Original Research Article

Association of Dietary Habits and Nutritional Status: A Prospective Study

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Abstract

Background: Childhood obesity is increasingly being observed with changing lifestyles of families. The magnitude of overweight ranges from 9% to 27.5% and obesity ranges from 1% to 12.9% among Indian children.

Objectives: The present study was undertaken to study the magnitude of overweight/obesity and its determinants among 11th and 12th class students in Rewa, MP.

Materials and Methods: A Study of Physical Activity and Obesity in Adolescent Girls and Boys of Rewa & quot; has been undertaken between June to September 2018 in Central Academy School Rewa, M. P. (North India). 250 school going children of 11th and 12th standard were selected as subject for the study in random basis.

Results: The study shows that only vegetarian were overweight (2.22%).4.65% children at risk of being overweight and 1.4% come in over weight group are taking junk food. Children who were taking saturated fat in their diet, out of them 3.56% were at risk of overweight and 1.33% was overweight. Furthermore, 16% children were underweight also. A statistically significant effect of dietary preference is observed in our study, 20% of adolescents who are non-vegetarian are underweight in comparison to 11% who are vegetarian and all overweight children are from vegetarian families.

Conclusions: In our study more children who were not consuming junk food were under weight as compared to those consuming junk food, Obesity was exclusively present in children consuming junk food and saturated fats. Although larger number of the children were at the risk of overweight who were not eating junk food and saturated food. Dietary habits in itself may not be the only deciding factor for obesity. An interplay of multiple factors is responsible for development of obesity. Food choice availability had been associated with increased BMI. The availability of high fat fast foods and the decreased number of family meals results in less fruit and vegetable consumption and higher fat food consumption. Hence there is a need of awareness on dietary pattern and habit of adolescent children and include this point in existing health programs.

Keywords: BMI, Overweight, Obesity, School-Going Children.

Introduction

India is a sizable country with several ethnic groupings. Our nation has a sizable percentage of malnourished children, and on the other end of the spectrum, the number of fat children is also on the rise for a variety of reasons. The main contributing factor may not be an excessive diet but rather a lack of activity. The primary epidemiologic change that occurred in the twenty-first century was the switch from infectious to chronic illnesses, with cardiovascular diseases topping the list in terms of death and morbidity.

This transformation may be attributed mostly to India's social, economic, and public health improvements. A new problem has appeared at the start of the new millennium: a noticeable rise in the prevalence of obesity, which is accompanied by a rise in the number of chronic diseases linked to obesity and a clinical manifestation of these diseases at younger ages. Overweight and obesity are risk factors for a lack of physical exercise. A difficult complex issue, obesity. It is spreading alarmingly fast around the world among all age groups, but it is most prevalent among urban youth. Numerous studies have revealed a 5–10% increase in obesity every decade in recent years. Up to 80% of children who are fat as children go on to be obese adults, making childhood obesity a significant risk factor for adult obesity [1].

Coronary artery disease, cerebrovascular disease, hypertension, type II diabetes, hyperlipidemia, orthopaedic disorders, cholelithiasis, hyperuricaemia, early pubertal changes, irregular menstruation, respiratory infections, obstructive sleep apnoea (OSA), and psychosocial issues are a few of the health risks associated with obesity [1]. The frequency of overweight and obesity among young people is skyrocketing and has reached epidemic levels. Genetic, social, cultural, and environmental factors all have a role in childhood obesity. Increased energy intake over expenditure leads to obesity [2-10]. The present study has been undertaken to study physical activity, and obesity in adolescent boys and girls of Rewa city to probe the magnitude to problem and factors related to them.

Material and Methods

The present study has been undertaken between June to September 2018 in Central Academy School Rewa, M. P. (North India). 250 school going children of 11th and *12th* standard were selected as subject for the study in random basis. All the participants were subjected to sign the consent form and asked some specific questions for physical activity and their food habits. Data collection was carried out by face to face interviews at the school campus. The information regarding demographic features, food habits, family history about and religion were recorded using a questionnaire.

