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DIETARY BEHAVIOURS, PHYSICAL ACTIVITY PATTERNS AND BODY MASS INDEX OF ADOLESCENT BOYS AND GIRLS

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ABSTRACT

Adolescence is a period of rapid physiological maturity coupled with several social and psychological changes. During this phase, any form of under-nutrition/over-nutrition can result in increased risk of degenerative diseases (such as low bone mineral density, altered adiposity, impaired glucose tolerance, dyslipidemia) in later years of life. There is high incidence of both under-nutrition and over-nutrition among adolescents across the world, especially in India. In order to overcome these problems, it is necessary to target evidence based interventions.

The study was conducted to assess the dietary habits, lifestyle practices and body mass index (BMI) of school going adolescents. 150 adolescent boys and girls were enrolled from schools providing educational facilities to children belonging to low, middle and high income group families. Results indicate that most adolescents were preferentially leading a sedentary lifestyle. There were several dietary errors such as irregular eating habits, faulty food choices and nutritional inadequacies. The mean height, weight and BMI of the girls were 152.1cm, 48.9kg and 21.2 while that of the boys 163.9cm, 58.1kg, and 23.1 respectively. Data indicate the prevalence of underweight (30.6%) and overweight/ obesity (18.0%). Drinking (9.3%), smoking (6.0%), tobacco chewing (2.0%) and drug abuse (1.3%) were also reported.

Keywords: Adolescents, Body Mass Index, Nutrients, Physical Activity, Smoking, Substance Abuse

I. INTRODUCTION

Adolescents comprise 18 per cent (1.2 billion) of the world population. India is home to the greatest number of adolescents (243 million) which constitute 21 per cent of the country's population [1]. The limited data available on adolescent health all over the world [2] and especially in India indicate that while improved immunization has resulted in a steep decline in the spread of communicable diseases, the status of non-communicable diseases (NCDs) continues to remain a public health issue. Malnutrition in the form of under and over nutrition has been

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found to co-exist among adolescents especially in the low- and middle income countries [3, 4]. In India, 47 per cent adolescents (15-19 years) are underweight with their body mass index (BMI) being less than 18.5. Further, about 39 per cent, 15 per cent and 2 per cent adolescent girls suffer from mild, moderate and severe anaemia [5]. Though there is not enough National data on overweight and obesity for this segment of the population, the world health statistics on adults indicate that the status of over nutrition is also grim. According to the World Health Organization (2014), 1.9 per cent and 2.1 per cent of Indians suffer from obesity and elevated blood pressure; nearly 26 per cent of Indians (30-70 years) are at risk of dying due to cancer, diabetes, cardio-vascular diseases (CVDs) and chronic respiratory diseases [6]. It is well known that the origin of these diseases particularly CVDs is at an early age and that adiposity, blood pressure and blood cholesterol levels track well from adolescence to adulthood [7]. Further, anaemic and under-weight adolescent girls - the future mothers, would give birth to low birth weight babies and it is well documented that low birth weight babies tend to have low high density lipoprotein cholesterol, high triglyceride concentrations and insulin resistance during their future years of life.

Adolescent health is a cause of concern worldwide because it is affected immensely by demographic changes, urbanization, technological advancements (work, leisure), economic growth, changes in food processing patterns as well as exponential growth of mass media [2]. During adolescence, dietary intake and lifestyle is greatly influenced by the peers and mass media [8]. Irregular meals, nibbling, bingeing, increased consumption of fast foods/processed foods, eating outside home are some of the characteristic features of adolescent diets [9, 10, 11, 12, 13, 14]. There is increased involvement with media [15]. Watching television especially at night during adolescence has been found to be associated with poor physical stamina, obesity, smoking and elevated serum cholesterol during adulthood [16, 17, 18]. Self and peer perception of body image and substance abuse are closely associated with physiological, social and mental health of the adolescents [19, 20, 21, 22, 23].

