"The Relationship Between the Home Environment and Weight Status among Aligarh Muslim University Secondary School Students"

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ABSTRACT

The present study aimed at assessing adolescent school children's (16-17 yrs) dietary habits, weight status, and their home food environment. It also aimed at assessing challenges and strategies to promote healthy eating among these children. We also developed a valid and reliable home food checklist and a home food environment survey questionnaire keeping the Indian household and food choices in view. A 100 students (50 girls and 50 boys) were selected by stratified random sampling from different schools of AMU. They were requested to fill a self-administered modified pre-validated global food and health survey questionnaire as established by the WHO. Minor changes were made according to Indian choices

The student's age, weight and BMI (Body Mass Index) were carefully recorded initially. We observed that 50% of students were underweight (mostly girls, 70%). Only 10% girls were overweight as compared to 30% of boys, 40% boys showed a healthy/normal weight for age and height.

With regard to the student's dietary habits, it was not surprising that underweight student frequently skipped breakfast, did not bring lunch boxes and also should less food intake over a seven days period. Only 30% of these students were physically active.

In contrast, 50-75% overweight children showed frequent consumptions of fast food and soft drinks over a seven days period and occasional fruit intake. Only 10% were physically active.

Students with a healthy weight range showed frequent consumption of breakfast with complex carbohydrates and protein, less intake of junk food and 70% were regularly physically active.

The above results indicate the need for improved/revamped nutritional education at the school level, along with increased emphasis on outdoor physical activity, sports and games. Currently, the Indian education system lays more stress on requisition of theoretical knowledge. Sports and games are secondary fields, in contrast to the western approach where great emphasis is placed on excellence in sporting activities. Indeed, this also reflects in our sporting performance at the global level.

Thus study also aimed at developing a home-friendly, easy to use, home food checklist and home food environment survey questionnaire which would be of benefit to both researchers and family members in order to help in improving dietary habits.

Partial modifications were made in the validated and tested HFC and HFES questionnaire by Martha J. Nepper (2016), with reference to Indian household food frequencies.

The final HFC and HFES (30 day period) covered common food items eg fruits, vegetables, fruit juice, milk and milk products like Dahi and Paneer, Ghee, Lentils as well as sweet and savory snacks and carbonated soft drinks. Availability and visibility of these items was easily assessable in a short span of time (20-30

minutes).

Significant and positive correlation was found between major food categories in both instruments (p <0.05).

It is possible that lower correlation for some items may be due to due to the fact that parents may not have actually assessed availability/visibility of these items. Lack of clear understanding or language constraints may also have influenced the results. High positive correlation for fast food or snacks may be due to false impression of these being healthy snacks as Promoted commercially. Failure to read actual composition of these items is an important factor here. A significant positive correlation was noted specially for availability visibility of sweet and savory snacks and dietary intake of these items among School children at home. The same was not true for fruit, vegetable or, milk. This could be due to attractive commercial promotion and packaging of these items, in addition to taste influences. This further emphasizes the need for proper nutritional education in the population in general and school children in particular.

Certain limitations of our study include restriction to school of AMU, sample size of 100 only Reliance on parents and students to provide accurate answers, possibility of language problems (eg Hindi versus English medium), lack of uniform financial status among families. We feel that larger studies are needed in this direction. Moreover, the HFC and HFES should be provided in different language formats to enable better understanding.

KEY WORDS

Home Environment, Weight Status and Secondary School Students.