Inclusion criteria: We studied all healthy children of middle and late adolescent age group.

Exclusion criteria: Children having any systemic disease or any chronic illness.

Methodology of anthropometric parameter: Different anthropometric measurements such as BMI, waist hip ratio, waist circumference and Hip circumference are used as the part of index for investigating cardiovascular risk factors [5]. Therefore, the reliability and validity of anthropometric measurements for the use of index of cardiovascular risk factors are well established. [5&6].

Observation & Result

The present study entitled "association of dietary habits and nutritional status" is a

prospective study conducted on 250 school going adolescent children, carried out in central academy school, Rewa (M.P.), during the period of June to September 2018.

Table 1: Demographic Distribution of Cases

Sex	Case	Percentage	
Male	170	68.00%	
Female	80	32.00%	
Total	**250**	**100.00%**	
Age group	**Male**	**Female**	**Total**
15-16 year (Middle Adolescent)	93 (54.71%)	55 (68.75%)	148 (59.2%)
17-18 year (Late Adolescent)	77 (45.29%)	25 (31.25%)	102 (40.8%)
Total	**170 (100%)**	**80 (100%)**	**250 (100%)**
Habitat	**Male**	**Female**	**Total**
Rural	33 (19.41%)	20 (25%)	53 (21.2%)
Urban	137 (80.59%)	60 (75%)	197 (78.8%)
Total	**170 (100%)**	**80 (100%)**	**250 (100%)**
Type of family	**number**	**percentage**	
Hindu	242	97.0%	
Muslim	8	3.00%	
Total	**250**	**100.00%**	
Type of family	**Number**	**Percentage**	
Nuclear	173	69.2%	
Joint	77	30.8%	
Total	**250**	**100.00%**	
Diet	**Number**	**Percentage**	
Veg	135	54.00%	
Non-veg	115	46.00%	
Total	**250**	**100.00%**	

In this table total of 250 children belonging to Adolescent age group were evaluated. Out of 250 children 68% were male & 32% were female. As per the established criteria, children were segregated into two groups, middle (15-16 years) & late adolescent (17-18 years). 59.2% children were of middle adolescent age group & remaining 40.8% were of late adolescent age group. In this study group 21.2% children belonged to rural area where as 78.8% were from urban area. The difference in habitat may be because the school chosen for the study was located in the city.

Table 2: Distribution of Cases According to Dietary Preferences

Diet	Number	Percentage
Veg	135	54.00%
Non-veg	115	46.00%
Total	**250**	**100.00%**
Dietary Habits	**Number**	**Percentage**
Taking Junk food	215	86.00%
Not taking junk food	35	14.00%
Total	**250**	**100.00%**
Saturated Fat	**Number**	**Percentage**
Yes	225	90.00%

No	25	10.00%
Total	**250**	**100.00%**

Though 54% children were vegetarian, the percentage of non-vegetarian children was also high ie 46.0%. Ost of the children were taking junk food in their diet (86%). Majority (90%) of families were using saturated fat in their diet.

