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Adolescent's dietary behavior and its linkages with nutritional status: A study of dual-earner

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Abstract
Increase in the livelihood cost drives the parents to be bread-winner of the family for healthy sustenance. However, Rapid Changes in the family structure brought changes in the dietary pattern of members with replacement of the cooked meals with the processed food as well as unhealthy fast-food. Lack of time prompts parents to ask their growing child to have food and beverages outside home. Also, changes in the lifestyle behaviour affects the dietary behaviour that in turn impacts the nutritional status and increase the risk of chronic diseases among the adolescents. This study is an attempt to understand the dietary behaviour of the adolescents of the dual-earners and its linkages with their nutritional status. A self-administered questionnaire was developed to explore the lifestyle, psychological wellbeing and nutrition of the adolescents aged 15-19 years who's both parents are working and those studying in the colleges of Delhi and Mumbai University. 447 adolescents selected through criteria, completed the interview. Results shows that only half of the respondents had the breakfast and one-third had lunch day before the survey. Less than one-third of adolescent reported consumption of vegetables except the potatoes in the preceding week but 95% reported eating at least one energy-dense snack.

Less than half of the respondent consumed a particular fruit and juices while 80% reported drinking three or more servings of energy-dense beverages. Overall, the adolescents reported poor dietary intakes. It is found that with increase in the number of family member, consumption of any food item decreases while family affluence and parental education also impacts the consumption. It is found that those who consumes energy-dense food and beverages are more likely to be obese. The Indian adolescents reported poor food consumption patterns, and these findings highlight the need to design effective nutrition promotion strategies to encourage healthy eating in adolescence and targeting food supply and availability.

Keywords: Adolescent, dual-earner parents, dietary pattern, nutrition

Introduction

Nutrition and Health as well as are crucial for everyone health. During the growing-up years, teens faced the heat of physical as well as environmental changes. The studies reported that many teens in the developing countries enter adolescence undernourished, making them more vulnerable to disease and early death (WHO, 2016a) [1]. Singh and Gopalkrishna (2014) [2] found that socio-cultural, economic and household food security are the reason for adolescent undernourishment. However, many adolescents are also found to be obese and overweight due to changes in the lifestyle. The prevalence of obesity among young men and women is higher in urban areas (IIPS and ICF, 2017) [3], teens studying in private school (Sonya *et al*., 2014) [4] and belonging to affluent family (Richter *et al*., 2009) [5]. A report published by WHO in 2016 indicates that only one-fourth of the adolescent do the required physical activity. Family history as well as genetics are also found to be related with the child obesity (Jackson & Beaver, 2015) [6]. Adolescent are reported to gain weight when they enters the higher studies after school completion due to lack of time as well as physical activity and changes in the daily routine like food and sleep hour (Baum, 2017) [7]. Long working hours and the poor family conditions together with the lack of comprehension on the part of parents leads to increased likelihood of children becoming delinquent (Radin, 1971; Sutherlan & Cressy, 1968) [8, 9]. Richter *et al*. (2009) [5] found that family socio-economic status is strongly associated with the consumption of vegetables as well as watching television. However, the low socio-economic status found to be related with the poor diet, less physical activity consumption of alcohol and substance use (Hanson & Chen, 2007) [10]. Parents working in non-standard hours has negative impacts on the adolescent wellbeing (Dockery, Li, & Kendall, 2009, Champion *et al*., 2012) [11, 12].

Using data from 2001-02 German Time Budget Survey, Chen and his colleagues found that parental labour force participation is negatively associated with time spent on eating with children and which in turn affect the eating habits (Chen, Moser, & Nagya, 2015) [13]. So, this paper explores the consumption of food items, number of meals, current nutrition status as well as illness among the adolescent and impact of various factors on the child nutrition.

Data and Methods

In this study, a multistage procedure employed to understand the significant relationship between the psychological wellbeing, lifestyle, and socio-demographic factors through a self-administered questionnaire. The detailed information is as follows:

Site and Population

Delhi University and Mumbai University were purposively selected for the survey purpose being present due to their presence in the biggest metropolitan cities of India. The first is the Indian capital and the second is the economic capital of India. These cities have largest chunk of parents working not only to fulfil their needs but also to support their lifestyle. The study focused on adolescents (under 20 years) of working parents studying in colleges, staying in Delhi and both parents working for more than 1 year. Who were a sub-sample of the population?

