Nutritional status and school eating pattern of adolescents

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■**ABSTRACT :** Diet plays a very important role in growth and development of school going adolescents, during which the development of healthy eating habits is of supreme importance. There is a dual burden of under nutrition and over nutrition in this age-group. Nutritional needs during adolescence are increased because of the increased growth rate and changes in body composition associated with puberty. The dramatic increase in energy and nutrient requirements coincides with other factors that may affect adolescents' food choices and nutrient intake and thus, nutritional status. The present study assessed the nutritional status and Schooleating pattern of adolescents studying in Schools of Chandigarh City. Both quantitative and qualitative methods were used in this study. A quantitative survey was carried out using a pre-tested self-administered structured questionnaire among 280 students from the age group of 13 to 15 years studying in government and private schools of Chandigarh City. Demographic profile of the study participants revealed that, out of total, 30.71 per cent (86) were girls, and 69.29 per cent (194) were boys. Results of anthropometric measurements revealed that overweight, obesity and underweight was seen in 7.9 per cent, 6.4 per cent and 36.8 per cent of adolescents, respectively. Overweight and obesity was seen more in girls (11.6 % and 9.3%, respectively) as compared to boys (7.9 % and 6.9%, respectively). Underweight was more observed in boys (41.2%) as compared to girls (29.1%). Study revealed that majority of adolescents prefers to eat in school canteen even after having their packed lunch. The main reason was the influence of their peer groups. Fast food and aerated beverages were most preferred food items consumed from the school canteen. Increase trend in overweight, obesity and under nutrition in early adolescent was due to the change in dietary pattern and consumption of junk food in school. The factors responsible for this is the quest for independence and acceptance by peers, increased mobility, greater time spent at school and/or work activities, and preoccupation with self-image, contribute to the erratic and unhealthy eating behaviour that are common during adolescence. During adolescence, young people are in a transition period when they gradually take over the responsibility for their own eating habits. Knowledge is one of the factors necessary for a healthy transition of responsibility. The incidence of malnutrition can be reduced through appropriate nutrition education and intervention programs involving adolescents, their parents and teacher in the school.

■**KEY WORDS:** Weight status, Anthropometry, School eating pattern, Unhealthy eating behaviour, Packed lunch

The word 'adolescence' is derived from the Latin verb '*adolescere*', which means "grow to maturity." Adolescence is a grey area in the spectrum of life falling between childhood and adulthood. It is an age of transition when an individual experiences rapid growth and development, both physical and psychological and changes from being a child to an adult (Bhave and Nair, 2002).According to the World Health Organization adolescence is a stage of development which corresponds roughly to the ages between 10 and 19 years (WHO, 2003). According to the studies from National Institute of Nutrition figures, the population projections for India indicate that the number of adolescents will increase from 200 million in 1996 to 215.3 million in 2016 (Venkaish *et al.,* 2003).

Adolescents have very special nutritional needs due to the rapid growth (lean body mass, fat mass, bone mineralization) and maturational changes associated with the onset of puberty. Many adolescents do not meet dietary requirements for their age group due to inadequate dietary intake of energy and proteins. There is a dual burden of under nutrition and over nutrition in this age-group. Some adolescents have, however, problems with dietary excesses resulting in overweight and obesity as well as dietary inadequacies resulting in underweight (Barbara and Robert, 2001).

Some dietary patterns appear quite common among adolescents, to mention a few: snacking, usually on energy-dense foods; meal skipping, particularly breakfast, or irregular meals; wide use of fast food; and low consumption of fruits and vegetables (Cavadini *et al.*, 1999 and Dausch *et al.*, 1995). Many schools offer fat-rich, high-sugar snacks and soft drinks in their canteens. This in turn competes with their packed lunch. Eating healthy is not always consistent with eating what is always popular. Adolescents rarely think about the long-term benefits of good health and have a hard time relating today's actions to tomorrow's health outcomes (Wardlaw, 2003).There is lot of research done on nutritional status of adolescent This study was done with the objective to analyze nutritional status and school eating pattern of early adolescents.

■ **RESEARCH METHODS**

The study tools involved both quantitative and qualitative components. The study was carried out among adolescents of the selected schools. For quantitative component, a survey was carried out using a self-administered structured questionnaire, among 280 students who included 86 girls and 194 boys from one government and two private schools to include desired age-group of 13-15 years. The questionnaire was pre-tested. The selected classes were explained the purpose of the study. Participation in the study was voluntary. Self-administered questionnaire was completed by students. The instruments were collected after checking for completeness. The questionnaire was designed to assess the school eating patterns and food habits of adolescents, in which the questions were asked on the consumption of packed lunch, preferred snacks in school canteen and reason for eating at school canteen.