Despite the above mentioned health scenario, India does not have any nation-wide evidence based operational policy pertaining to the prevention and management of NCDs among adolescents, especially through the primary care system [6, 15, 23]. Though, the National Family Health Survey III, District Level Household and Facility Survey III and Sample Registration System provide some data on the adolescent population of India, there is no comprehensive data which gives holistic view of the nutrition and health status especially with relevance to NCDs in this segment of the population [24, 25, 26, 27, 28]. The study was, therefore, conducted to contribute towards the data base on the present nutrition and health status of school-going adolescents belonging to various socio-economic segments of India's' population. Thus, this research work was conducted with the objective to study the existing dietary behaviours, lifestyle practices and body mass index (BMI) of school going adolescent boys and girls belonging to low, middle and high income families.

II. METHODOLOGY

Adolescents (N=150; aged >15 to <18 years), both boys and girls were enrolled from four different schools (one LIG - boys, one LIG - girls, one MIG - boys and girls and one HIG – boys and girls) providing educational facilities to children from the different socio-economic segments of our society. Informed written consent was obtained from the school Principals and the adolescents as well as their parents before initiating the conduct of the study. Subjects were enrolled on the basis of inclusion criteria.

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Inclusion criteria:

- adolescents aged between >15 to <18 years and studying in class eleventh
- informed written consent from the child and the parent/caregiver to participate in the study
- co-operation and willingness of the adolescent to give the needed information
- not suffering from any stress (physiological/emotional) as reported by class teacher

Exclusion criteria:

- adolescents Aged between >15 to <18 years but not studying in class eleventh
- informed written consent (child, parent/caregiver) not available
- out-liars
- Child suffering from any kind of trauma or stress (as reported by class teacher)

  Thus based on the gender, enrolled subjects were grouped as adolescent boys (n=75) and adolescent girls (n=75).

2.1 Tools and Techniques

Data were gathered on the dietary behaviors, nutrient intake, lifestyle pattern and anthropometric measurements using appropriate tools and techniques.

2.1.1 Questionnaires: For gathering the necessary information from the enrolled adolescents, three questionnaires were developed, designed and pre-tested. Questionnaire on general profile helped to gather information on the date-of-birth, gender, family profile, family income, occupation and educational status of parents. Questionnaire on activity pattern was used to elicit detailed life style of the adolescents such as their involvement in household chores, method of commuting to school, market etc. and the time spent in active/sedentary play, games and exercise. Information regarding the exercise schedule (if any) of the parents was also noted. The Questionnaire on dietary habits was used to assess the dietary errors of the adolescents. Information was gathered on varied aspects of eating pattern and food choices such as bingeing, nibbling, frequency of eating-out, consumption pattern of fruits, vegetables etc. to name a few. The semi-quantitative food frequency questionnaire comprised of 35 food items based on their energy, dietary fiber, fat (quantity/quality), sodium, calcium and iron content. This questionnaire was used to gather data on the frequency and the amount of food items consumed per meal which were further used to compute the average daily consumption of each food item as well as the individuals' average nutrient consumption.

2.1.2 Performa for 24 hour diet recall: One day 24 hour dietary recall method was used to gather data on the food intake of the adolescents during the previous 24 hours. The dietary intake data were used to compute the nutrient intake i.e. energy, protein, carbohydrate, dietary fiber, fat, sodium, calcium, iron and B-group vitamins (thiamin, riboflavin, niacin, folic acid and cyanocobalamin).

2.1.3 Anthropometric Measurements: Anthropometric measurements are well recognized to be good indicators of past nutritional status. Two anthropometric measurements i.e. weight and height, were taken for computing the Body Mass Index (BMI) and the nutritional status of the enrolled adolescents. A spring based weighing scale with an accuracy of $\pm$0.5Kg was used for recording the weight of the subjects. Height of the adolescents was measured by using a non-flexible standardized measuring tape having an accuracy of $\pm$0.1cm.

