Cross sectional study to find out the association of childhood obesity and lifestyle factors among school children in a part of Hyderabad

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<u>Abstract</u>

Background- Over 340 million children and adolescents aged 5-19 years were overweight or obese in 2016[6]. According to ICMR-INDIAB study 2015, prevalence rate of obesity and central obesity are varies from 11.8% to 31.3% and 16.9%–36.3% respectively. Aims and Objectives -associations of lifestyle factors such as screen time, physical activity, and food consumption with childhood obesity in schools. Materials and methods- Study design –cross sectional study. Study population- 1200 high school students. Sampling method-simple random sampling Sample size-N= 4PQ/L2 is considered for calculation as the study is qualitative study. The prevalence of obesity in adolescents in India was taken as 30 %. Observations and results- Prevalence of obesity was 12.42%, In screen time, 89(44.5%) spend more than 3 hours watching television. Significant difference in physical activity (66.2%), non active mode of transport (87.5%), consumption of sugar sweetened beverages (62.1%), Nutritive poor energy dense food (54.3%), healthy snacks (5.4%) and obesity, were found. Conclusion: This study provides useful findings that overweight/obesity in children is on alarming, therefore, more attention should be given to childhood obesity, and needs be focused for obesity prevention in school-aged children by creating awareness about healthy diet and improving life style. Key Word: obesity; Screen time, Physical activity,

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INTRODUCTION

Obesity is a major public health crisis among children and adults. Substantial numbers of literatures have been emerged to show that overweight and obesity are major public health challenges to the developing nations causing morbidities and mortalities. Besides, overweight and obesity are causing the healthcare costs to be substantial^{1,2} The world is undergoing rapid epidemiological and nutritional transition, from stunting, under nutrition, Anemia to obesity, Diabetes, and other nutrition related chronic diseases.³ Obesity is widely recognized as a key risk factor for coronary heart disease, hypertension, diabetes and many other health problems⁴. Increased prevalence of childhood obesity may have adverse morbidity and mortality implications in the adult life of the child.5 Worldwide obesity has nearly tripled since 1975. Most of the world's population live in countries where overweight and obesity kill more people than underweight. Over 340 million children and adolescents aged 5-19 years were overweight or obese in 2016⁶. In India The prevalence of obesity in India varies due to age, gender, geographical environment, socioeconomic status, etc. According to ICMR-INDIAB study 2015, prevalence rate of obesity and central obesity are varies from 11.8% to 31.3% and 16.9%-36.3% respectively. In India, abdominal obesity is one of the

How to cite this article: Srinivas Suudhi. Cross sectional study to find out the association of childhood obesity and lifestyle factors among school children in a part of Hyderabad. *MedPulse International Journal of Pediatrics*. December 2019; 12(3): 60-65. http://medpulse.in/Pediatrics/index.php major risk factors for cardiovascular disease. Obesity is one of the main medical and financial burdens for the government.⁷ Factors related to overweight and obesity of children have been well documented including dietary behaviors, physical activity, screen time, modes of journey to school and sleep duration^{8,9,10}. Children's time spent on physical activity and screen time are now recognized as important factors related to children's weight status and other health outcomes¹¹. The study was aimed to explore the associations of lifestyle factors such as screen time, physical activity, and food consumption with childhood obesity in near schools in Hyderabad.

MATERIALS AND METHODS

The cross-sectional was conducted at 4 High schools were selected which were with in 20 kms from Chavelle Mandal, Rangareddy District, Telangana and all the schools selected are Private schools.

Study population: 1200 High school students studying in 7th, 8th and 9th standard, who were present on the day of data collection and accepted for the participation were included in the study.

Study period: June 2019 to Oct 2019.

Sample size calculation- N= 4PQ/L2 is considered for calculation as the study is qualitative study. The prevalence of obesity in adolescents in India was taken as 30 %⁷. Allowable error considered as 10% and with confidence interval of 95%, the sample size calculated was 1200.

Sampling method

The sampling method used was Simple random sampling method. There were about 10 schools with in 20 kms of the Medical College and Hospital, each having around 300-350 high school students (students studying in $6^{th},7^{th},8^{th},9^{th}$ were taken excluding 10^{th} as the school authorities did not allow them to participate in the study) in their school, as the sample required is 1200, only four schools were included in the study and the four schools to be included in the study were selected by simple random sampling method. Although the total high school students were more than 1200, I restricted my data to only 300 students per school.

Ethical clearance: The study was conducted after obtaining ethical clearance from the Institutional Ethics Committee, Dr Patnam Mahinder Reddy Medical College.