Anthropometric measurements included weight, height and BMI. Body weight in light clothes was measured to the nearest 0.1 kg using a Commercial Balance scale and height to the nearest 0.5 cm using a locally manufactured hanging stature meter. Subject was asked to stand without shoes, upright against a wall with hills, hips and shoulders touching the wall. The body mass index (BMI), or Quetelet index, is a statistical measure of body weight based on a person's weight and height. Though it does not actually measure the percentage of body fat, it is used to estimate a healthy body weight based on a person's height. BMI of respondent was computed using the formula weight (kg)/ height (m²). Nutritional status of children's were then identified using the cut off values for normal anthropometrical variables in Asian Indian adults (Ramachandran *et al.,* 2003 and Shah *et al.*, 2008).

■ **RESEARCH FINDINGS AND DISCUSSION**

The results obtained from the present investigation as well as relevant discussion have been summarized under following heads:

Body Mass Index :

Results of BMI revealed that majority of girls and boys (48.9%) were of normal weight followed by 36.8 per cent who were underweight while the prevalence of overweight and obesity is 7.9 per cent and 6.4 per cent, respectively. Out of total 86 of girls 29.1 per cent were underweight, 52.3 per cent were of normal weight, 11.6 per cent were overweight and 9.3 per cent were obese. In boys 41.2 per cent were underweight, 47.4 per cent were normal weight, 6.2 per cent were overweight and

5.2 per cernt were obese.The prevalence of overweight and obesity in school going early adolescents in the present study counters the results obtained from other studies. However it is supported by the study conducted by Shah *et al.* (2008) which showed that there are more underweight adolescents as compared to overweight and obese adolescents.

Food eating pattern:

Results of food eating pattern in school are classified on the basis of sex and Body Mass Index. Results related to food eaten during the recessperiod showed that majority of female students (51%) preferred to have packed food brought from their home, followed by 36 per cent who preferred to have both (packed food and canteen food) while 40 per cent of the total boys preferred to eat both (packed lunch and canteen food) followed by 37 per cent who preferred packed food only. Overweight/Obese girls (56%) and boys (55%) fall in the category of both (packed food and canteen food).

Majority of respondents (girls 48%, boys 45 %) eat from their school canteen because of the taste of food (Table 3). Other driving forces due to which students preferred to eat in the school canteen were not carrying packed food (girls 26%, boys 36%) and peer influence (girls 26%, boys 19%). In case of overweight/ Obese category majority of girls (50%) and boys (50%) prefer canteen food because of its taste.

Preferences for food items to carry in packed food revealed that majority of both girls (93.3%) and boys

Table 1: Distribution of sample based on Body Mass Index (BMI)

Grading	BMI (kg/m^2)	Sex					
		Girls		Boys		Total	
		Freq.	%	Freq.	%	Freq.	%
Under weight	<18.0	23	29.1	80	41.2	103	36.8
Normal weight	18-22.9	45	50	92	47.4	137	48.9
Over weight	23-24.9	10	11.6	12	6.2	22	7.9
Obese	>25	8	9.3	10	5.2	18	6.4
Total		86	100	194	100	280	100

Table 2: Distribution of samples based on food eaten during recess period

Sex	BMI→ Food eating pattern↓	Normal		Overweight/Obese		Underweight		Total	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Female	Packed lunch(Only)	24	53	6	33	14	61	44	51
	At school canteen (Only)	7	16	2	11	2	9	11	13
	Both (Packed lunch and at school canteen)	14	31	10	56	7	30	31	36
	Total	45	100	18	100	23	100	86	100
Male	Packed lunch (Only)	40	43	4	18	28	35	72	37
	At school canteen (Only)	22	25	6	27	16	20	44	23
	Both (Packed lunch and at school canteen)	30	32	12	55	36	45	78	40
	Total	92	100	22	100	80	100	194	100

Table 3: Distribution of samples based on reason for eating in school canteen

Sex	Reason	Group						Total	
		Normal		Overweight/Obese		Underweight			
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Female	Taste	10	48	6	50	4	44	20	48
	Peer influence	4	19	4	33	3	33	11	26
	Do not carry packed lunch	7	33	2	17	2	23	11	26
	Total	21	100	12	100	9	100	42	100
Male	Taste	22	42	9	50	24	46	55	45
	Peer influence	8	15	3	17	12	23	23	19
	Do not carry packed lunch	22	42	6	33	16	31	44	36
	Total	52	100	18	100	52	100	122	100