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2.2 Data Collection

Schools providing educational facilities to adolescents belong to low, middle and high socio-economic groups of our society were identified and contacted for necessary permissions. Adolescents (N=150) were enrolled on the basis of their informed written consent as well as that of their parents/caregiver. In-depth data on all the necessary parameters were gathered through a series of contacts with each adolescent. Weight and height reading were taken in duplicate while keeping all standard precautions in mind to ensure accuracy. The measurements were taken in completely secure and private surroundings. In order to develop rapport, during the first contact general information was taken from the student. Dietary intake data were gathered during the last contact. The data gathered were analyzed quantitatively as well as qualitatively. The dietary intake data were converted into the amount of raw ingredients and the nutrient intake was computed using the Nutritive Value of Indian Foods as given by Indian Council of Medical Research. BMI was calculated using the formula: BMI = Weight (kg) ÷ Height (m^2). Data on weight, height and BMI were compared with standards given by the World Health Organization.

III. RESULTS AND DISCUSSION

3.1 General Information

The mean age of adolescents was 16.5 years (15.3 to 18.0 years); and that of boys and girls was 16.7 and 16.6 years respectively. Nearly 84.0 percent adolescent boys and girls were aged between >16 to <18 years; thus, majority of them were in the mid/late adolescence. Majority of the adolescents were Hindus (92.0%) followed by Christians (4.5%), Muslims (3.3%) and Sikhs (1.6%). Adolescents belonged to various castes; as reported by them, 34 per cent, 27 per cent, 29 per cent and 10 per cent were Brahmins, Kshytrias, Vaish/Artisans and Scheduled Caste/tribe respectively. Nearly 72 per cent adolescents belonged to nuclear families. About 53 per cent, 69 per cent and 82 per cent adolescents belonging to low, middle and high income groups had 3-5 members in their family. The average family size was bigger in case adolescents belonging to lower income group as compared to their middle and high income counterparts. With increasing family size, food choices and personal care gets limited this in turn can greatly influence the child's physical, social and mental health. Educational qualification of the parents was found to be higher with a rise in socio-economic status. Socio-economic status wise data on the educational status of fathers' indicated that nearly 50.6 per cent (HIG), 21.3 per cent (MIG) and only 3.3 per cent (LIG) were graduates/post-graduates. While 71.3 per cent fathers were working outside home, only 30.6 per cent mothers were going out for work. Compared to middle income group families, a greater number of mothers were working outside home in both the lower and upper economic group. It was observed that the presence of a parent/guardian at home during meal times motivated the adolescents to eat home cooked food rather than the fast food/junk food.

3.2 Dietary Habits

Several dietary errors were observed in the food choices and diet pattern of the enrolled adolescents. Majority (46.6 per cent) of the adolescents were non-vegetarian; non-vegetarian foods being consumed at least once a day by 17.1 per cent adolescents. Eggs (whole) were consumed daily by 62.0 per cent subjects following eggetarians or non-vegetarian habits. Preference was given to non-vegetarian foods products which were fried or roasted and often procured from the unorganized processed food sector or fast-food outlets. Nibbling and bingeing were

also reported. Nearly 24 per cent girls and 37 per cent boys nibbled regularly; and about 34 per cent girls and 58 per cent boys binged on their favorite dish/snack. The frequency of bingeing varied from daily to once a month. Studies have indicated that bingeing and nibbling are associated with poorer nutritional status, higher adiposity, elevated serum lipids, lower bone mineral density and dental caries [29]. TABLE 1 gives details about the dietary habits and eating pattern of adolescents.

Table 1: Dietary Habits and Eating Pattern of Adolescents

Dietary Pattern	Girls (n=75)	Boys (n=75)	Total (N=150)
Food Habbit: Lactovegetarian	24 (32.0)	19 (25.3)	43 (28.6)
Eggetarian	22 (29.3)	15 (20.0)	37 (24.6)
Non-vegetarian	29 (38.6)	41 (54.6)	70 (46.6)
Nibbling	31 (41.3)	27 (36.0)	58 (38.6)
Bingeing	21 (28.0)	30 (40.0)	51 (34.0)

**figures in brackets indicate percentage*

Income, gender and academic schedule (examination days and vacations) were found to have an influence on the meal pattern. Generally adolescents belonging to low income group were found to be following a three meal pattern, though boys often indulged in frequent nibbling and bingeing as compared to girls. Four to five meal pattern were generally followed in case of the middle and high income subjects. While greater number of girls had the habit of skipping breakfast, boys were found to avoid the mid-morning meal (school) or had snacks from the canteen/road-side vendors. 78.6 per cent children reported to be viewing television or were engrossed with mobile phones during meal times. This is of great significance as television viewing can distract the attention of an individual and result in improper food intake. It also reduces family interactions during mealtimes which are very important for the mental and social health of subjects in this age group. Majority of the subjects reported that food related advertisements and peer pressure influenced their food choices.