INTRODUCTION

The prevalence of childhood overweight and obesity is increasing worldwide at a rapid rate (Lobstein*et al.*, 2004). Given that these conditions are persistent (Hesketh*et al.*, 2003) and have important health consequences throughout life (Dietz, 1998; Must and Strauss, 1999), halting this rising prevalence is an important public health priority (World Health Organization, 1999). Obesity genesis is complex, with diet, physical activity and sedentary behaviors all contributing to the recent dramatic shifts in prevalence. Dietary data from throughout the western world suggest that children's diets are not consistent with dietary recommendations of health authorities (Gregory *et al.*, 1995; Krebs Smith *et al.*, 1996; Munoz *et al.*

Given the rapid rise in obesity prevalence and the paucity of knowledge regarding how we may actively halt this rise, all aspects of the child's environment are important to consider (Davison and Birch, 2001). It is likely that a child's eating behaviors are learnt in early childhood and that the home environment exerts substantial on the development of these behaviors (Birch and Fisher, 1998; Campbell and Crawford, 2001). Quantitative studies have considered relationships between children's food choices and various environmental factors, such as the in sequence of mother's nutrition knowledge (Contento*et al.*, 1993), the in sequence of television viewing (Robinson and Killen, 1995; Coon *et al.*, 2001), the impact of parental feeding styles (Birch and Fisher, 1998) peer pressure (Birch, 1980) and the role of parental modeling (Birch *et al.*, 1982). Qualitative studies have provided insights regarding maternal perceptions of children's weight (Jain *et al.*, 2001; Sherry *et al.*, 2004) and maternal beliefs and practices about child feeding (Baughcum*etal.*, 1998; Sherry *et al.*, 2004). However, no studies have previously sought to describe parental views on the determinants of young children's food choices. Given the likely importance of the family environment on the eating behaviours of young children and the fact that parents are the principal regulators of children's eating and food supply, it is important to document these perspectives. Understanding parental views on these relationships will inform interventions

that seek to prevent obesity in children.

STATEMENT OF THE PROBLEM

Lack of activity leads an increase in the accumulation of fat in youngsters and very commonly, above all among those who a lead luxurious and sedentary life, which causes gain in their body weight. Decreased activity is not the only the cause of weight gain. The environment of home and surroundings also influences food intake and activity levels. At home while at rest adolescents being either unaware of the right or wrong choice of diet or through neglect of healthy diet easily gain weight. Keeping in consideration the home environment and weight status this study is titled as **"The relationship between the home environment and weight status among Aligarh Muslim University secondary schools students, (adolescents, ages, 16-17 years)**

PURPOSE OF THE STUDY

The purpose of this study is to examine and explore the home food environment between healthy weight, underweight overweight and obese children, ages 16-17 years and is divided in three separate studies with the following primary objectives:

1. To develop a valid and reliable parent-friendly home food checklist to assess the availability and visibility of healthy and unhealthy food and beverages in the home.
2. To compare the availability and visibility of healthy and unhealthy food and beverages and family meal variables in the home food environment between healthy weight, underweight, overweight and obese children.
3. To explore challenges and strategies in promoting healthy eating in the home among parents of healthy weight, underweight, overweight and obese children.

SIGNIFICANCE OF THE STUDY

The study will help the students and parents to manage weight and will render assistance for further study. The study will further help the adolescents to avoid the unhealthy food in order to maintain healthy weight and prevent lifestyle diseases.

HYPOTHESIS

- The home environment effects negatively on the weight of children.
- Adolescents are overweight in the secondary school.
- Adolescents are overweight because of unawareness in relation to diet.

DELIMITATION

Only students from schools AMU will be part of the study.

LIMITATIONS

- The study was limited to the particular schools of Aligarh Muslim University.
- The study was limited to the adolescent, ages, 16-17 years.
- The study was limited up to the relationship between the home food environment and weight status of the adolescent.
- The study was limited in exploring the effect of home food environment and healthy weight of children.

STATISTICAL ANALYSIS

I. **Development of a valid and reliable home food check list and survey questionnaire to assess availability of healthy and unhealthy food items and beverages in an Indian content study.**

Sample selection : 50 male and 50 female students (16-17 years) from different schools of AMU were selected trough stratified random sampling. Their families (100) were recruited for the study with informed consent. Short demographic profiles of students (age, BMI, weight & status) and parents were prepared carefully

Method : A home food checklist and 30 days home food environment survey questionnaire was developed using partial modifications in the pre-validated and tested home food inventory developed by Martha J. Nepper (2016). This was administered to parents of the participating students

Home food checklist (HFC) : This included 53 healthy and unhealthy food items (fruits, vegetable, fast foods/snacks, and beverages) commonly found in Indian households. A yes/no format was used to simplify the process. Sample checklist is attached.