(98%) preferred parantha with pickle/sabji (Table 4). Among normal weight girls, 97.3 per cent preferred parantha with pickle/sabji, 78.3 per cent preferred maggi/ noodles and sandwiches each, 73 per cent preferred stuffed parantha and 68.4 per cent preferred fruits. Overweight/obese girls had given equal preference for parantha with pickle/sabji, maggi/noodles, sandwiches and fruits *i.e.* 93.8 peer cent and 87.5 per cent preferred stuffed parantha. Among underweight girls, 95.3 per cent preferred sandwiches, 90.4 per cent each preferred maggi/noodles and fruits each, 85.7 per cent preferred parantha with pickle/sabji and 76.2 per cent preferred stuffed parantha. Although overweight/obese, normal

weight and underweight girls have similar preferences for food items carried in packed food, overweight/obese girls have given more preference to maggi/noodles as compared to normal weight girls.

Among normal weight boys, 98.6 per cent preferred parantha with pickle/sabji, 82.9 per cent preferred maggi/ noodles, 78.6 per cent preferred stuffed parantha, and 77.1 per cent each preferred sandwiches and fruits. All overweight/obese boys (100%) preferred parantha with pickle/sabji, 81.2 per cent preferred fruits, and 75 per cent preferred stuffed parantha and had given equal preference to maggi/noodles and sandwiches *i.e.* 68.8 per cent. Among underweight boys, 98.4 per cent

Table 4: Distribution of sample based on preference for food items in packed Lunch

Sex	BMI→	Normal (38)		Overweight/Obese (n=16)		Underweight (n=21)		Total	
	Food Items↓	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Female	Parantha with pickle/sabji	37	97.3	15	93.8	18	85.7	70	93.3
	Maggi/noodles	29	78.3	15	93.8	19	90.4	63	86
	Stuffed parantha	27	73	14	87.5	16	76.2	57	75
	Sandwiches	29	78.3	15	93.8	20	95.3	64	85
	Fruits	26	68.4	15	93.8	19	90.4	60	80
	Food Items↓	Normal (n= 70)		Overweight/Obese (n=16)		Underweight (n=64)		Total	
Male	Parantha with pickle/sabji	69	98.6	16	100	63	98.4	147	98
	Maggi/noodles	58	82.9	11	68.8	47	73.4	116	77.3
	Stuffed parantha	55	78.6	11	68.8	47	73.4	113	75.3
	Sandwiches	54	77.1	12	75	48	75	114	76
	Fruits	54	77.1	13	81.2	50	78.1	117	78

Table 5: Distribution of sample based on preference for Snacks

Sex	Snacks	Group						Total (n=42)	
		Normal (n=21)		Overweight/Obese (n=12)		Underweight (n=09)			
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Female	Fast food (Burger/Hotdog)	8	38	11	91.6	6	66.6	25	59.5
	Biscuits	5	23.8	6	50	7	77.7	18	42.8
	Potato chips	13	61.9	8	66.7	8	88.8	29	69
	Sandwiches	18	85.7	7	58.3	4	44.4	29	69
	Pastry/Chocolates	7	33.3	8	66.7	4	44.4	19	45.2
	Fried snacks	7	33.3	9	75	6	66.6	22	52.3
	Maggi/noodles	11	52.3	11	91.6	5	55.5	27	64.2
Male	Snacks	Group						Total (n=122)	
		Normal (n=52)		Overweight/Obese (n=18)		Underweight (n=52)			
	Fast Food (Burger/Hotdog)	43	82.6	17	94.4	39	75	99	81.1
	Biscuits	18	34.6	7	38.8	17	32.6	42	34.4
	Potato chips	26	50	16	88.8	29	55.7	71	58.1
	Sandwiches	32	61.5	11	61.1	43	82.6	86	70.4
	Pastry/Chocolates	24	46.1	10	55.5	24	46.1	58	47.5
	Fried snacks	38	73	12	66.6	35	67.3	85	69.6
	Maggi/noodles	41	78.8	14	77.7	47	90.3	102	83.6

preferred parantha with pickle/sabji, 78.1 per cent preferred fruits, 75 per cent preferred sandwiches and 73.4 per cent each preferred maggi/noodles and stuffed parantha. Normal weight, overweight/obese and underweight boys preferred parantha with sabji/pickle most. Overweight/obese girls have given equal preference for parantha with pickle/sabji, maggi/noodles, sandwiches and fruits *i.e.* 93.8 per cent while overweight/obese boys preferred parantha with sabji/pickle most (100%) followed by fruits (81.2%), sandwiches and maggi/noodles by 68.8 per cent.