Sampling Design

The study was exploratory in nature; therefore, we did not use any parameter to calculate a necessary or sufficient sample size. A three stage sampling procedure was used. At a first stage, all affiliated colleges were selected that have the regular courses such B.Sc., B.Com. or B.A. At the second stage, only co-ed colleges were opted for a better understanding of the mutual relationships between boys-girls and gender related issues. At third stage, only those colleges were selected that have all three faculties *viz*. Science, Arts and Commerce. It was useful in order to have sufficient size of the population from which sample was selected for the study and to increase the heterogeneity in the sample. Then fifteen colleges were chosen randomly. Data from 15 colleges was collected by obtaining the necessary ethical permission. Four from each of the South and North Campus because there are more Non-NCR students in the north campus which impact the social credibility of any student in Delhi while 7 colleges were selected lying in Mumbai metropolitan region. Ten students were selected from each of any science departments or course, any arts departments or course and any commerce departments or course i.e. 30 students (10 student's X 3 Courses) in total from each college. So the total sample would be around 450 (30 students * 15 Colleges). The total of 447 adolescent fulfilling the selection criteria, completed the questionnaire.

Tool and Scale and analysis

Self-Administered questionnaire that includes the information of adolescent background, background and lifestyle of parents, siblings, friends, parenting style, anthropometric measures, illness and psychological wellbeing, was developed by the researcher by utilizing various trusted source of information such as NFHS, Youth in India Study, and others. The Methods also involves the comparison of the observed Body Mass Index (BMI), height and weight with the standard BMI, height and weight for particular age provided by the Indian Association of Paediatrics to understand the differentials in current situation of adolescent with those of required nutrition.

Ethical issue

All the necessary ethical approval was taken from institute ethical committee (SREC).

The respondent was informed about the purpose of the study, further, informed consent from the respondents was taken before interview.

Data collection and Analysis

The primary data was collected during July 10, 2018 to November 15, 2018 from adolescents aged 15-19 years studying in the colleges of Delhi and Mumbai Universities. Various colleges were approached for this study however only 15 colleges given the necessary permission to get the data from adolescents. Following the criteria, the total of 447 adolescent found to be completed the questionnaire We have utilized these sub scales for further analysis. Univariate, Bivariate, and Multivariate statistical methods are used to assess the dietary behaviour and nutrition among the adolescent and the related factors.

Results

Profile of the Adolescent

The study encompassed 447 adolescents, out of which about 47 percent (209) adolescent belonged to Mumbai and 53 percent (238) belonged to Delhi. Further, this study included about 31 percent of middle adolescents (16–17 years) and about 69 percent of late adolescent (18-19 years). About 79 percent of the study respondents were Hindus. In total, around 15 percent participants belong to OBC and around 15 percent participants belong to SC/ST caste. About half of the respondents had 5–6 members in the household including them. About 17 percent and 30 percent of the respondents had 3-4 members and 7 and more members in the household respectively. More than 58 percent of the fathers while one-third of the mothers have age more than 45 years in both the cities. 30 percent mothers and more than 40 percent fathers in both cities have education till secondary. In sample, about 44 percent adolescent's fathers have engaged in formal sectors and 56 percent have engaged in informal sectors. While, 54 percent mothers employed in formal sectors and 46 percent in informal sectors. Altogether, about 32 percent fathers had monthly income less than 25000 and about 37 percent mothers had monthly income of less than 25000.

Nutrition among Adolescents

Frequency of Meals

Table 1 showing the percentage distribution of meals/ snacks taken by adolescent in Delhi and Mumbai. It is found that more than half of the adolescent had breakfast yesterday in both the cities. Only 1 in 3 and about 27 percent adolescent had lunch in Mumbai and Delhi respectively. In Mumbai, more than 80 percent adolescent had dinner yesterday while 87 percent adolescent in Delhi had dinner yesterday. There was a significant relationship between the cities and had dinner yesterday.

Three fourth adolescent have breakfast usually at home in

Mumbai and Delhi. While, 19 percent and 16 percent adolescent in Mumbai and Delhi respectively usually have breakfast in college. In Mumbai, one in three adolescent usually taking lunch at home, while about 66 percent adolescent in Delhi take lunch at home. One in five teenager in Mumbai and one in four teenager in Delhi take lunch in college. Place of having lunch is associated with the cities. Majority of the teenagers (Mumbai 96% and Delhi 93%) usually have dinner at home.

One-third of adolescents take breakfast outside, around 18 percent teen in Mumbai and 20 percent teen in Delhi take lunch outside, and few teenagers take dinner outside the home more than 2 times in a week. The study did not show any significant differences between frequency of intake breakfast, lunch and dinner outside the home and the cities. In Mumbai, about 24 percent adolescent skipped three or more times breakfast in a week, followed by lunch (22 percent), and dinner (14 percent). Whereas, about 20 percent, 26 percent, and 19 percent of the teenagers live in Delhi skipped breakfast, lunch, and dinner 3 or more times in a week respectively.

In Mumbai, around 1-in-10 teenagers have dinner or super with family, fix or buy the food for any of your family's meal, eat or take out a meal from a fast food restaurant, and on special diet for medical reasons. In Delhi, around 8 percent, 14 percent, 16 percent and 12 percent students have dinner or super with family, fix or buy the food for any of your family's meal, eat or take out a meal from a fast food restaurant, and on special diet for medical reasons respectively. The differences between the cities was not found significant. Percentage of vegetarian was significantly high in Delhi (25%) than Mumbai. In Mumbai and Delhi, 26 percent and 28 percent youth have any problems with your appetite, like not feeling hungry, or feeling hungry all the time respectively.

