A study on the nutritional status and eating pattern of adolescent school going boys of Chandigarh

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Abstract
Background: Poor nutrition, unhealthy eating practices and decreased physical activity due to involvement and participation in screen time activities are major contributing factors for obesity.
Objective: To study the nutritional status and eating practices among 14 -18 years' adolescent boys of Chandigarh.
Methodology: 500 adolescent school going boys belonging to 14-18years were selected using random sampling technique and were assessed for Nutritional status, obesity (BMI) and eating pattern by using a pretested, self-designed, structured questionnaire developed considering the objectives of the study.
Results: Nearly one fourth (23 percent) subjects were overweight. Socioeconomic class and BMI of subjects was found to be significantly related (chi sq, p-value= 0.001) to Obesity and overweight status. Skipping breakfast (31.6%), snacking while watching television (40%) and eating in canteen (67.4%) were some of the unhealthy dietary habits. 70 % subjects devoted more than 1hr in sedentary leisure activity.
Conclusion: Large scale nationwide campaigns to spread messages on healthy nutrition and physical activity, targeted at specific groups are required for the prevention of obesity and to check the growing epidemic of obesity.

Keywords: obesity, eating pattern, socio economic status, leisure time activities, snacking, adolescent boys (14-18 years)

1. Introduction
Adolescence has been defined by WHO as the period of life spanning between 10-19 years (WHO, 1995) [1]. It is estimated that about 30% population of India are adolescents (Nath and Garg, 2008) [2]. Adolescence is a period after infancy where growth rate is rapid and nutrient requirement increases due to increase in physical growth and development. Life style changes and nutrition transition affects the eating habits, physical activities and leisure time activities of adolescents.

Physical activity has decreased and sedentary leisure time activities have increased. This has led to increase in the prevalence of obesity and overweight among children and adolescents.

Obesity is a major and rapidly growing global public health concern and is associated with significant morbidity and mortality. There is evidence that children and adolescents of affluent families are more overweight than in the past possibly because of decreased physical activities, sedentary lifestyles, altered eating patterns and increased fat content of the diet (Agras *et al.* 2004) [4].

Low levels of physical activity, watching television, and consuming junk food are associated with a higher prevalence of overweight. Children belonging to High schools/Senior Secondary classes are particularly vulnerable to external factors owing to newfound independence and the influence through peer pressure and exposure to media. This study is planned to determine the prevalence of obesity and eating pattern among adolescent boys (14-18 years) in Chandigarh as this age group is a growing phase.

2. Materials and Methods
The present cross sectional study was conducted in the Government and Private schools of Chandigarh. Schools having children in the age group of 14-18 years were selected using purposive random sampling technique (n=500). Before conducting the actual survey in the school the permission from the indexed school Principal was also taken. For the study purpose, children in the age group of 14-18 years were selected from 9th to 12th class randomly. A semi-structured pre-tested questionnaire was administered to each child to collect data on socio-demographic profile and dietary pattern. Socio-economic status was assessed using Kappuswamy scale (Kumar *et al*, 2007) [5].

Anthropometric measurements of weight, standing height, were measured by utilizing standard methodology (Jelliffe 1989) [6]. BMI classification (WHO 2004) [7] was used for categorization of subjects in overweight and obese categories.

Statistical analysis was done using SPSS (version 15.0) Frequencies, percentages, means and standard deviations were calculated. T test, Chi Square test were also used.

3. Result and Discussions
The present study was conducted on 500 adolescent boys, Majority of boys belonged to government schools (n=460) and rest of the boys belonged to private schools (n=40).

Socioeconomic status as assessed using Kuppuswamy Scale (2007) found that nearly 85% of subjects were belonging to upper class and rest to lower middle.

Majority of boys (43.4%) were vegetarian, non-vegetarian (38.6%) and ova vegetarian (18.0%).

The dietary changes that characterize the "nutrition transition" include both qualitative and quantitative in the diet. Skipping meal is the present trend among our society mainly in adolescents.