Preference for snacks eaten at the school canteen revealed (Table 5) that majority of girls preferred potato chips and sandwiches equally *i.e.* (69%) followed by

maggi/noodles (64.2) while on the contrary boys preferred maggi/noodles (83.6%) followed by fast food (81.1).

For the normal weight girls sandwiches was the most preferred snack (85.7%) followed by potato chips (61.9%), and maggi/noodles (52.3%), fast food, pastry/chocolates, fried snacks and biscuits rated lower than these at 38 per cent, 33.3 per cent, 33.3 per cent and 23.8 per cent, respectively. Overweight/obese girls had given equal preference to fast food and maggi/noodles *i.e.* 91.6 per cent followed by fried snacks (75%), potato chips and pastry/chocolates equally preferred by respondents *i.e.* 66.7 per cent, then after preferred fast food and pastries/chocolate (85.7%) and fried snacks
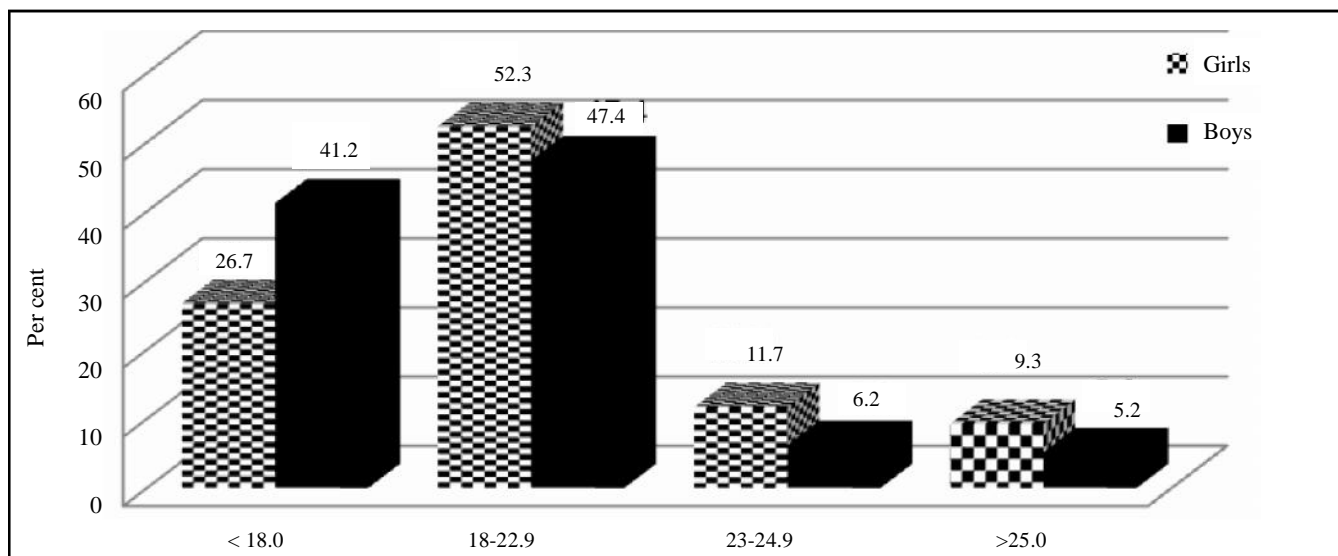

Fig. 1 :   Distribution of adolescents on the basis of Body Mass Index

Table 6: Distribution of sample based on preference for beverages									
		Group						Total (n=86)	
Sex	Beverages↓	Normal (n=45)		Overweight/ Obese (n=18)		Underweight (n=23)			
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
Female	Fruit juice	39	86.6	17	94.4	21	91.3	77	89.5
	Cold drinks	33	73.3	16	88.8	18	78.2	67	77.9
	Lassi/Chach	40	88.8	17	94.4	19	82.6	76	88.3
	Tea	30	66.6	17	94.4	16	69.5	63	73.2
	Coffee	32	71.1	17	94.4	17	73.9	66	76.7
		Normal (n=92)		Overweight/ Obese (n=22)		Underweight (n=80)			
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
	Fruit juice	90	97.8	17	77.2	72	90	179	92.2
	Cold drinks	68	74	20	91	58	71.2	146	75
	Lassi/Chach	78	84.7	20	90.9	55	68.7	153	78.8
	Tea	72	78.2	17	77.2	58	71.2	147	77.7
	Coffee	67	72.8	15	68.1	55	68.7	137	70.6