Consumption of food items

Table 2 shows the percentage of food items the respondent had in the last week. Most adolescents had cereals (83%), vegetables (93%), fruits and juices (91%), dairy products (84%), and pulses (71%) in the last week. About 3-4th teen had chapati/roti and half adolescent had bread last week. Whereas last week, only 1 in 5 teenagers consumed cereals/grits and other grains (rice etc.). Around 70 percent and 62 percent adolescents had potatoes and tomatoes in last week respectively. Around 1-3th teenagers had carrots, green beans and peas. More than half of the adolescent had banana, about 45 percent had apple/juice, and other juices. Few students had peaches (7 percent), pineapple/juice (11 percent) and melon (12 percent) in last week.

It was found that 45 percent of adolescent had Milk ice cream and similar proportion consumed butter in last week. Almost one third had milk, curd and yogurt while the consumption of cheese (26%), fat free milk (14%) and low fat milk (11%) was comparatively low. Half of the teenagers had pulses last week. Three fifth students consumed non-vegetarian food last week out of which about half of the adolescent consumed egg (47%) and chicken (45%) last week. Fish was consumed by only 27% of the teen in last week.

Almost all adolescent (95%) consumed energy dense snacks last week. Chocolates (70%), somosa/other fried items (69%), ice cream (64%), and biscuits (60%) were highly consumed by adolescent in last week. More than half of adolescents consumed confectionery items (58%), pizza (56%), burgers (54%), and noodles/pasta (51%) in the past week. In addition, four-fifths of adolescents consumed energy-dense beverages last week. The highly consumed energy dense beverages were coffee/tea (66%) and regular soft drink (27%). Last week, highly consumed energy dense beverages were coffee / tea (66%) and regular soft drinks (27%).

Table 3 shows the percentage of food and beverage items the respondent had in the last week by place of residence. More than 80 percent adolescent consumed cereals in Mumbai and Delhi. Pulses and Legumes was consumed by around 70 percent of adolescent in both the cities. More than 90 percent teenagers consumed vegetables and fruits/juices in both the cities. In Mumbai and Delhi, 85 percent and 83 percent of adolescents consumed dairy products in the previous week respectively. There was a significant difference in the intake of non-vegetarian food between Mumbai (63%) and (55%) adolescent. Almost all teenagers in Mumbai (96%) and Delhi (95%) consumed energy-dense snacks. Whereas, four-five teenagers consumed energy dense beverages in both cities last week.

Consumption of food items by background characteristics

Table 4 shows the percentage of food and beverage items the respondent had in the last week by adolescent background characteristics in the study sample. 80% and 85% adolescents of age 16-17 years and 18-19 years consumed cereals last week respectively. In the same age groups around 70% of adolescents consumed pulses and legumes. Most of the middle and late teens consumed Vegetables, fruit and juice, and dairy products last week. Half of the middle and late adolescents consumed non-vegetarian food last week. Almost all and 80% middle and late teenagers consumed energy-dense snacks and beverages respectively. 40% middle teen and 53% late teens used bottled water last week.

More than 4-in-5th male and female adolescents consumed cereals. Around 70% female teen agers and 72% male teenagers consumed pulses and legumes. Vegetable intake was high in both male and female adolescents. Fruits and juice intake was comparatively high in female teen (93%) than male teen (89%). More than 80% female and male adolescent consumed dairy products whereas, 56% male and 61% female adolescents consumed non-vegetarian food. More than half boys and 46% girls used bottled water last week.

Around 86% science student consumed cereals, while around 82% arts and commerce student consumed cereals. Only 65% science student consumed pulses and legumes and about 3-in-4 students of arts and commerce consumed pulse and legumes last week. In the last week, almost all students in any education stream consumed vegetables, fruits and juices, energy-dense snacks, and beverages. Whereas, around 60%, 62% and 54% adolescent of science, arts and commerce stream consumed non-vegetarian food last week respectively. Also, in last week, 3-4th, half and 43% of teenagers of science, arts and commerce stream used bottled water respectively.

Hindu (86%) consumed more cereals than other religion (73%). Most Hindus (95%) and 85% of adolescents from other religions consumed vegetables last week. Intake of non-vegetarian food was high in non-Hindu adolescents

(68%) than Hindu (56%). In last we, 86% Hindus and 77% non-Hindus consumed dairy products. About 85% of SC/ST and other castes and 73% of adolescents consumed cereal in the last week. Also, almost all adolescents belong to other castes and SC/ST consumed fruits and juices, while 84% of OBC adolescents had fruits and juices. Three fourth OBC and SC/ST adolescent whereas 58% adolescent of other caste consumed non-veg food. In last week, around half of the other castes teenagers, 45% of SC/ST castes, and only 39% of backward classes drank bottled water. Less the member of house the consumption non-vegetarian food was high. Similarly, the consumption of bottled drinking water and dairy products decreased with the increase of family members.