There was wide variation in the amount and type of food consumed during school hours. Packed tiffin was preferred more by girls than the boys. The common tiffin menus were cereal with pickle or vegetable or pulse, sandwich, patties, noodles, macroni, fried food, biscuits and rusk etc. The inclusion of non-vegetarian food in packed lunch was less common. Fried foods, burgers, patties and carbonated beverages were preferred food items purchased from school canteen and roadside vendors. TABLE 2 gives details of the food usually consumed by adolescents during lunch break.

Table 2: Food Consumed during School Time

Usual Food consumption Pattern at school	Girls (n=75)	Boys ((n=75)	Total (N=150)
Food consumed during lunch break:			
Home cooked food (packed tiffin)	35 (46.6)	13 (17.3)	48 (32.0)
Purchased food (canteen/vendor)	13 (17.3)	22 (29.3)	35 (23.3)
Home cooked food and purchased	20 (26.6)	25 (33.3)	45 (30.0)
food	07 (9.3)	15 (20.0)	22 (14.6)
No food			

Reasons for food consumption:			
Substitute home food	15 (20.0%)	20 (26.6)	35 (23.3)
Supplement home food	17 (22.6%)	26 (34.6)	43 (28.6)
Spend free time	43 (57.3%)	29 (38.6)	72 (48.0)

**figures in brackets indicate percentage*

Nearly 13.6 per cent adolescents were found to be eating food from restaurants or other fast-food outlets daily or two-three times a week. Carbohydrate and fat rich food items such as burgers, pizzas, chow Mein, potato cutlets (tikki), gol-gappas, chole-bhature along with ice-cream and carbonated beverages were preferred (refer fig. 1).

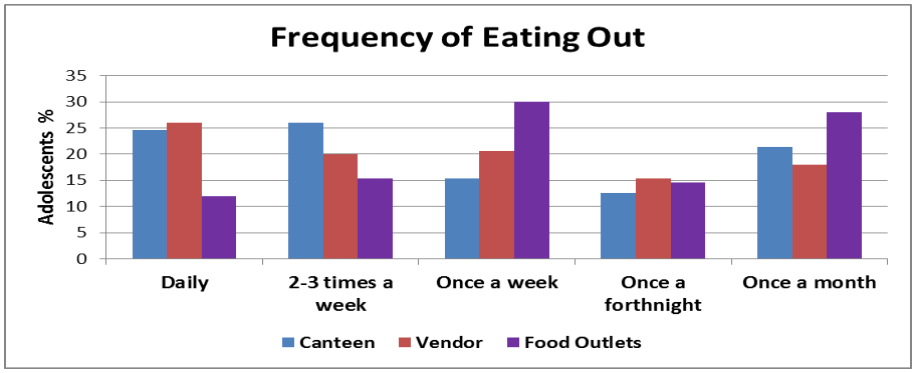

Figure 1: Frequency of Eating Out: Restaurants and Fast Food Outlets

Milk is a complete food but is often avoided by the adolescents, particularly girls due to several food fads or preference for other lesser nutritious drinks such as tea/coffee or non-nutritious drinks such as carbonated beverages. Data indicated that only 56 per cent boys and girls were consuming milk every day, while 36 per cent were taking milk/curd once in a fortnight/month or rather rarely. The average amount of milk consumed per day was $\leq$125ml in most of the subjects not consuming milk every day. 58.6 per cent, 36.0 per cent and 5.4 per cent were consuming standardized milk (4.5% fat), buffalo's milk (6.0-7.0% fat) and toned/double-toned/skimmed milk (0.5-3.0%) respectively. Data on cooking medium indicated that 24 per cent were using mustard oil; while pure ghee, Vanaspati and mixed vegetable oil was being consumed by 4.0 per cent, 15.3 per cent and 26.6 per cent subjects. Canola and Olive oil which have acceptable n-3:n-6 ratio were not being used by any of the households. Commonly used frying mediums were vanaspati – a hydrogenated fat (24.6 per cent), mustard oil (23.3 per cent) and mixed vegetable oil (19.3 per cent). In most (88.0 per cent) of the households fat left-over after frying was being used for cooking food without sieving and no care was being taken regarding the storage of used fat at low temperature. Repeated heating of fat over long duration results in the production of several polycyclic aromatic hydrocarbons which can cause oxidative damage to the cell membranes.