Table 3: Relations between Dietary Preferences & BMI

BMI (kg/m²)	Food		Total	
	Veg	**Non-Veg**		
Under weight	15 (39.47%) (11.11%)	23 (60.53%) (20%)	38 (15.2%)	χ^2=6.12 p =0.019, Significant
Normal weight	109 (55.9%) (80.74%)	86 (44.1%) (74.78%)	195 (78%)	
At risk of Over weight	8 (57.14%) (5.93%)	6 (42.86%) (5.22%)	14 (5.6%)	
Over weight	3 (100%) (2.22%)	0 (0%) (0%)	3 (1.2%)	
Total	135 (54%)	115 (46%)	250 (100%)	
BMI (kg/m²)	Junk Food		Total	
	Yes	NO		
Under weight	29 (76.32%) (13.49%)	9 (23.68%) (25.71%)	38 (15.2%)	χ^2=7.11 p=0.06, Significant
Normal weight	173 (88.72%) (80.47%)	22 (11.28%) (62.86%)	195 (78%)	
At risk of Over weight	10 (71.43%) (4.65%)	4 (28.57%) (11.43%)	14 (5.6%)	
Over weight	3 (100%) (1.4%)	0 (0%) (0%)	3 (1.2%)	
Total	215 (86%)	35 (14%)	250 (100%)	
BMI (kg/m²)	Saturated Fat		Total	
	Yes	No		
Under weight	36 (94.74%) (16%)	2 (5.26%) (8%)	38 (15.2%)	χ^2=18.43 p=0.0004, Significant
Normal weight	178 (91.28%) (79.11%)	17 (8.72%) (68%)	195 (78%)	
At risk of Over weight	8 (57.14%) (3.56%)	6(42.86%) (24%)	14 (5.6%)	
Over weight	3 (100%) (1.33%)	0 (0%) (0%)	3 (1.2%)	
Total	225 (90%)	25 (10%)	250 (100%)	

3.75% children from joint families were overweight while none in the nuclear family were overweight. The study shows that only vegetarian were overweight (2.22%).4.65% children at risk of being overweight and 1.4% come in over weight group are taking junk food. Children who were taking saturated fat in their diet, out of them 3.56% were at risk of overweight and 1.33% were overweight. Furthermore, 16% children was underweight also.

Discussion

The study shows that only vegetarian were overweight (2.22%).4.65% children at risk of being overweight and 1.4% come in over weight group are taking junk food. Children who were taking saturated fat in their diet, out of them 3.56% were at risk of overweight and 1.33% were overweight. Furthermore, 16% children were underweight also.

In our study 77% boys and 80% girls had normal weight for their age, 16% boys 12%girls are underweight (Table no. 23) there are only 3 girls and no boys who are overweight. According to BMI 16.4% males are underweight where as 12.5% females are underweight (Table No. 23).Considering the above criteria, in the present study, 78% boys are underweight, 1% of boys are overweight; obesity is noted only in one case (0.2%).

V. N. Tripathi *et al* [3] in their study on 1338 adolescents in school, 55% boys were under weight on the basis of BMI, only 3 boys were obese (0.2%).

Therefore, the prevalence of obesity is the same as in the current study, but the incidence of underweight is lower. 40% of adolescent males, according to V. R. Parmar, S. Basu, *et al* [4], were underweight (BMI 5th percentile for age). A comparable research by K. Anand [5] found that the prevalence of obesity (BMI 27.5) was 1.37 times greater in urban children (2.19%) than in rural children (1.6%). Additionally, the age range of 14 years showed the highest prevalence of obesity. (3.14%).

Studies have shown that height, weight and BMI values are significantly lower in those from poor socioeconomic status than those from well to do group [6].

Surprisingly, amid a nutritional situation that is improving, overnutrition is becoming a significant issue, especially among well-off urban residents in several states like Delhi and Punjab. Recent data from Delhi public schools show that 7% of teenagers are fat and roughly 23% of adolescents are overweight.

It was statistically significant that females tended to be overweight in middle and late adolescence while boys tended to be underweight. These results may be the consequence of early pubertal changes in girls. In a cross-sectional community-based survey, Gorden *et al* [8] from New Zealand found that estimates for childhood obesity should be interpreted with caution because the percentage of children who were estimated to be obese was higher when indices were based on weight and height than when indices were based on measures of body fat (SFT and percentage of body fat). According to Caramina N. G. *et al*., in their research of Canadian children aged 9 to 12 they found that 33% of kids were overweight and 38% were obese.