Table 5, shows the percentage of food and beverage items the respondent had in the last week Parent's background characteristics in total sample. 63% of teenagers ate non-vegetarian food, whose father earns less than Rs.25,000 monthly. Half of the teenagers, whose father earned more than Rs.25,000 monthly, drank bottled water last week. Intake of fruits/juices and dairy products was higher among the adolescents those whose father earns more. Similar result was found with the mother monthly income. Consumption of dairy products was higher among adolescents whose father's education is graduate. Mother education is related to fruits and juices intake and dairy product intake.

Weight Management and History

Table 6 shows the weight management and Health History among the adolescent by city. About 45% and 51% of adolescents living in Mumbai and Delhi were concerned about their weight respectively. Few teenagers in Mumbai (3%) and Delhi (7%) were trying to control their weight by losing weight or vomiting, taking diet pills or laxatives, or not eating. In Mumbai and Delhi, 12% and 16% of adolescents were overweight as a child respectively. There is no difference in respondent weight management between cities.

Anthropometry of the Adolescents

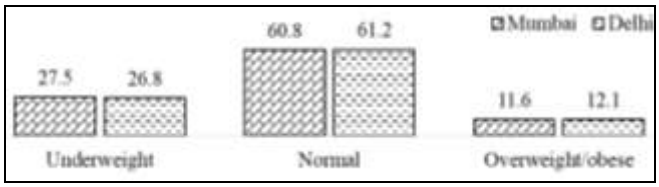


Fig 1: Body Mass Index

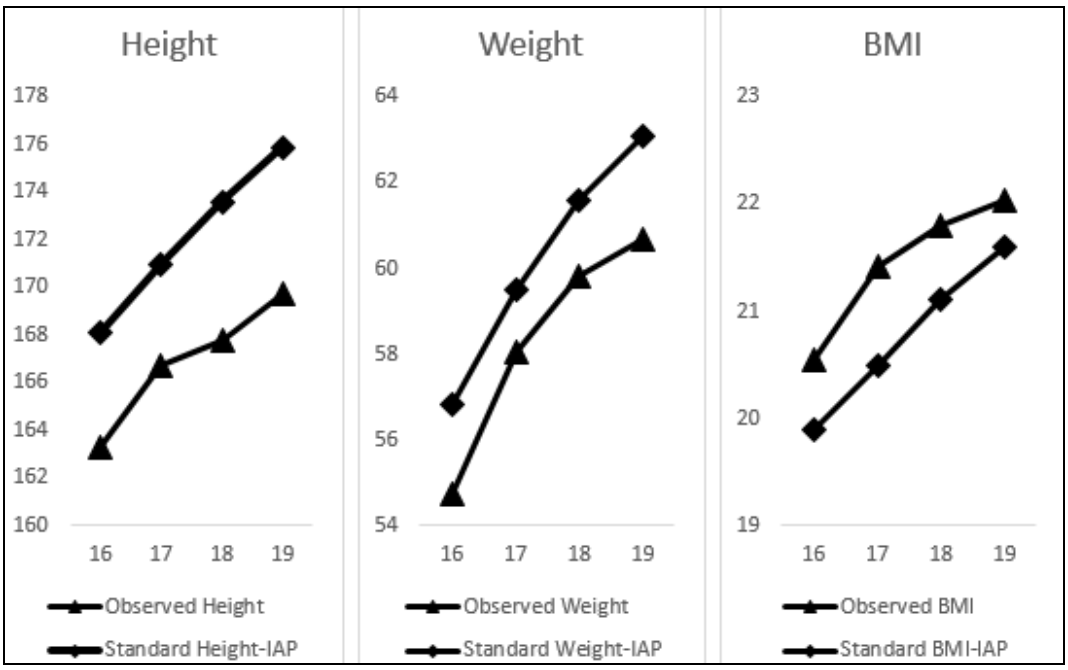
It was found that, in both the cities, more than three fourth of teenagers were found to be underweight and 12% were overweight/obese at the time of survey (Figure 1) among those who provided the weight and height.

In Delhi, 17% teenagers were concerned about their weight are overweight/obese as shown in Table 7. Respondent who are on diet, one in four and 22% of them were overweight/obese in Mumbai and Delhi respectively. Those who were overweight as a child, around 26% in Mumbai and 31% in Delhi were also found to be overweight/ obese at the time of survey.