3.3 Nutrient intake

Analysis of the dietary intake data gathered by one day 24 hour recall method indicated that much of the energy contribution was from carbohydrate rich foods followed by and fat rich foods. The average energy intake of girls and boys was 1561kcal and 1360 kcal respectively. The total mean energy intake was not high when compared with the recommended dietary allowance given by the India Council of Medical Research. The mean protein intake was 33.9g and 43.2 g in case of boys and girls respectively. The protein intake was lowest in case of girls belonging to the low income group and highest in the diets of boys belonging to the high income group.

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ANOVA indicated significant variation in the in the protein intake income wise (p=0.0004) as well as gender wise (p=0.0000). The diets were rich in simple carbohydrates and the average intake was 190.8g and 246.7g respectively. The fiber intake was particularly low; the average dietary fiber intake being 11.8 and 15.6g in the diets of girls and boys respectively. The dietary fiber intake was not meeting even fifty percent of the proposed levels of intake in the case of all the enrolled subjects. The data indicate that the consumption of whole grains, fresh fruits and vegetables especially with their edible peels was rather low. The diets were particularly rich in fat. The energy contribution from fat varied between 7.2 per cent to 37.2 per cent in case of girls and 7.6 per cent to 41.6 per cent in the case of boys. Nearly fifty percent of adolescents were consuming more than 22g of fat per day. Similar results were obtained on assessing the dietary intake of 3,350 school children wherein most of the meals were found to be containing total fat particularly saturated fat above the requirements of the students [30]. The mean intake of cholesterol was 184.3mg and 201.4mg per day in the diets of girls and boys respectively. The dietary cholesterol intake was more than 300mg/day in the diets of 8.0 per cent subjects and it was between 200-300mg/day in case of 12 per cent subjects. It is well known that a high dietary cholesterol intake particularly when coupled with high saturated fat intake results in increased serum total cholesterol particularly LDLc [31].

Table 3: Mean Nutrient Intake of Adolescent Boys and Girls

Nutrient	Girls (n=75)	Boys (n=75)
Energy (kcal)	1360±415	1561±341
Protein (g)	33.9±6.7	43.2±12.3
Total Fat (g)	29.9±17.3	39.1±19.8
Carbohydrates (g)	184.3±121.3	211.4±118.2
Dietary fiber (g)	11.8±3.9	13.1±3.5
Calcium (mg)	419±132.6	572.7±173.9
Iron (mg)	9.6±3.7	13.8±5.6

Calcium and iron are two most important minerals required during adolescence to support expanding blood volume and the increase in skeletal mass. The diets were found to be grossly deficient in iron; the dietary intake was not meeting even 60 per cent of the recommended dietary allowance. The average dietary intake of calcium, vitamin A and B-group vitamins was also compromised in the diets of several adolescents particularly girls belonging to the low income group. Similar results have been reported in other studies related to dietary habits of adolescents in various countries [11, 12, 32, 33]. TABLE 3 gives the mean nutrient intake by boys and girls of energy and salient nutrients.

3.4 Physical Activity Pattern

Majority of adolescents were found to be leading a sedentary lifestyle and preferred to use labour saving devices wherever possible. Most (60 per cent) of the adolescents commuted between home and school by school bus or private vehicle. As compared to boys (32 per cent), a greater number of girls (48 per cent) commuted between school and home by walking or cycling. This gender difference was observed in case of adolescents going to schools representing the lower and middle income segment. In case of high income group, 92 per cent girls and

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84 per cent commuted by school bus or private vehicle. Fig. 2 gives details regarding the preferred mode of transport between home and school by adolescent girls and boys.