Another research from Manitoba indicated that 40% of girls and 40% of boys had BMIs that were above the 90th percentile and that 64% of girls and 60% of boys had BMIs that were above the 85th percentile of reference.139 Indigenous children are 20% more likely to be obese, according to a Canadian community health survey. According to Berkey *et al*., for both boys and girls, a 1-year rise in BMI was greater among those who said they spent more time watching TV or playing video games during the year between the two assessments and in those who said their calorie intake rose during that period. Girls who reported consuming more calories and engaging in less physical exercise during the year between the two BMI examinations also showed larger year-to-year increases in BMI. Although the projected impacts' sizes were modest, when added together over the course of adolescence, they might result in significant increases in body weight. Promising approaches to preventing obesity

include those that aim to limit calorie consumption, cut down on time spent watching TV, playing video games, and promote physical exercise. There is no change in EI: BM Rest between age groups or genders, according to Down *et al*.

Although there was no correlation between the percentage of underweight and normal weight children and the type of family, it was remarkable that all 8% of adolescents at risk for being overweight were from joint families. There were 3 girls in our study who were overweight. The lack of time is a significant issue in nuclear and single-parent homes. This encourages the consumption of packaged foods, fast food, and high dietary fats by all family members, including children, putting them at a greater risk of obesity and other lifestyle illnesses. In our investigation, we found that food choice had a statistically significant impact . All overweight youngsters come from vegetarian homes, while 20% of non-vegetarian teenagers are underweight compared to 11% of vegetarian adolescents.

In our study more children who were not consuming junk food were under weight as compared to those consuming junk food . Obesity was exclusively present in children consuming junk food and saturated fats. Although larger number of the children were at the risk of overweight who were not eating junk food and saturated food. Dietary habits in itself may not be the only deciding factor for obesity. An interplay of multiple factors is responsible for development of obesity. Food choice availability had been associated with increased BMI. The availability of high fat fast foods and the decreased number of family meals results in less fruit and vegetable consumption and higher fat food consumption.

Conclusion

In our study more children who were not consuming junk food were under weight as

compared to those consuming junk food. Obesity was exclusively present in children consuming junk food and saturated fats. Although larger number of the children were at the risk of overweight who were not eating junk food and saturated food. Dietary habits in itself may not be the only deciding factor for obesity. An interplay of multiple factors is responsible for development of obesity. Food choice availability had been associated with increased BMI. The availability of high fat fast foods and the decreased number of family meals results in less fruit and vegetable consumption and higher fat food consumption. Hence there is a need of awareness on dietary pattern and habit of adolescent children and include this point in existing health programs.

References

1. K E Elizabeth. Nutrition and Child Development. 4th edition, Paras Medical Publication. 2009.
2. World Health Organization. Obesity – preventing and managing the global epidemic. Geneva: World Health Organization, 1998-40.
3. Kahn BB, Flier JS. Obesity and insulin resistance. J Clin Invest. 2000; 106:473–81.
4. Ginsberg HN. Insulin resistance and cardiovascular disease. J Clin Invest. 2000; 106:453–8.
5. Lobstein TJ, James WP, Cole TJ. Increasing levels of excess weight among children in England. Int J Obes Relat Metab Disord. 2003; 27: 1136–8.
6. Freedman DS, Srinivasan SR, Valdez RA, Williamson DF, Berenson GS. Secular increases in relative weight and adiposity among children over two decades: the Bogalusa Heart Study. Pediatrics. 1997; 99:420–6.
7. Moreno LA, Sarria A, Fleta J, Rodriguez G, Bueno M. Trends in body mass index and overweight prevalence among

children and adolescents in the region of Aragon (Spain) from 1985 to 1995. Int J Obes Relat Metab Disord. 2000; 24:925–31.

8. Claude Bouchard. Gene–Environment Interactions in the Etiology of Obesity: Defining the Fundamentals, Obesity. 2008; 16, S5–S10.

9. Daniel H. Bessesen. Update on Obesity. The Journal of Clinical Endocrinology & Metabolism June 1, 2008; 93(6): 2027-2034

10. William H Dietz and y C Bellizzi. Introduction: the use of body mass index to assess obesity in children[1, 2] Am J Clin Nutr July 1999vol. 70 no. 1 123S-125S.