METHODOLOGY

Before conducting the study, information about the number of schools present with in 20 kms radius from the college, and it was found that there were around 10 schools with in 20 kms radius of the college and enquired about average number of students present in each class

and the whole school and found that, each schools is having total students of 300-350, High school students studying in 6th,7th,8th,9th classes respectively. As the sample size required was 1200, 4 High schools were selected by simple random sampling method. Once the schools were selected, Data was collected from each school, on each day after taking informed consent, from the school authorities and students. Before collecting the data, the purpose of the study and importance of giving information was explained to the students and school authorities.

Survey Measures: The data was collected by distributing a pre designed, pretested and semi structured questionnaire which consisted of three parts, the first part having questions on socio demographic data, The second part of the survey questions collected information on, physical activity (including modes of transport to/from school, sports participation), screen time (television watching and computer use), and dietary behaviors (including SSB and snack consumptions). Self-reported weight and height were collected and Body Mass Index was calculated, We had compared the weight status derived from self-reported or measured weight and height according to the WHO Child Growth Standards12 Students were asked to remember and estimate the time spent by the child in a range of activities including both physical activities and screen time. Physical activities included organized games, sports as well as unorganized physical activities. Information on screen time was collected by asking how long their child spent on watching TV, videos or using computer. The responses were classified as '\le 2 hrs./day', '2-3 hrs./day' or '>3 hrs./day' for physical activity or screen time respectively. Children's modes of travel to/from school were recorded as 'active transport' (walking/cycling) and 'inactive transport' (public transport, car or other methods). Information about students' dietary habits and patterns was collected using a set of short questions. Children were asked to write about child's daily consumption of fruits and vegetables, the frequency of consuming fast food, SSB (including soft and sweetened drinks and sports drink) or snacks using food frequency questions (FFQ). Snacks were listed in the questionnaire as 'sweets, meat seafood and eggs, grain, beans, vegetable and fruits, dairy and dairy products, nuts, potatoes, ice-cream'. Information on snacks was categorized into two groups: "Healthy Snacks" (including vegetables and fruits, dairy, nuts), "Energy dense, nutrient poor" (including sweets, ice-cream, chips). The frequencies of snacks were recorded as 'Hardly eat', '1-2 times/wk.', '3-4 times/wk.' and '>5 times/wk'. SSB frequencies were classified into '<2 cps/wk., 2-5 cps/wk., 5-7 cps/wk. and >7 cps/wk'. Filled answered sheets were

collected after 45 minutes. After the answer sheets were collected, the importance of regular physical activity, having healthy snacks and reducing screen time was explained to the students using Power point. The answers

OBSERVATIONS AND RESULTS

were entered in Microsoft excel using coding system and analyzed using percentages and proportions. The results were tabulated and presented by percentages.

Table 1: Distribution of c	hildren according to socio de	emographic factors
Socio Demographic factors	Factor	Number (Percentage)
Gender	Male	630(52.5)
	Female	570(47.5)
Age (yrs)	10-12	AE2/27 7E)
	12-14	455(57.75)
	>14	407(30.91)
Average Age	12.6 years	200(25.55)
	Joint	347 (28.91)
Type of Family	Nuclear	800(66.66)
	Extended	53(4.41)
	Illiterate	88 (7.33)
	Primary	128(10.66)
Fathers Education	Secondary	149(12.41)
	Higher and Intermediate	408(34)
	Graduate	427(35.58)
	Illitrate	423(35.25)
	Primary	234(19.5)
Mothers Education	Secondary	256(21.33)
	Higher and Intermediate	124(10.33)
	Graduate	163(13.58)
	Class-I	200(16.67)
	Class-II	767(63.92)
Socio economic status	Class-III	88(7.33)
	Class-IV	78(6.5)
	Class-V	67(5.59)

Total high school children participated in the study were 1200 and as shown in Table 1, out of the 1200 participants , 630 (52.5%) were males and 570 (47.5%) were females. All the children who participated in the study were from 10-15 years, in that 453(37.75), were between 10-12 years and 467(38.91) were between 12-14 years, and 280(23.33) were more than 14 years. Regarding Parents education, Fathers education, only 7.33 % were illiterate, 835(69.58 %) of the fathers have more than higher secondary education. Regarding mothers education, 423 (35.25%) were illiterate and only 287(33.91%) were having more than high school education. According to Kuppuswamy's classification,¹³ majority of families belong to Class I and Class II socio economic class 200(16.67%) and 767(63.92), respectively.