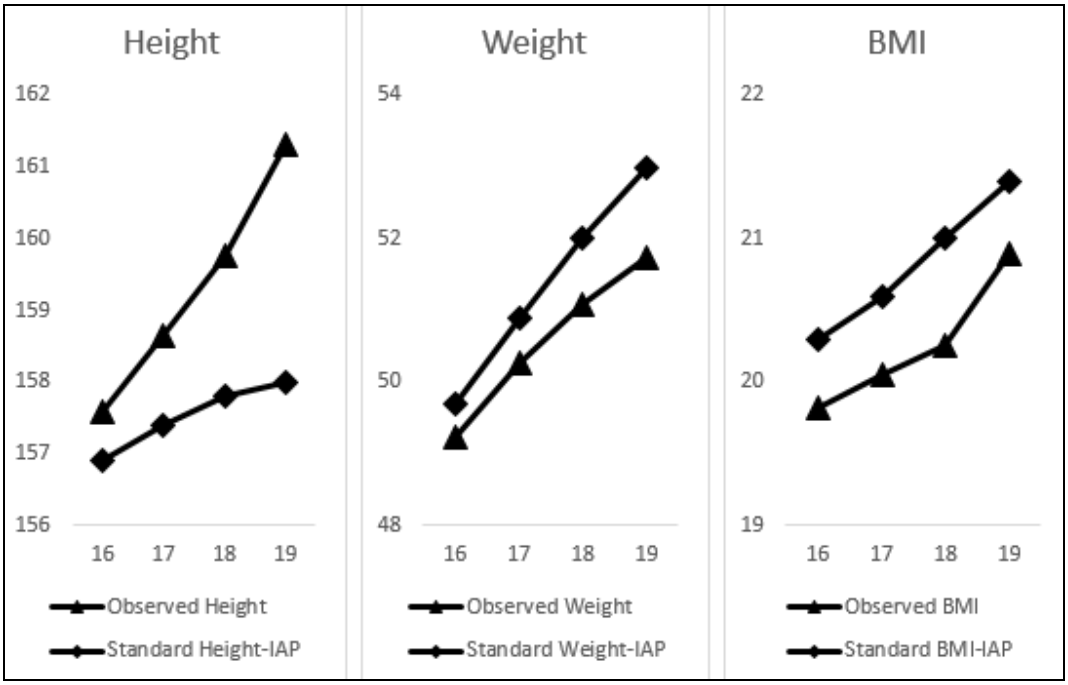
Comparison of Standard Growth (Median) and Survey data among the adolescent aged 16-19 by Sex in Mumbai and Delhi

The Study also looks into the standard height and standard weight provided by Indian Association of Pediatrics (IAP). These standards are calculate for average Indian girl and boy separately for each age. It is necessary to compare the calculated and standard as to find the differentials that shows the nutritional gap.

A difference was found in observed median height of boys and girls and standard IAP growth as shown in Figure 2. The observed median height and median weight is lower than IAP standard among the boys and while average observed height is higher for girls among the study respondent.



Male



Female

Fig 2: Comparison of Standard Growth (Median) and Survey data among the adolescent (all respondents) aged 16-19 by Sex

Anthropometric measures and related factors

Table 8 showing the body mass index by adolescent background characteristics in Mumbai and Delhi. In Mumbai Around 15% late adolescent were overweight/obese. Male (17%) were more overweight/obese than female. Hindus (12%) were overweight/obese. In 16% other caste were overweight/obese. A similar pattern was observed in Delhi.

Table 9 showing the body mass index by adolescent father's background characteristics in Mumbai and Delhi. In Mumbai, 13% and 12% adolescent were found to be overweight/obese whose father and mother monthly income was less than 25000 respectively. In Delhi, 17% adolescent were overweight/obese whose father monthly income was more than 25000 and more. Also, 15% teenagers were overweight/obese whose mother's education was higher secondary and Graduated and 13% were overweight/obese whose mother's income was less than 25000 monthly.

Table 1: Table showing the percentage distribution of meals/ snacks taken by adolescent in Delhi and Mumbai.

Background characteristics		Mumbai (n=209)		Delhi (n=238)		Total (n=447)	
		N	Per.	N	Per.	N	Per.
Meals or snacks had yesterday	Breakfast	108	51.7	134	56.3	242	54.1
	Lunch	70	33.5	65	27.3	135	30.2
	Dinner	169	80.9	207	87.0	376	84.1
	Morning snack	71	34.0	70	29.4	141	31.5
	Afternoon snack	135	64.6	165	69.3	300	67.1
	Evening snack	70	33.5	65	27.3	135	30.2
Taking Breakfast usually	Home	153	73.2	179	75.2	332	74.3
	College	39	18.7	39	16.4	78	17.4
	Other place	17	8.1	20	8.4	37	8.3
Taking Lunch usually	Home	157	75.1	156	65.5	313	70.0
	College	40	19.1	60	25.2	100	22.4
	Other place	12	5.7	22	9.2	34	7.6
Taking Dinner usually	Home	201	96.2	221	92.9	422	94.4
	College	5	2.4	7	2.9	12	2.7
	Other place	3	1.4	10	4.2	13	2.9
Breakfast outside, in a week	<=2 times	136	65.07	159	66.81	295	66.0
	>2 times	73	34.93	79	33.19	152	34.0
Lunch outside, in a week	<=2 times	172	82.3	191	80.25	363	81.2
	>2 times	37	17.7	47	19.75	84	18.8
Dinner outside, in a week	<=2 times	194	92.82	217	91.18	411	92.0
	>2 times	15	7.18	21	8.82	36	8.1
Skip meal 3 or more times a week	Breakfast	50	23.9	47	19.7	97	21.7
	Lunch	45	21.5	62	26.1	107	23.9
	Dinner	30	14.4	45	18.9	75	16.8
Eat dinner or super with your family 4 or more times this week		19	9.1	20	8.4	39	8.7
Fix or buy the food for any of your family's meal		22	10.5	33	13.9	55	12.3
Eat or take out a meal from a fast food restaurant 2 or more times a wee		25	12.0	38	16.0	63	14.1