30 day home food environment survey (HFES) : Availability and visibility of healthy and unhealthy food items in the home was assessed (over past 30 days period) through this questionnaire. This was also adapted from the validated questionnaire by Nepper (2016) with modification according to Indian food choices. Instructions were given on how to assess visibility e.g in kitchen top, on dining table, etc. A 5 point scale was used with a score range of 0-4. Sample survey questionnaire is attached.

Data analysis : SPSS software version 12.0 (Chicago, USA) was used to analyze the data Spearman correlation co efficient (r) were used to assess relationship between the results from the checklists with Ps <0.05 considered significant. This was also used to assess the relationship between the availability/visibility of food categories from the two questionnaires and intake of the participating students in those families.

II. **Assessment of dietary habits and home food environment among adolescents school children (16-17 years).**

A validated and tested WHO global food health survey questionnaire (self administered) was used with slight modification with reference to Indian food preferences.

Study sample : As previously stated (50 male and 50 female schools students (16-17 years, of age) from various schools of AMU) participated in the study. Student's dietary habits were assessed through 25 questions, with a 7 day format for better recall.

Data analysis : Results were analyzed using SPSS software version 12.0 (Chicago, USA). Chi-square test/t test was used to compare results with $p < 0.05$ considered significant. Spearman correlation coefficients (r) were used to assess association between the result of above survey and availability/visibility of healthy/unhealthy food items in their homes.

III. Challenges and strategies in promoting healthy eating habits.

A short questionnaire adapted from the validated and tested questionnaire By Nepper (2016) was used to assess family eating habits and food served at mealtimes over past 7 days. A 5 point scale was used with score range of 0-4. Sample questionnaire is attached.

The results were correlated with demographics profile of the families and health status of students in their families. Specific problems were identified which hindered healthy eating habits and counter strategies were proposed in order to help parent promote healthy eating habits among their wards.

ANALYSIS AND INTERPRETATION OF DATA

This study comprised a100 adolescents (age 16-17 years) studying in various schools of Aligarh Muslim University out of these, there were 50 male and 50 female students. An equal number of families of these students (100) were included in the study.

The participation was voluntary and prior consent was taken from the students and their families

1. **Dietary food habits and weight status of student participants.**

I. Table I shows the demographic profile of the 100 students in this study.

TABLE – I

	Total Number	Age (yrs.)	BMI Kg/m^2	Healthy Weight (N)	Under Weight (N)	Over Weight (O)
Students	100	16+5	17.5	30	50	20
Boys	50	16+2	18.5	20	15	15
Girls	50	16+1	16.9	10	35	5

Out of the 100 students, the average age overall was 16±1.5 years, 16 ±2yrs for boys and 16± 1yrs for girls. The BMI ranged from. As shown in table I, 50% of the students were underweight for age and height mostly girls showed a lower weight than expected (35, 70%). An equal number of boys showed weight less than 0r more than expected for age and height (15 each, 30%). Most of the boys were of normal weight (20). Among the girls, only 5 were overweight (10%).

These findings are depicted graphically in the following bar charts.