Iable 2: Nutritional status of Participants							
Nutritional status	Boys	Girls	Total	P value			
NoN Over weight	409(64.9)	373(65.4)	782(65.17)	0.81(>0.05)			
Over weight	126(20)	143(25.1)	269(22.42)	0.03(<0.05)			
Obese	95(15.1)	54((9.5)	149(12.42)	0.0036(<0.05)			
Total	630	570	1200				

As Shown in table 2, out of the total 1200 students, majority that is 782 (65.17%) were not over weight, 269 (22.42), were overweight and 149(12.42) were obese. In Non-Obese category, there was not a significant difference between boys and girls, where as in overweight and obese category, boys are significantly overweight and obese compared to girls.

Table 3: Participants based on the Life style characteristics							
Screen time(hrs./day)	Boys	Girls	Total(1200)	Chi square	P Value		
≤2	397	327	724(60.3)				
2-3	113	163	276(23)	20.00	0.000000		
>3	120	80	200(16.7)	20.00	0.000029		
Physical activity(hrs./day)							
≤2	112	66	178(14.8)				
2-3	104	123	227(18.92)	11.88	0.02635		

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>3414381795(66.25)Modes of travel to/from school 330 5201050(87.5) 3.8 0.0002 Inactive (others)530520150(12.5) 13.8 0.0002 Active (walking/cycling)10050150(12.5) 13.8 0.0002 Sugar-sweetened beverage(cps/wk.) $\leq 2389300689(57.41)_{2-568138206(17.17)2-568138206(17.17)40.180.000015-78778165(13.75)40.180.00001>78654140(11.67)_{2-2/wk.355085(7.08)1-2/wk.355085(7.08)15.890.0011≥/wk.12068188(15.67)_{2-2/wk._{2-2/wk.3654140(11.67)Hardly eat8654140(11.67)_{2-2/wk._{37}78165(13.75)_{0.0001}Hardly eat8654140(11.67)_{2-2/wk._{37}78165(13.75)_{0.0001}Hardly eat8654140(11.67)_{2-2/wk._{389}300689(57.41)$						
Modes of travel to/from school5305201050(87.5)13.80.0002Active (walking/cycling)10050150(12.5)13.80.0002Sugar-sweetened beverage(cps/wk.) </td <td>>3</td> <td>414</td> <td>381</td> <td>795(66.25)</td> <td></td> <td></td>	>3	414	381	795(66.25)		
$\begin{array}{c c c c c c c } & 1530 & 520 & 1050(87.5) \\ Active (walking/cycling) & 100 & 50 & 150(12.5) \\ \hline \mbox{Sugar-sweetened beverage(cps/wk.)} & & & & & & \\ & \leq 2 & 389 & 300 & 689(57.41) \\ & 2-5 & 68 & 138 & 206(17.17) \\ & 5-7 & 87 & 78 & 165(13.75) & 40.18 & 0.00001 \\ & >7 & 86 & 54 & 140(11.67) \\ \hline \mbox{Energy dense, nutrient poor} & & & & & & \\ Hardly eat & 386 & 354 & 740(61.67) \\ & 1-2/wk. & 35 & 50 & 85(7.08) \\ & 3-4/wk. & 89 & 98 & 187(15.58) & 15.89 & 0.0011 \\ & \geq 5/wk. & 120 & 68 & 188(15.67) \\ \hline \mbox{Healthy Snacks} & & & & \\ Hardly eat & 86 & 54 & 140(11.67) \\ & 1-2/wk. & 87 & 78 & 165(13.75) \\ & 1-2/wk. & 87 & 78 & 165(13.75) \\ & 1-2/wk. & 87 & 78 & 165(13.75) \\ & 3-4/wk. & 68 & 138 & 206(17.17) & 40.18 \\ \hline \mbox{ODD11} \\ & \geq 5/wk. & 389 & 300 & 689(57.41) \\ \end{array}$	Modes of travel to/from school					
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≥5/wk.12068188(15.67)Healthy Snacks 36 54140(11.67)Hardly eat8654140(11.67)1-2/wk.8778165(13.75)3-4/wk.68138206(17.17)≥5/wk.389300689(57.41)	3-4/wk.	89	98	187(15.58)	15.89	0.0011
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3-4/wk. 68 138 206(17.17) 40.18 0.00001 ≥5/wk. 389 300 689(57.41)	1-2/wk.	87	78	165(13.75)		0.00001
≥5/wk. 389 300 689(57.41)	3-4/wk.	68	138	206(17.17)	40.18	0.00001
	≥5/wk.	389	300	689(57.41)		

