12] also reported a similar urban predominance of overweight and obesity.

We found that students from private schools were higher prevalence of overweight (15.5% Vs 11.7%) and obesity (9.2% Vs 4.6%) than government school students. A study from Delhi (India) reported high prevalence of overweight and obesity high income group school which is consistent with the findings of this study. High prevalence of Overweight and obesity among private school children may be due to changed dietary patterns and altered physical activity[24].

Limitation of the study includes failure to include more socio-demographic variables and hospital based study. Since this is a hospital based study, findings of this study cannot be generalized.

CONCLUSION:

There is high prevalence of overweight and obesity among school going children. Female gender, younger age, urban residence and private school were found to be significantly associated with higher prevalence of overweight and obesity.

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