On special diet for medical reasons	25	12.0	29	12.2	54	12.1
Vegetarian	36	17.2	58	24.4	94	21.0
Problems with appetite, like not feeling hungry, or feeling	54	25.8	69	29.0	123	27.5

*p-value<0.1, **p-value<0.05, N – Frequency, Per. - Percent

Table 2: Percentage distribution of the food items the respondent had in the last week

The list of food and beverage items the respondent had in the last week					
	N	**Per.**		**N**	**Per.**
Cereal	373	83.4	Pulses and Legumes	316	70.7
Chapati/ Roti	327	73.2	Dried beans (black beans, kidney beans, pinto Beans)	133	29.8
Bread	206	46.1			
Cereal/grits	87	19.5	Pulses	210	47.0
Other grains (Rice, etc.)	94	21.0	Nuts	128	28.6
Vegetables	414	92.6	Non-Vegetarian	262	58.6
Carrots	135	30.2	Egg	208	46.5
Corn	127	28.4	Fish	120	26.8
Broccoli	49	11.0	Chicken	200	44.7
Green beans	148	33.1	Other non-veg item	67	15.0
Green salad	111	24.8	Energy Dense Snacks	426	95.3
Greens	132	29.5	Biscuits	267	59.7
Peas	142	31.8	Muffins	76	17
Potatoes	317	70.9	Noodles/pasta	229	51.2
Tomatoes	279	62.4	Rolls	89	19.9
Other vegetables	165	36.9	Cakes/cupcakes	191	42.7
Fruit and Juices	406	90.8	Candy	106	23.7
Apple/juice	203	45.4	Chocolates	312	69.8
Banana	262	58.6	Chips	212	47.4
Pineapple/juice	39	8.7	French fries	104	23.3
Grape/juice	47	10.5	Cookies	147	32.9
Melon	53	11.9	Other sweets	81	18.1
Oranges/juice	89	19.9	Burger	240	53.7
Peaches	31	6.9	Pizza	252	56.4
Pear	65	14.5	Ice cream	287	64.2
Pomegranate/juice	114	25.5	Other confectionery items	258	57.7
Other juices	198	44.3	Samosa, Other fried items	306	68.5
Dairy products	374	83.7	Energy Dense beverages	357	79.9
Fat free milk	61	13.6	Fitness water	38	8.5
Low fat milk	48	10.7	Regular soft drink	121	27.1
Whole milk	162	36.2	Diet drinks	24	5.4
Flavoured milk	85	19	Fruit flavoured drink	83	18.6
Cheese	117	26.2	Sport drinks	31	6.9
Yogurt	132	29.5	Energy drinks	63	14.1
Curd	163	36.5	Recovery drinks	21	4.7
Butter	190	42.5	Coffee or tea	296	66.2
Milk Ice cream	200	44.7	Bottled Water	219	49
Other products	55	12.3			

N – Frequency, Per. - Percent

Table 3: The list of food and beverage items the respondent had in the last week by place of residence

Food Groups		**Mumbai (N=209)**		**Delhi (N=238)**		**Total (N=447)**	
		N	**Per.**	**N**	**Per.**	**N**	**Per.**
Cereal	Yes	177	84.7	196	82.4	373	83.4
Pulses and Legumes	Yes	145	69.4	171	71.8	316	70.7
Vegetables	Yes	195	93.3	219	92.0	414	92.6
Fruit and Juices	Yes	190	90.9	216	90.8	406	90.8
Dairy Products	Yes	177	84.7	197	82.8	374	83.7
Non-Vegetarian	Yes	132	63.2	130	54.6	262	58.6
Energy Dense Snacks	Yes	201	96.2	225	94.5	426	95.3
Energy Dense beverages	Yes	169	80.9	188	79.0	357	79.9
Bottled Water	Yes	100	47.8	119	50.0	219	49.0

*p-value<0.1, **p-value<0.05, N – Frequency, Per. - Percent

Table 4: The list of food and beverage items the respondent had in the last week by adolescent background characteristics