Table 2 shows the lifestyle characteristics of the high school children, First regarding screen time that is watching television, Majority that is 724 (60.3%) watch less than 2 hours per day, 276 (23%) watch 2 to 3 hrs per day and 200 (16.7%) watch more than 3 hours per day. Regarding Physical activity, Majority 795 (66.25) do more than 3 hours of physical activity, next 227 (18.92) do 2-3 hours of physical activity and 178 (14.8) do less than 2 hours of physical activity. Regarding mode of travel to school, majority that is 1050 (87.5%) travel by Inactive transport and few that is 150 (12.5%) go in an active form. Regarding intake of sugar sweetened beverages, majority of high school students that is 689 (57.41) consume less than 2 beverages per week, next majority of students were 206 (17.17) 2-5 beverages per week, and few that is 165 (13.75%) take 5-7 and more than 7 beverages per week were taken by 140 (11.67%) of the high school students. Regarding consumption of Energy Dense, Nutrient poor food, Majority that is 740 (61.67%) hardly eat energy dense Nutrient poor food, 188 (15.67%) of children take more than 5 times a week and 187 (15.58%) of high school students take this energy dense, nutrient poor food for about 3-4 times a week. Now regarding healthy snack consumption, Majority of high school students that is 689(57.41%) have healthy snacks regularly that is more than 5 times per week, the next majority of the students take 3 to 4 times a week. 206 (17.17%). 165 (13.75%) take healthy snacks only 1-2 times/week and 140 (11.67%) hardly eat healthy snacks. There was significant difference in boys and girls in screen time per week that is boys watch more television, physical activity less than 2 hours is more in boys, significantly active mode of travel from school in boys, sugar sweetened beverages, energy dense nutrient poor food and healthy snacks consumption is more in boys.

Table 4: Comparison of life style characteristics with Non over weight, over weight and obesity

Screen time(hrs./day)	Non Over weight (782)	Over weight (269)	Obese (149)	Total	Chi square	P Value
≤2	721(99.7)	2(0.2)	1(0.1)	724(62.83)		
2-3	21(7.6)	202(73.18)	53(19.20)	276(23)	1000 1	0.0001
>3	40(20)	71(35.5)	89(44.5)	200(16.67)	1089.1	
Physical activity(hrs./day)						
≤2	2(1.12)	56(31.46)	120(67.41)	178(14.83)		
2-3	60(26.43)	153(67.4)	14(6.17)	227(18.92)	1044	0.00001
>3	720(90.57)	60(7.54)	15(1.89)	795(66.25)	1044	0.00001
Modes of travel to/from school						
Inactive (others)	72769.24)	213(20.29)	110(10.48)	1050(87.5)	F9 01	0.00001
Active (walking/cycling)	60(40)	56(37.33)	39(26)	150(12.5)	58.01	0.00001
Sugar-sweetened beverage(cps/wk.)						
≤2	616(89.40)	45(6.53)	28(4.06)	689(57.42)		
2-5	121(58.73)	78(37.86)	7(3.39)	206(17.16)		0 00001
5-7	30(18.2)	49(29.7)	86(52.1)	165(13.75)	691.78	0.00001
>7	15(10.7)	97(69.3)	28(20)	140(11.67)		
Energy dense, nutrient poor						
Hardly eat	657(88.7)	53(7.2)	30(4.1)	740(61.67)	858.14	0.00001

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1-2/wk.	62(72.9)	17(20)	6(7.1)	85(7.08)		
3-4/wk.	30(16)	146(78.1)	11(5.9)	187(15.58)		
≥5/wk.	33(17.5)	53(28.2)	102(54.3)	188(15.67)		
Healthy Snacks						
Hardly eat	8(5.7)	34(24.3)	98(70)	140(11.67)		
1-2/wk.	29(17.6)	117(70.9)	19(11.5)	165(13.75)	022.50	0.00001
3-4/wk.	121(58.7)	81(39.3)	4(1.9)	206(17.17)	922.56	0.00001
≥5/wk.	624(90.6)	37(5.4)	28(4.1)	689(57.41)		