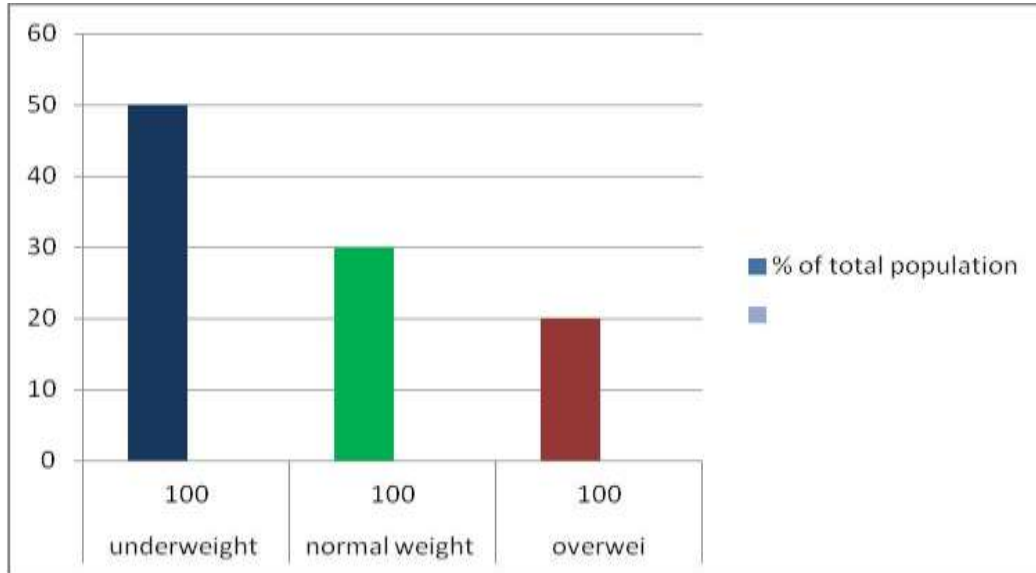**Chart 1: % distribution of students according to weight**

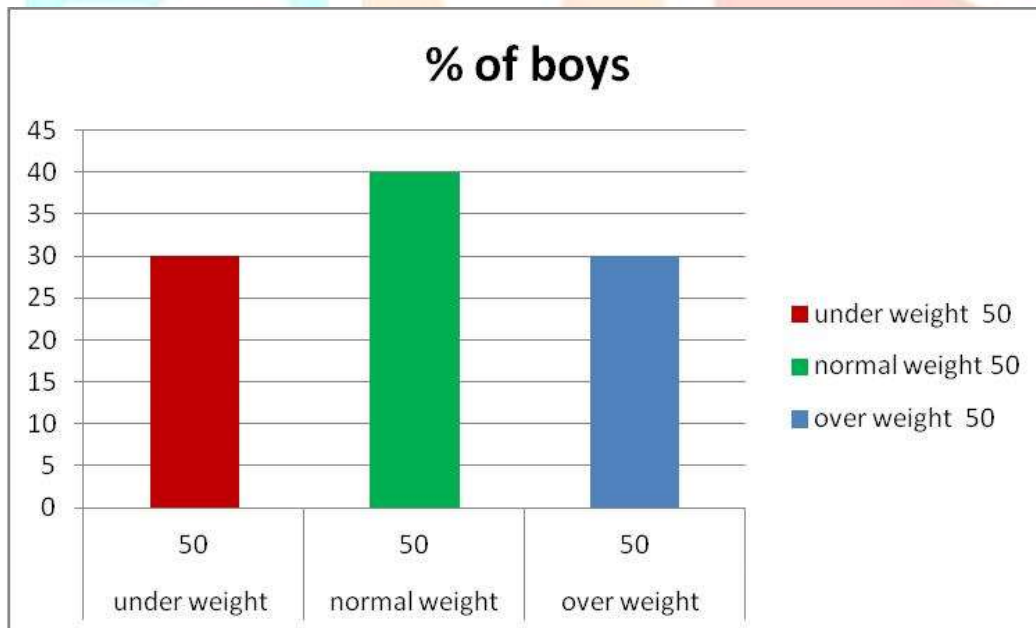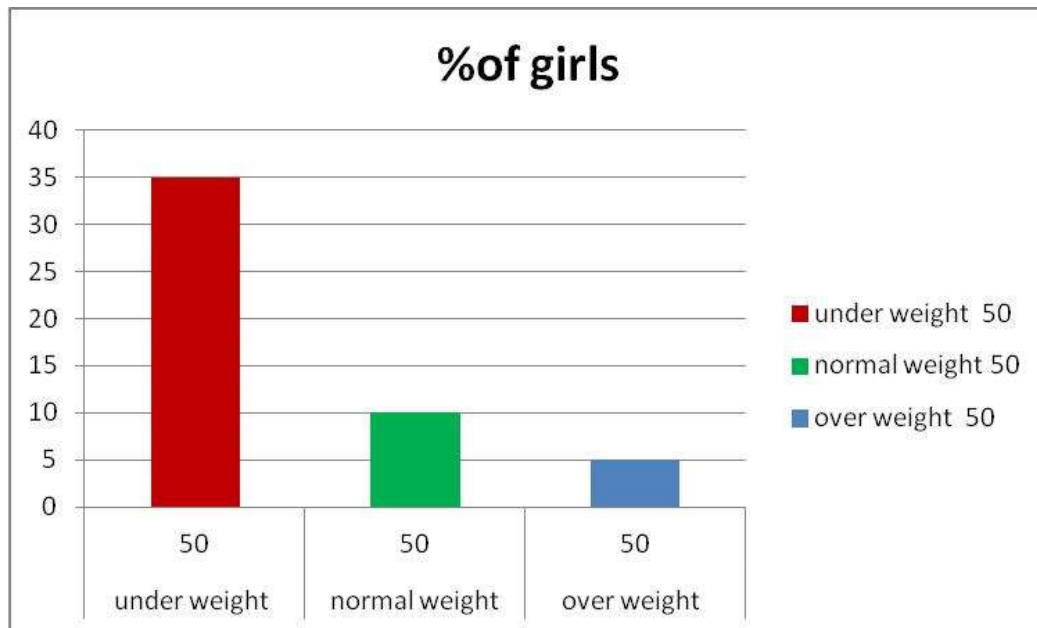**Chart 2: % distribution of boys according to weight.**