Table 1: Distribution of boys on the basis of skipping of meals

S. No.	Skip meals	Yes (%)	No (%)	Total %
1	Breakfast (5:00 to 10:00 am)	365(73)	135(27)	500(100)
3	Mid-morning (School lunch break)	290(58.0)	210(42.0)	500(100)
4	Lunch (after school time)	32(6.4)	468(93.6)	500(100)
5	Dinner (8:00 to 9:30 pm)	10(2)	490(98.0)	500(100)
6	Bed time (Before sleep)	388(77.6)	112(22.4)	500(100)

In the present study majority (70%) of boys had their breakfast before going to school and only thirty percent boys skipped their breakfast. The study revealed that more adolescents skipped breakfast (20%) than skipped lunch (6.4%) and dinner (2%).

It is revealed from the table below that nearly 70% (n=337) of subjects were eating in the canteen. Students reported reasons like peer influence (40%) taste (16.0%) and feel hungry (8.8%) as some of the reasons for eating in the canteen. Within the subjects70% (n=235) who also bought packed lunch at school. The reasons for eating in the canteen along with packed lunch reported were peer pressure, self-reputation and eating fast foods etc.

Table 2: Distribution of subjects eating in the canteen along with packed lunch

S. No.	Canteen	Number of boys (%)
1	337	67.4
2	163	32.6
	500	100.0

Nearly 75% of subjects were in the habit of eating out. However, their frequencies of eating out varied ranging from every day and alternate day (12.8%) to once in a fortnight (7.2%).

Table 3: Distribution of subjects according to time spent on Television/play station/computer

S. No.	Time duration	Number of boys (%)
1	No	60(12.0)
2	<1hour	91(18.2)
3	1-2 hour	95(19.0)
4	2-3 hour	109(21.8)
5	3-4 hour	68(13.6)
6	>4hour	77(15.4)
	Total	500(100.0)

Time spent on watching TV, computer or play station showed that only 39% subjects' watch two or less than two hours and 61% subjects spend more than two hours of their time on these activities. With more than two hours of time being used for sedentary leisure activity, time for physical activity is also proportionately reduced.

Table 4: Distribution of subjects eating meal while watching TV

S. No.	Eating meal while watching TV	Number of boys (%)
1	Breakfast	5(1)
2	Breakfast and dinner	21(4.2)
3	Breakfast and lunch	1(0.2)
4	Breakfast, lunch and dinner	60(12)
5	Dinner	112(22.4)
6	Lunch	41(8.2)
7	Lunch and dinner	100(20)
8	Do not watch	160(32)
	Total	500(100)

Frequency distribution of boys according to their eating meals along with TV is shown in above table 4. Maximum number of boys (68%) had any one or more meal while watching TV and only 32% did not have any meal while watching TV. The habit of snacking while watching TV was found among 40% of subjects.
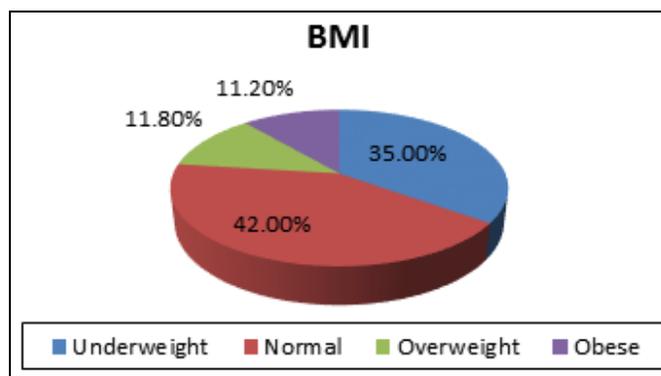

Fig 1: Distribution of boys on the basis of their BMI

Subjects when classified using BMI (WHO, 2004) [7] revealed that about 42.0% were having normal BMI, where as 35.0% were underweight.

Overweight and obesity are influenced by various factors such as age, sex, eating habits and among which socioeconomic status is an important one. Table 5 reveals the distribution and relationship of BMI with socioeconomic status.