(83.3%). In underweight category potato chips gained highest preference (88.8%) followedby biscuits 77.7 per cent, fast food and fried snacks get equal preference *i.e.* 66.6%.

For boys maggi/noodles was the most preferred snack (83.6%) followed by fast food (81.1%). Fast food was the most preferred snack in normal weight and overweight/obese category of boys *i.e.* 82.6 per cent and 94.4 per cent, respectively while 90.3 per cent of underweight boys preferred maggi/noodles as the most preferred snack. Biscuits were the least preferred snack for both girl (42.8%) and boys (34.3%). It is evident from the Table 5 that respondents prefer foods, which are high in fat and sugar. These refined foods (simple sugars) have lesser satiety. They are digested readily and person feels hungry in small time gap and eats something else.

Fruit juices were most preferred beverage among both girls 89.5 per cent and boys 92.2 per cent (Table 6) and teawas least preferred beverage by girls (73.2%) and coffee was least preferred by boys (70.6%).Though in overweight/obese girls cold drinks were least preferred (88.8%) as compare to laasi/chach, tea, coffee 94.4 per cent each. But it is higher in compare to normal and underweight girls *i.e.* 73.3 per cent and 78.2 per cent, respectively. Lassi/chach was the second most preferred beverage in normal weight (84.7%) and overweight/ obese (90.9%) boys. While cold drinks and tea were the second most preferred beverage by underweight boys *i.e.* 71.2 per cent.

Conclusion :

Adolescence is a period of rapid changes. And an ideal nutritional status in this age gives a strong foundation for healthy life in future. An increase in overweight, obesity along with underweight in adolescents, which calls for an immediate action not only by parents but also by the School Management. All the snacks available at school canteen were high in fat and sugar and they were the obvious choice available to adolescents. As far as beverages are concern adolescents preferred fruit juices and lassi/chach, which strongly prove that adolescents chose healthier option if made available to them.The School Management can play a pivot role in creating awareness towards healthy lifestyle also can provide healthier eating options in their canteens.

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■ REFERENCES

Barbara, A.B. and Robert, M.R. (2001). Present knowledge in nutrition (8th edition,Washington,DC: (International life Sciences Institute-ILSI Press).p. 426-36

Bhave, S.Y. and Nair, M.K.C. (2002). Course manual for adolescent health. Part-II: Indian perspective. In: Bhave S.Y., editor. Adolescent health. New Delhi: Indian Academy of Pediatrics;. p. 7–11.

Cavadini, C., Decarli, B., Dirren, H., Cauderay, M., Narring, F. and Michaud, P.A. (1999). Assessment of adolescent food habits in Switzerland Appetite. 32:p97–106.

Dausch, J.G., Story, M., Dresser, C., Gilbert, G.G., Portnoy, B. and Kahle, L.L. (1995). Correlates of high-fat/low-nutrient-dense snack consumption among adolescents: results from two national health surveys. *Am. J. Health Promot.*, **10** : 85–88.

Ramachandran, A., Snehalatha, C. and Vijay, V. (2003). Cut off values for normal anthropometric variables in Asian Indian adults. *Diabetes Care,* **26**(5): 1380-1384.

Shah, C., Diwan, J., Rao, P., Bhabhor, M., Gokhle, P. and Mehta, M. (2008). To assess the obesity in school children. *Calicut Med. J.,* **6** (3) : 1-8.

Venkaish, K., Damayanti, K., Nayak, M.U. and Vijayraghvan, K. (2003). Diet and nutritional status of rural adolescents' in India. Nutrition News, National Institute of Nutrition, Hyderabad. 24:4.

Wardlaw, G.M. (2003). Contemporary Nutrition: Issues and Insights. 5th Ed. Boston: MacGraw Hill.

World Health Organization (2003). Nutrition in adolescence. Issues and Challenges for the Health Sector. Issues in Adolescent Health and Development,. Geneva, Switzerland: WHO.p1-37

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