Table 4 shows life style characteristics of high school students who are non-overweight, over weight and obese, First regarding screen time , Majority of obese children that is 89(44.5%) spend more than 3 hours watching television, next is overweight children that is 71(35.5%) and less 40(20%) from non-overweight children . and the difference is significant. Physical activity in hours per day ,720(90.57%) of non-overweight children spent more than 3 hours per day in physical activity and 120 (67.41%) of students in obese category spend less than 2 hours per day in physical activity. There is significant difference in physical activity and obesity, overweight and non over weight. Regarding mode of travel to school, significantly non overweight children 60(40%) opted for active transport to school compared to obese children. Regarding consumption of sugar sweetened beverages, 97(69.3%) of overweight children and 28(20%) of obese children consume more than 7 beverages per week and 85(52.1%) of obese children consume 5-7 beverages per week. on calculation of p value, the results show that there is significant association with sugar beverages consumption and obesity and overweight. Regarding energy dense and poor nutrient food consumption, 102(54.3%), of obese people consume more than 5 times per week and majority 657(88.7%) of non overweight children hardly consume this type of food. There is significant association in consumption of high energy and low nutrient food with obesity. 624(90.6%) of nonoverweight children consume health snacks more than 5 times per week and 98(70%) of obese children hardly eat healthy snacks and there is strong association of consumption of healthy snacks and non over weight.

DISCUSSION

This study was one of few studies conducted in Rangareddy district, Telangana in exploring the associations of lifestyle factors with obesity in children. The prevalence of obesity was (12.42%) (9.5% for boys and 12.42% for girls) and overweight was11.2% (14.4% for boys and 8.0% for girls), which was consistent with other research in other settings¹⁴. Our results in relation to obesity and overweight are higher in comparison with the study conducted in china¹⁵ that is 11.2% (14.4% for boys and 8.0% for girls). In a study in ethiopia¹⁶ prevalence of overweight and obesity was 12.3% and 4.4% respectively

similar to the present study in over weight, but our obesity prevalence was little higher .In a study in Port Said city in Egypt¹⁷ the prevalence of overweight was 17.7%, whereas the prevalence of obesity was $13.5\%^{17}$ similar to our study results .In Nigerian study the prevalence was found to be 11.4% (overweight) and 2.8% (obesity)¹⁸. In Pakistan the prevalence of overweight was 23%.¹⁹In USA study also prevalence was more that is 21-24% (overweight) and 16-18% (obese).²⁰ The reason for the variability may be attributed to different factors including the socio demographic and economic variability. There was significant difference in boys and girls in screen time per week that is boys watch more television, physical activity less than 2 hours is more in boys, significantly active mode of travel from school in boys, sugar sweetened beverages, energy dense nutrient poor food and healthy snacks consumption is more in boys. Similar to the results in the study of china¹⁵. There was significant gender difference in daily screen time, The mean consumption of SSB, in consumption of "Energy dense, nutrient poor" and "Other" snacks. In our study 44.5% of obese, 35.5% of overweight and 40(20%) of non-overweight children spend more than 3 hours in watching television. There is significant difference in obesity, overweight and non-overweight children with screen time spent in hours. Similar to the study conducted by Liangli and coworkers¹⁵ where screen time was significantly associated with children's weight status. Prevalence in more than 3 hours watching TV in the present study was 16.67% and in the study conducted in Ethiopia¹⁶ 85.6% watch TV more than 3 hrs. Quiet high compared to the present study. The overall prevalence of physical activity (>3 hours/day) in the present study is 66.25%, where as in students of bahirdar city 34.6% have regular physical activity.¹⁶ In the present study 90.57%, 7.54% and 1.89 % of non-overweight children, overweight and obese children spend more than 3 hours per day in physical activity. There is significant difference in physical activity and obesity, overweight and non over weight but in the study conducted by Liangli and coworkers¹⁵ and other studies^{21,22} significant difference was in a reverse direction surprisingly. Our study of positive association of vigorous physical activity and Non over weight was similar to the study conducted in Ethiopia and other studies also^{23,24}. Regarding mode of

travel to school (69.24%) and consumption of Sugar Sweetened Beverages (72.1%) and consumption of high energy and low nutritive value snacks (60.2%) there is significant high prevalence in obese and overweight children were as in Liangli et al study¹⁵ these characteristics were not associated with overweight and obesity .In Ethiopia study¹⁶ Only 9.7% of the children were having outside junk food, the prevalence is quiet low. Regarding consumption of healthy snacks, 57.41% is the prevalence and 90.6% of non-overweight children had 5 times/week healthy snacks. The prevalence of consumption of healthy snacks is quiet good compared to study conducted in Ethiopia¹⁶ where 27.4% of there spondentsatefruitmore than five days per week. In the present study 11.6% hardly ate healthy snacks similar to the study conducted in Ethiopia where 13.5% of respondents did not eat fruits at all.¹⁶ To conclude from the present study that overweight/obesity in children is on alarming, therefore, more attention should be given to childhood obesity, and needs be focused for obesity prevention in school-aged children by creating awareness about healthy diet and improving life style.

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