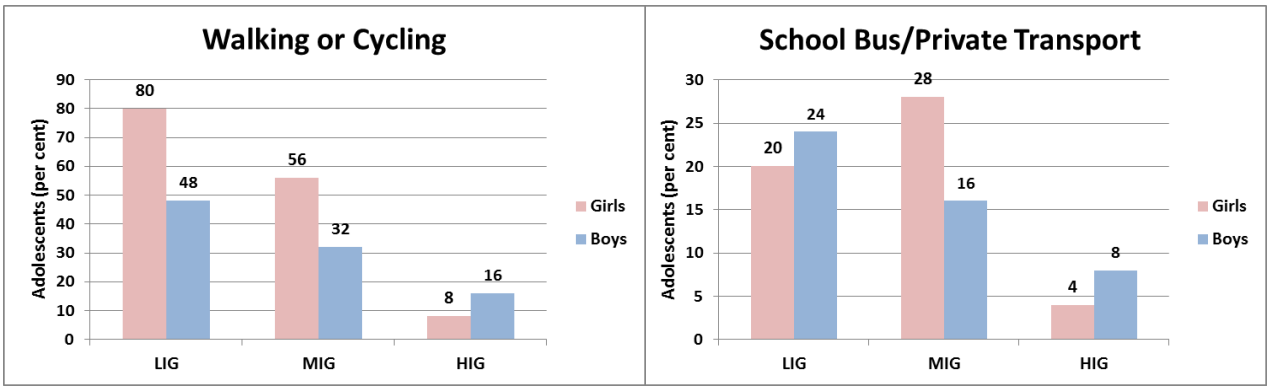

Figure 2: Mode of commuting between home and school

Involvement in games/exercise was influenced to a great extent by the academic schedule; activity level being lowest during examination days. Although 67.3 per cent adolescents expressed that the number of games period should be increased; nearly 55.4 per cent of these adolescents were spending their games period already allocated in their time-table in gossiping, completing their homework or visiting the canteen/vendors standing outside the school. No regular exercise schedule was being followed by most of the adolescents (69.3 per cent). Similarly, 79.3 per cent mothers' and 78.0 per cent fathers' were not following any regular exercise schedule. While girls preferred playing badminton, skipping, *kho-kho* or walking; boys preferred to attend a fitness center or play cricket. Much of the free-time of adolescents was being spent in sedentary activities such as watching television, using computer/mobile phone, talking to friends or playing indoor games. Leisure time physical inactivity is well documented to be associated with elevated serum low density lipoprotein cholesterol (LDLc) and insulin levels [34]. While majority of the girls belonging to the lower income families (88 per cent) were actively involved in various types of household chores; it was not so in case of girls belonging to middle and higher income families. Boys (52.6 per cent) preferred to purchase or help in purchasing groceries and this was not influenced by income group. Similar trends have been observed in other studies wherein adolescents have been found to prefer a sedentary lifestyle [35, 36, 37, 38].

3.4 Anthropometric Measurements

Adolescents belonging to the low income were lighter and shorter than their affluent counterparts. The mean body weight of the girls was 48.9$\pm$6.9 kg; and that of the boys 58.1$\pm$12.8 kg. Body weight was found to be influenced by economic status especially in case of girls. According to the standards given by the National Council of Health Statistics (NCHS), nearly 41 subjects were lighter than their western counterparts. Fig. 3 gives the mean anthropometric measurements of enrolled adolescents.