Background Characteristics		Cereals		Pulses and Legumes		Vegetables		Fruit and Juice		Dairy Products		Non-Vegetarian		Energy Dense Snacks		Energy Dense beverages		Bottled Water	
		N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.
Age (in years)	16-17	111	79.3	98	70.0	129	92.1	127	90.7	118	84.3	82	58.6	133	95.0	111	79.3	56	40.0
	18-19	262	85.3	218	71.0	285	92.8	279	90.9	256	83.4	180	58.6	293	95.4	246	80.1	163	53.1
Sex of respondent	Male	184	82.1	161	71.9	207	92.4	199	88.8	191	85.3	125	55.8	212	94.6	181	80.8	117	52.2
	Female	189	84.8	155	69.5	207	92.8	207	92.8	183	82.1	137	61.4	214	96.0	176	78.9	102	45.7
Education Stream	Science	129	86.0	97	64.7	137	91.3	136	90.7	124	82.7	89	59.3	143	95.3	122	81.3	86	57.3
	Arts	122	82.4	109	73.6	141	95.3	135	91.2	128	86.5	92	62.2	142	95.9	121	81.8	69	46.6
	Comm.	122	81.9	110	73.8	136	91.3	135	90.6	122	81.9	81	54.4	141	94.6	114	76.5	64	43.0
Religion	Hindu	304	86.1	253	71.7	334	94.6	325	92.1	302	85.6	198	56.1	340	96.3	281	79.6	174	49.3
	Others	69	73.4	63	67.0	80	85.1	81	86.2	72	76.6	64	68.1	86	91.5	76	80.9	45	47.9
Caste	Others	265	85.2	222	71.4	290	93.2	287	92.3	269	86.5	180	57.9	295	94.9	246	79.1	162	52.1
	OBC	49	73.1	47	70.1	61	91.0	56	83.6	50	74.6	41	61.2	64	95.5	55	82.1	26	38.8
	SC/ST	59	85.5	47	68.1	63	91.3	63	91.3	55	79.7	41	59.4	67	97.1	56	81.2	31	44.9
Total members	3-4	64	86.5	58	78.4	71	95.9	69	93.2	67	90.5	51	68.9	71	95.9	60	81.1	47	63.5
	5-6	204	85.0	162	67.5	218	90.8	213	88.8	203	84.6	140	58.3	227	94.6	186	77.5	119	49.6
	7+	105	78.9	96	72.2	125	94.0	124	93.2	104	78.2	71	53.4	128	96.2	111	83.5	53	39.8

N – Frequency, Per. - Percent

Table 5: The list of food and beverage items the respondent had in the last week by Parent's background characteristics

Father's Characteristics		Cereals		Pulses and Legumes		Vegetables		Fruit and Juice		Dairy and Products		Non-Vegetarian		Energy Dense Snacks		Energy Dense beverages		Bottled Water	
		N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.	N	Per.
Father Age	<=45 years	101	55.2	131	71.6	167	91.3	165	90.2	150	82.0	79	43.2	171	93.4	146	79.8	80	43.7
	>45 years	159	60.2	185	70.1	247	93.6	241	91.3	224	84.8	183	69.3	255	96.6	211	79.9	139	52.7
Father's Schooling	<=Secondary	109	55.3	138	70.1	180	91.4	183	92.9	162	82.2	129	65.5	189	95.9	160	81.2	86	43.7
	Higher Sec.	67	56.3	77	64.7	110	92.4	102	85.7	95	79.8	59	49.6	111	93.3	84	70.6	61	51.3
	Graduate+	84	64.1	101	77.1	124	94.7	121	92.4	117	89.3	74	56.5	126	96.2	113	86.3	72	55.0
Father's Job Sector	Formal	113	57.7	139	70.9	179	91.3	177	90.3	165	84.2	115	58.7	185	94.4	155	79.1	96	49.0
	Informal	147	58.6	177	70.5	235	93.6	229	91.2	209	83.3	147	58.6	241	96.0	202	80.5	123	49.0
Father's monthly income	<25000	76	53.1	92	64.3	137	95.8	129	90.2	118	82.5	90	62.9	139	97.2	118	82.5	68	47.6
	25000+	97	64.2	114	75.5	139	92.1	136	90.1	134	88.7	77	51.0	144	95.4	118	78.1	78	51.7
	Don't know	87	56.9	110	71.9	138	90.2	141	92.2	122	79.7	95	62.1	143	93.5	121	79.1	73	47.7
Mother Age	<=45 years	173	56.4	217	70.7	282	91.9	281	91.5	256	83.4	162	52.8	290	94.5	241	78.5	138	45.0
	>45 years	87	62.1	99	70.7	132	94.3	125	89.3	118	84.3	100	71.4	136	97.1	116	82.9	81	57.9
Mother's Schooling	<=Secondary	74	54.8	89	65.9	123	91.1	121	89.6	101	74.8	83	61.5	126	93.3	110	81.5	59	43.7
	Higher sec.	93	58.9	114	72.2	146	92.4	142	89.9	135	85.4	92	58.2	149	94.3	115	72.8	75	47.5
	Graduate+	93	60.4	113	73.4	145	94.2	143	92.9	138	89.6	87	56.5	151	98.1	132	85.7	85	55.2
Mother's Job Sector	Formal	139	57.4	170	70.2	226	93.4	223	92.1	213	88.0	155	64.0	234	96.7	187	77.3	131	54.1
	Informal	121	59.0	146	71.2	188	91.7	183	89.3	161	78.5	107	52.2	192	93.7	170	82.9	88	42.9
Mother's monthly income	<25000	88	53.0	119	71.7	153	92.2	146	88.0	141	84.9	100	60.2	158	95.2	129	77.7	78	47.0
	25000+	91	56.2	112	69.1	149	92.0	149	92.0	129	79.6	89	54.9	154	95.1	129	79.6	76	46.9
	Don't know	81	68.1	85	71.4	112	94.1	111	93.3	104	87.4	73	61.3	114	95.8	99	83.2	65	54.6