Chart 3: % distribution of girls according to weight.

Modified pre validated GFHS dietary food habits survey

The self administered questionnaire consisted of 25 questions related to the students habits at home and school and habits related to physical activity and physical education at school. Table food shows a comparison of these factors among healthy and unhealthy weight students (both overweight and underweight).

TABLE – II

P (a: b) =<0.05
P (a: c) = <0.05
P (b: c) =<0.05

Category	N=50[a] under weight	N=30[b] healthy normal weight	N=20[c] over weight
Intake break fast	15=yes (30%) 35= no (70%)	30=yes (100%)	10=yes (50%) 10=no (50%)
Bread/burns in breakfast	15=yes	10=yes (33.3%) 20=no (66.66%)	20=yes (100%)
Lunch box brought to school	50=no (100%)	30=yes (100%)	15= yes (75%) 15= no (25%)
Fast food intake in lunch box or at school	50=no (100%)	30=no (100%)	20=yes (100%)
Fast food intake over	30=1-2days (60%)	15= 1-2 days (50%)	15= 4-5 days (75%)

a 7 day period	20=no (40%)	15=no (50%)	5= 1-2 days (25%)
Soft drink intake over a 7 days period	30= 1-3 days (60%) 20= no (40%)	15= 3-4 days (50%) 15= 1-2 days (50%)	10= 4-5 days (50%) 10= 1-2 days (50%)
Fruit intake over a 7 days period	50=1-2 days (100%)	30=3-4 days (100%)	20=1-2 days (100%)

As shown in table II, there was frequent consumption of fast foods (burger pizza, ice cream) and soft drinks over a 7 days period (at least 4-5 days) in 50-75% of overweight students. In contest, fruit consumption was only sometimes (1-2 days). In comparison healthy weight children showed more frequent fruit consumption, brought a lunchbox to school and had breakfast before coming to school, with complex carbohydrates (eg roti, sabzi or egg) and less of refined foods.