Table 5: Distribution of respondent's socioeconomic status with their BMI

S. No.	Socio Economic Status	Underweight (N=175)	Normal (N=210)	Over wt. (N=59)	Obese (N=56)	Total (N=500)	Chi- Sq.
1	Lower middle	14(2.8)	4(0.8)	0(0.0)	5(1.0)	23(4.6)	
2	Upper class	46(9.2)	80(16.0)	26(5.2)	29(5.8)	181(36.2)	
3	Upper lower	5(1.0)	1(0.2)	0(0.0)	0(0.0)	6(1.2)	32.958
4	Upper middle	110(22.0)	125(25.0)	33(6.6)	22(4.4)	290(58.0)	
	p-value	0.001** (HS)					

(HS= highly significant) (p>0.05)

Socioeconomic status was assessed by Kuppuswamy scale (Kumar, 2007) [5] reveals that 11.0% overweight and obese subjects were in upper class and upper middle class each. The prevalence of obesity is higher among upper socio income group which could be because of their eating pattern or money available for expenditure. A statistical significant relation was found between socioeconomic status and BMI by using chi-square test. This shows that socioeconomic status affects the BMI.

Table 6: Distribution of subject's BMI according to their time spends on TV/Play station/Computer

TV/Play station/Computer duration (hours)	Underweight (N=175)	Normal (N=210)	Overweight (N=59)	Obese (N=56)	Total (N=500)	Chi-square value
Nil	21(4.2)	31(6.2)	5(1.0)	3(0.6)	60 (12)	
<1	48(9.6)	26(5.2)	7(1.4)	10(2.0)	91(18.2)	
1-2	33(6.6)	42(8.4)	11(2.2)	9(1.8)	95(19.0)	
2-3	21(4.2)	55(11.0)	19(3.8)	14(2.8)	109(21.8)	37.952
3-4	29(5.8)	21(4.2)	6(1.2)	12(2.4)	68(13.6)	
>4	23(4.6)	35(7.0)	11(2.2)	8(1.6)	77(15.4)	
p-value	0.001**(HS)					

(HS= highly significant) (p>0.05)

A significant relationship was found between duration of time spent on sedentary leisure activities like TV/ Play station/ Computer games and BMI of subjects when chi-square was applied. Maximum (21.8%) number of subjects watched TV 2-3 hours. There is not much variation found among BMI of subjects of various categories. Out of 500 subjects, 6.6% overweight and obese subjects watch TV 2-3 hours, followed by 3.8% overweight and obese subjects watch TV who watched TV more than 4 hours. This shows that TV duration has an impact on subjects' BMI.

Distribution of subjects' BMI according to their snacking habit while watching TV/ Computer games/Play station reveals that more number of subjects were overweight (8.6%) and obese (7.8%) who snack while performing sedentary leisure activities as compared to who did not snack (6.8%). However, non-significant relationship between BMI and TV/ Play station/ Computer games duration was found.

A statistically significant relationship was found between BMI and SES. (Chi Sq. 32.95, p> 0.001), BMI and time spent on sedentary leisure activities like TV/Play Station/Computer using Chi Sq. test (37.95 p>0.05). However, non-significant relationship was found between and BMI and habit of snacking while watching TV/ Computer games and Play station. Chi Sq. 7.726 p>0.52 (p-value=0.01, NS= non-significant)

4. Discussion
The present study was planned to evaluate the prevalence of obesity and assess eating pattern of school going adolescents of Chandigarh. Various factors like dietary pattern, time on sedentary leisure activities were studied in relation to obesity and over-weight. The result of the present study shows almost the same prevalence of overweight but prevalence of obesity among Chandigarh boys is higher as compared to the results of (Shashidhar et al. 2010 and Khan et al. 2010) [10, 11].

The prevalence of overweight (including obese) adolescents ranged from 22% in better off schools to 4.5% in lower income group schools. Similarly in a Delhi school students (10-16 years) with tuition fees more than Rs. 2,500 per month, the prevalence of overweight children was 31%, of which 7.5% were obese. And among them 23.10% and 8.30% boys were overweight and obese. (Kapil U, 2002) [9].