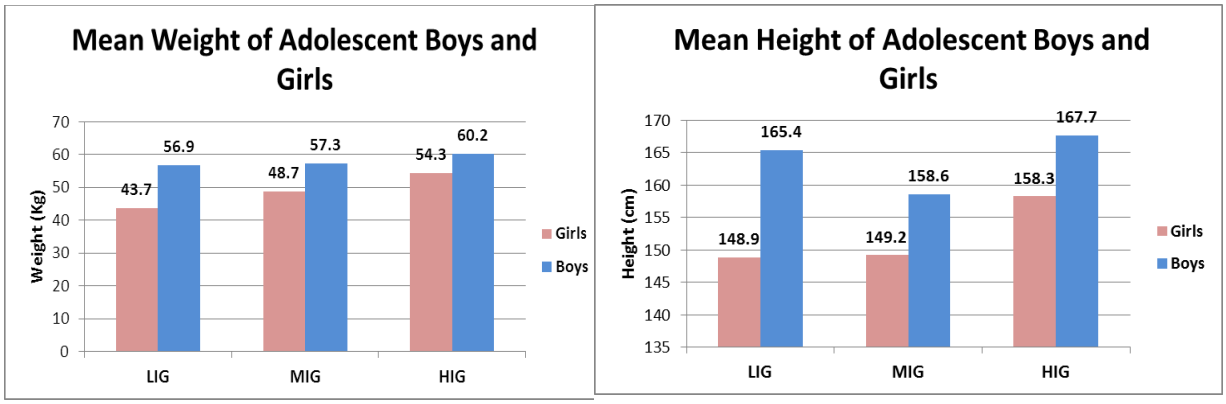

Figure 3: Anthropometric data: Mean weight and height of adolescent boys and girls

The mean height of girls and boys was 152.1±6.4cm and 163.9±8.3cm respectively. As compared to the NCHS standards, 42.6 per cent boys and 60.0 percent girls were shorter than their healthier counterparts. Girls belonging to high income group were taller than those belonging to the low and middle income group. There was no significant difference in the height of girls belonging to low and middle income groups. This trend was not observed in case of boys; those belonging to high income group were tallest while those belonging to the high income group were shortest (Fig. 3).

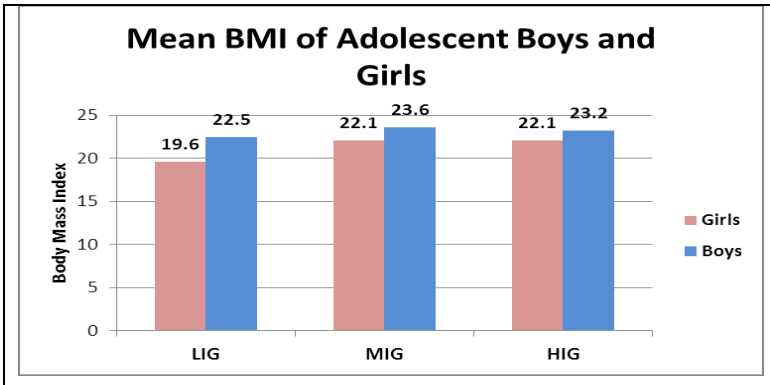

Figure 4: Mean body mass index of adolescent boys and girls

The mean body mass index (BMI) of the adolescents was 22.15±4.7 (14.2 - 35.3). Nearly 30.6 per cent subjects were underweight while 18.0 per cent were overweight/obese (BMI >25). The mean BMI of the adolescent boys and girls in the 25th percentile was 17.7 and 13.9 whereas; in the 75th percentile it was 35.8 and 33.5 respectively. Fig. 4 gives the mean BMI of adolescent boys and girls belonging to low, middle and high income group respectively. Both over nutrition and nutritional deficiencies have been found to be associated with metabolic syndrome in adult life [4, 38, 39, 40].

3.4 Drinking and Smoking Behavior

Alcohol and substance abuse grossly affect the physiological, social and mental health of adolescents. Stress and peer pressure are closely associated with substance abuse. Nearly 36 per cent, 24 per cent and 34 per cent adolescent boys belonging to low, middle and high income group were found to be current users (though not regularly) of alcoholic beverages, usually beer. 24 per cent, 16 per cent and 24 per cent boys belonging to low, middle and high income group reported that they were current smokers of cigarette/bidi. About 3.3 per cent and 4.0 percent girls from low and high income group reported to be current users (though not regularly) of alcoholic beverages. Tobacco chewing and consumption of pan-masala were also reported by several adolescents. Easy availability of alcohol, cigarette/bidi, pan masala and tobacco at home was a prime reason for

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their consumption for the first time by these adolescents followed by peer pressure. 2.0 per cent, 1.3 per cent and 2.0 per cent adolescents reported to have tasted, were current and past users of drugs, indicating the easy availability of these harmful substances to school children. Similar trends have been reported in other studies [19, 22]. Details about the consumption of alcoholic beverages, smoking, tobacco chewing and consumption of pan-masala as well as drugs are given in fig. 5.