N – Frequency, Per. - Percent

Table 6: Table showing the adolescent looking for weight and the related factors

Weight Management and History		Mumbai (N=209)		Delhi (N=238)		Total (N=447)	
		N	Per.	N	Per.	N	Per.
Concerned about your weight	Yes	94	45.0	123	51.7	217	48.5
On a diet now to lose weight or to maintain your weight	Yes	34	16.3	53	22.3	87	19.5
Trying to lose weight or control your weight by vomiting, taking diet pill or laxatives, or not eating	Yes	7	3.3	16	6.7	23	5.1
Overweight as a child	Yes	24	11.5	38	16.0	62	13.9
Anyone in the family is overweight	Yes	40	19.1	53	22.3	93	20.8

N – Frequency, Per. - Percent

Table 7: Weight Management and BMI

Weight Management and History	Overweight/ Obese					
	Mumbai	Chi2	Delhi	Chi2	Total	Chi2
Concerned about your weight	15.3	2.0	17.4	6.4**	16.5	8.0***
On a diet now to lose weight or to maintain your weight	23.5	5.7**	22.0	6.0**	22.6	11.7***
Trying to lose weight or control your weight by vomiting, taking diet pill or laxatives, or not eating	71.4	25.3***	53.3	25.8***	59.1	49.6***
Overweight as a child	26.1	5.3**	31.4	14.7***	29.3	19.6***
Anyone in the family is overweight	22.9	5.3**	22.9	1.9	19.8	6.5**

***p-value<0.001, **p-value<0.05, *p-value<0.01

Summary and Discussion

This paper dealt with the Nutrition status and health of the adolescent. The present study results indicate that intake of meals (breakfast, lunch and dinner) outside the home, skipping meals, intake of non-vegetarian food, and energy-dense beverages are part of every adolescent life. The study found no difference between the two cities in the consumption of cereals, pulses, vegetables, fruits/juices, dairy products, energy-dense snacks and beverages, and bottled water. However, significant differences were found between cities in consuming non-vegetarian food. Consumption of food and beverages is not affected by the background characteristics such as age, sex, education stream, religion, caste, and total members. Though, the consumption of dairy products is high, and intake of non-vegetarian food is low among Hindus in both cities. Father's income is found to be associated with the intake of fruits/juices, dairy products and bottled water.

Between the cities, no difference was found in the prevalence of adolescents seeking weight management. However, BMI is highly associated with weight Management and History in both cities. Most teens who are trying to lose weight or control weight by vomiting, taking diet pills or laxatives, or not eating are overweight/obese in both cities. The family history and genetics of adolescents (overweight as a child) are found to be significantly associated with current obesity among adolescents. Similar findings were reported in the previous study (Jackson & Beaver, 2015) [6]. In Delhi, many adolescents aged 18-19 were found to be overweight. Teenagers whose mothers have completed higher education are more likely to be overweight and obese. Adolescent belonging to other caste is found to be overweight/obese in both cities. That shows that children from low socio-economic status are malnourished in both metropolitan cities. The effect of mother-father monthly income is found to be highly associated with the BMI of adolescents. The study also reported that affluent families impact the children's nutrition, i.e. most of them are found to be obese. A difference was found between boys' and girls' observed median height and standard IAP growth. 1 in 10 adolescents suffered from at least one disease in both cities. A difference was found between boys' and girls' observed median height and standard IAP growth. Though we may not conclude anything from this because adolescent height grows rapidly, while weight may not be a static process. The health benefits of regular physical activity have been documented by studies in the past (Janssen and Leblanc, 2010). However, this study found that four in five adolescents were not meeting the recommended guidelines of 60 minutes of physical activity each day. The Study give insights into the dietary behaviour and nutrition of the adolescent of the Dual-earner families and suggest the working parents to give enough time and counsel their children regarding the right nutrition.

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