In the present study a high percentage of obesity and overweight was found. Similar results have been reported in earlier study conducted amongst children (Qamra SR et al. 1991) [8]. A study from NCT of Delhi reported the prevalence of Obesity as 7.4%. While another study done in school children in Punjab reported prevalence of overweight and obesity to be 11.1 and 14.2% respectively (Chhatwal et al. 2004) [19] A study conducted in Pune documented the prevalence of obesity 5.7% and overweight 19.9% (Khadikar et.al). The high prevalence of obesity and overweight has also been reported (Shashidhar et al. 2010 and Khan et al. 2010) [10, 11]. The result of the study is comparable and it can infered that the prevalence of obesity is high in various parts of the country.

The result of the present study depicts that a large percentage (30%) of subjects are skipping their breakfast. This result is almost similar to the Australian study, conducted by Gayle et al. [12] in 2007 on 3250 adolescents (12-15 years) which reported that maximum numbers of subjects skipped breakfast followed by other meals.

BMI and watching television/computer activity have shown statistically significant relationship. There is consistent evidence that time spent in front of a television is associated with a number of negative outcomes among adolescents,

including overweight and obesity, poor dietary habits (Jeffery RW, 1998) [13], and social problems (e.g., aggressive behavior, low school achievement) (Strasburger VC, 2004) [14]. Louise et al, 2006 concluded that adolescents who ate snacks while watching television were more than three times more likely to watch ≥ 2 hours per day. The prevalence of eating snacks while watching television is associated with an increase in energy intake and decreased fruit and vegetable consumption. (Boynton-Jarrett, *et al.* 2003 and Van den Bulck and Van Michlo, 2004) [16, 17]. Consumption of main meals in front of TV etc was also very high which are similar to study on African-American girls to know the dietary intake while watching TV. From this study it was revealed that 40-50% girls consumed dinner while watching TV, followed by breakfast consumption (19-46%) and the lunch consumption was less than all which is about 4-8%.

In present era, adolescents are experiencing unfavorable shifts in activity patterns like decrease in physical activity and increase in leisure time computer/TV use. Low levels of moderate to vigorous physical activity (MVPA) and high levels of sedentary behavior (e.g., television viewing) have been shown to be associated with obesity (Berkey, 2003) [18].

In the present study prevalence of obesity was found to be high (11%) and statiscally significant in upper socio classes.

Study results are similar to the results of the study done by Tharkar *et al.* (2009) [21] where the prevalence of obesity and overweight was found to be similar and varied with socio-economic status. Children and adolescents from USES had 3.4 times higher odds of being overweight compared to those from LSES.

Watching television, playing video games and using the computer are common pastimes for many children. Time spent on these activities is referred to as "screen time." In a Canadian study, over a third (36%) of children aged 6 to 11 logged more than 2 hours of screen time each day. These children were twice as likely to be overweight/obese as were those whose daily viewing totaled an hour or less (35% versus 18%), and about twice as likely to be obese (11% versus 5%).(Shield.,2006) [22].

5. Conclusion
Obesity is the consequence of not only one single factor but of several factors like economy, purchasing power, dietary pattern, life style pattern along with a heredity predisposition.

Obesity in adolescents is a strong predictor of obesity among adults. To reduce the obesity incidences, adolescents should follow a regular physical activity regimen along with a healthy dietary pattern.

Thus, a two way strategy focusing on healthy life style and physical fitness should be developed, promoted and individual, parents and community to be educated and empowered with the same to have a healthy individual, society and nation.