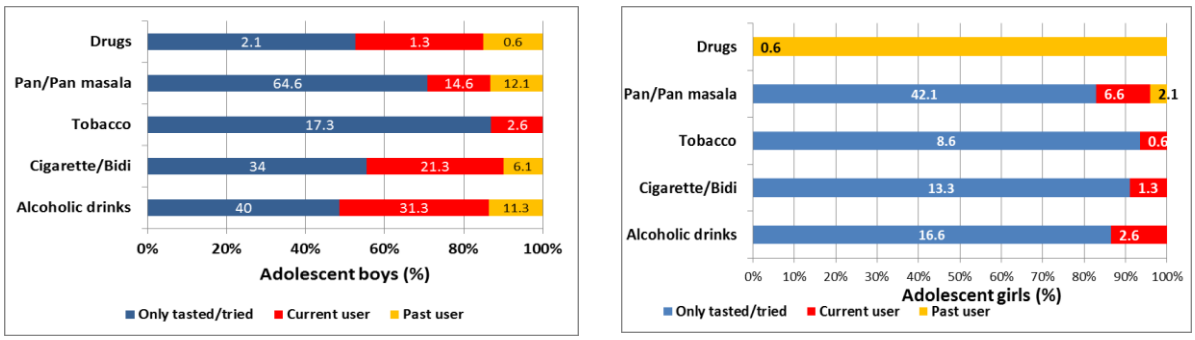

Figure 5: Drinking, smoking and substance abuse related behavior of adolescent boys and girls

IV. CONCLUSION

The study indicated presence of several dietary and lifestyle errors. Majority of the adolescents preferred a sedentary life style such as involvement in sedentary play and activities during games period and leisure time as well as use of media and labour saving devices as far as possible. Irregular meal timings, nibbling, bingeing and preference for processed/ready-to-eat food were observed in this age group. According to the nutrient intake, the diets were generally deficient in fiber, proteins and several micronutrients such as iron, calcium, vitamin A, thiamin, riboflavin, folic acid and cyanocobalamin. Anthropometric indices indicated that 68.0 per cent adolescents had not achieved their maximum growth potential. Data on BMI revealed the prevalence of both underweight (30.6 per cent) and overweight/obese (18.0 per cent). All these data are a pointer that the adolescents could be at an increased risk of developing degenerative diseases in the latter years of their lives. It is therefore imperative to:

- Screen adolescents further, for hypertension, impaired glucose tolerance, insulin resistance, dyslipidemia and anaemia apart from underweight and obesity.
- Involve important community members such as teachers, medical/para-medical professionals, policy makers for spreading awareness regarding dietary habits necessary for achieving and maintaining good health throughout the lifecycle.
- Promote active lifestyle and regular physical exercise which have been found to positively influence health by strengthening muscles, enhancing lung capacity as well as increasing circulation of blood by increasing the diameter of arteries and increasing the number of capillaries. It is therefore necessary to develop and implement effective fitness programmes in all schools.
- Facilitate counselling of adolescents to improve mental and social health as well as help them to avoid habits related to drinking, smoking and drug abuse.
- Develop an operational policy on ‘holistic adolescent health’ at the national level and implement cost-effective need-based intervention programmes.

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Since India is experiencing rapid nutrition transition there is a need to restructure the food and agriculture policy so as to facilitate greater consumption of fresh fruits and vegetables as well as protein rich foods through appropriate interventions related to the production, processing, pricing, labelling, sale and advertisement of food. There is also a need to take stringent action pertaining to the sale and availability of alcoholic drinks, cigarette, bidi, tobacco, pan, pan masala and drugs among the younger population.

V. ACKNOWLEDGMENTS

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