Underweight students, not surprisingly skipped breakfast frequently, did not bring a lunchbox to school, and showed less consumption of fruit over a 7 days period.

The difference between the three categories was significant using chi-square test (p<0.05).

In addition to, 60% of students felt they were not given adequate intentional information while only 50% participated in frequent physical activities over a 7 day period. Only 10% of overweight students, 70% of healthy weight and 30% of underweight students were active physically.

Home food checklist and 30 days home food environment survey questionnaire.

The home food checklist HFC was adapted from the validated checklist developed by Martha J Nepper (2016). It covered 53 food and beverage items found commonly in Indian households. There included fruits, vegetable, non vegetarian items, dairy products, soft drinks and fruit juices. Answers were in a yes/no formet.

The 30 day home food environment survey (HFES) questionnaire was also based on the HFES questionnaire validated by Martha J Nepper (2016). The modification was made keeping Indian household kitchens and food in mind. The parents were given instructions on assessment of availability and visibility of food stuffs/beverage on table kitchen counter or fridge, over the past 30 days. A 5 point scale was used, with a score of 0-4

A short demographic profile of the parents was also obtained using a self-administrated questionnaire, (with prior consents). The results are shown in table III.

Table III : Demographic characteristics of parents/ family.

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TABLE – III

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Total Number of Families	One Working parents	Both Working Parents	Family Income (Rupees)			Educational status of caregivers / parents		
			<10,000/m	10-30000/m	>30000/m	Below Class 10th	Intermediate	
100	60	40	35	25	40	30	10	60

Caregiver parents: Stay at home parent if only one parent is working.

As shown above, 60% of families had one working parent 35% of families had on income of <10,000 rupees/mth, while 40% earned >30, 000 rupees/mth 60% of parents (one or both) had the benefits of higher education (college graduate/postgraduate/post doctoral degrees) 30% of families had one or both parents with on educational level below high school.

Table IV: Correlation between food items in HFC and HFES.

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TABLE – IV

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Food/beverage groups	R(p-value)
Fruit	0.29 (<0.05)
Vegetable	0.39 (0.05)
Fruit juice	0.5 (0.05)
Milk	0.31 (0.05)
Soft drinks	0.6 (0.05)
Sweet snacks	0.23 (0,05)
Savoury snacks	0.32 (0.05)

HFC= Home food checklist

HFES= 30 days home food environment survey

Using Spearman correlation coefficient (r), results from the two instruments was assessed. Construct validity was assessed by examining if the availability scores from the HFC were associated with availability

score from the HFES.

The results are shown in table IV, Significant and positive correlation was noted between major food and beverage categories (Ps<0.05).

Table V: The relationship between availability/visibility of selected healthy/unhealthy food items (from the HFC and HFES) and dietary habits of students.

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TABLE – V

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Category	Dietary intake r (P value)
Fruit	0.32 (<0.05)
Vegetable	0.06 (>0.05)
Milk	0.02 (>0.05)
Soft drinks	0.56 (<0.05)
Fruit juice	0.03 (>0.05)
Sweet snacks	0.60 (<0.05)
Savoury snacks	0.75 (<0.05)

Table V: show the association between home food availability and fridge/kitchen visibility and the student's dietary intake. There was significant and posture association between scores of sweet and savory snacks and soft drinks and children's intake of these items (p<0.05).

However a significant association was not noted between scores of milk, fruit and vegetables and dietary intake.

CONCLUSION

Proper emphasis on nutritional education with practical application, equal and emphasis on physical and health education is essential to ensure proper dietary habits among school children. Also education at the community level is equally essential. The validated, simple, easy to used home food checklist and 30 day home food environment survey questionnaire developed by us will be useful help in Indian parents to assess their home food environment. This will help them in improving nutritional intake of their children and promoting healthy life style.

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