6. References
1. WHO. Physical status: the use and interpretation of anthropometry. Report of a WHO Expert Committee, Technical Series 954. Geneva: World Health Organization. 1995, 270-276.
2. Nath A, Garg S. Adolescent friendly health services in India: A need of the hour. Indian Journal of Medical Sciences. 2008; 62(11):465-72.
3. Activity Recommendations for Children 12-18 years. Published by the Australian Government Department of Health and Ageing, 2005. Available at: http://www.health.gov.au/internet/main/publishing.nsf/ Content/phd-physical-activity-youth-pdf-cnt.htm. Retrieved on October 20,2011.
4. Agras WS, Hammer LD, McNicholas F, Kraemer HC. Risk factors for childhood overweight: a prospective study from birth to 9.5years. Journal of Pediatrics. 2004; 145:20-25.
5. Kumar N, Shekhar C, Kumar P, Kund AS. Kuppuswamy's Socioeconomic Status Scale-Updating for 2007. Indian Journal of Pediatrics 2007; 74:1131-1132.
6. Jelliffe DB, Jelliffe EFP. Community Nutritional Assessment with special reference to less technically developed countries. Oxford (UK). Oxford University Press, 1989.
7. WHO. Expert consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. The Lancet. 2004; 363(9403):157-163.
8. Qamra SR, Mehta S, Deodhar SD. A mixed longitudinal study on the pattern of pubertal growth. Relationship to socio economic status and calorie intake IV. Indian Pediatrics. 1991; 28:147-56.
9. Kapil U, Singh P, Pathak P, Dwivedi SN, Bhasin S. Prevalence of obesity amongst affluent adolescent school children in Delhi. Indian Pediatrics. 2002; 39:449-52.
10. Shashidhar M, Ganesh S, Suphala S. Prevalence and determinants of overweight and obesity among adolescent school children of South Karnataka, India. Indian Journal of Community Medicine. 2010; 35(1):176-178.
11. Khan MI, Lala M K, Patil R, Mathur HN, Chauhan Nt. A study of the risk factors and the prevalence of hypertension in the adolescent school boys Of Ahmedabad City. Journal of Clinical and Diagnostic Research 2010; 4:3348-3354.
12. Gayle S, Abbie MacFarlane, Kylie Ball, Anthony Worsley, David Crawford. Snacking behaviours of adolescents and their association with skipping meals. International Journal of Behavioral Nutrition and Physical Activity. 2007; 4:36.
13. Jeffery RW and French SA. Epidemic obesity in the United States: are fast foods and television viewing contributing? American Journal of Public Health. 1998; 88(2):277-80.
14. Strasburger VC. Children, adolescents, and the media. Current Problem on Pediatric and Adolescence Health Care. 2004; 34(2):54-113.
15. Louise Hardy, Louise Baur, Sarah Garnett, David Crawford, Karen Campbell, Vanessa Shrewsbury, *et al.* Family and home correlates of television viewing in 12–13 year old adolescents: The Nepean Study. International Journal of Behavioral Nutrition and Physical Activity. 2006; 3:24.
16. Boynton-Jarrett R, Thomas TN, Peterson KE, Wiecha J, Sobol AM, Gortmaker SL. Impact of television viewing patterns on fruit and vegetable consumption among

adolescents. Pediatrics. 2003; 112(6 Pt 1):1321-6.

17. Van den Bulck J, Van Mierlo J. Energy intake associated with television viewing in adolescents, a cross sectional study. Appetite. 2004; 43(2):181-4.

18. Berkey CS, Rockett HR, Gillman MW, Colditz GA. One-year changes in activity and in inactivity among 10- to 15-year-old boys and girls: relationship to change in body mass index. Pediatrics. 2003; 111:836-843.

19. Chhatwal J, Verma M, Riar SK. Obesity among pre-adolescents of a developing country (India). Asia Pac J. Clin Nutr. 2004; 13:231-5.

20. Khadikar VV, Khadikar AA. Prevalence of obesity in Affluent School Boys in Pune. Indian Pediatrics. 2004; 41:857-8.

21. Tharkar S, Viswanathan V. Impact of socioeconomic status on prevalence of overweight and obesity among children and adolescents in Urban India. The Open Obesity Journal. 2009; 1:9-14

22. Shields M. Overweight and obesity among children and youth. Health Reports 2006; 17(3):27-42. Statistics Canada Catalogue no. 82-003. Available at: http://www.statcan.gc.ca/studies-etudes/82-003/archive/ 2006/9277-eng.pdf