



DIETARY INTAKE OF BOARDING STUDENTS IN TWO SELECTED NATIONAL SCHOOLS, KENYA

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ABSTRACT

The quality and quantity of food intake by an individual to a large extent determines the degree of nourishment and eventually his/her weight. The study aimed at investigating dietary intake by the students in two selected National schools in Kenya. The study utilised a cross-sectional study design. A sample of 183 students of ages 14-17 years were randomly selected for the study. Data were collected using food frequency questionnaires and 24-hour measured food intake. T-test was used to determine significance differences at 0.05 significance level. Results showed that the intake of bread, chapatti, buns, ice cream, oranges, french fries, cakes, soda and sugar sweetened beverages were significantly ($p < 0.05$) different between girls and boys. Intake of other foods was not significantly different girls and boys. Further, there was no significant difference in dietary intake of energy and protein between male and female students with regard to RDAs.

Key words: diet, intake, boarding, school

1.0 INTRODUCTION

The quality and quantity of food intake by an individual to a large extent determines the degree of nourishment and eventually his/her weight. High caloric and the macronutrient dense diets influence the extent to which excess energy is stored. According to World Health Organization (2000a), protein and carbohydrates have limited storage capacity. The capacity for fat storage in the body is virtually unlimited and excess dietary fat is readily stored in the adipose tissue depots (WHO, 2000a).

In Kenya, National schools enroll their students from all over the country by using quarter system from government such that all Districts are represented. Most of the National Schools have diversified diets and school tuck shops which sell a variety of snacks to students. Other sources of food is when students are visited officially and brought food stuffs from home, buying from outside school when there are outings, some special school events allow a lot of foodstuffs and also handouts from home on opening days. Some schools allow students to keep extra food from that offered by school diet and as such no school diet control.

Boarding High Schools in Kenya usually endeavor to adopt western type of diets containing high levels of energy from fats. They usually adopt diets of the middle class families and therefore bridge the gap between the students from the lower and the higher socio-economic families in terms of diet. These diets become better associated with those of the western developed countries. Besides many school students often take snacks which are carbohydrate and fat based between meals. The study aimed at investigating dietary intake by the students in two selected National schools in Kenya. The study findings are useful to Ministry of Education as well as Ministry of Health in initiating policy measures on proper healthy dietary practices to curb problems resulting from overweight and obesity.

2.0 MATERIALS AND METHODS

The study utilised a cross-sectional study design. It was carried out in two National Schools: Alliance Girls High School (AGHS) and Alliance High School (AHS), a boy school, which were purposively selected. The study schools are located in Kiambu County 30km to the South West of Nairobi. They have large school farms where they grow foods and keep livestock to supplement the diets provided to students. Alliance Girls High School and Alliance High School had population of 1000 and 1180 students respectively at the time of the study.

The study population comprised of adolescents aged 14-17 years in the two schools. A sample of 183 students, determined using Fisher's, et al. (1991) Formula at 95% confidence level, was used in the study. Proportionate samples of 90 and 93 students were taken from AGHS and AHS respectively. Simple random sampling was used where a table of random numbers was generated from class lists using Excel sheet to get the students in each school until the desired sample of 183 was achieved.

Permission to carry out the research was obtained from the schools. Consent forms were issued to the students to sign. The study employed four research assistants who were trained for a period of three days prior to data

collection. They were shown on how to weigh food after serving and before eating and filling the food frequency tables. To ensure anonymity, each questionnaire was given unique code to represent the different school and school number.

A food frequency questionnaire was used to establish how often certain foods were consumed per week as well as other foodstuffs consumed which were not in the list. A 24-hour observed and measured food intake was conducted among the students focusing on energy and protein intake. Foods were weighed in the two schools before cooking and records kept for every meal. These records gave the details of all the ingredients used in every meal. The two schools had proper records of food taken every day in a week. Food intake was also assessed based on the minimum and maximum plate sizes as it was observed in food service. During different meals in a day foods were weighed before eating for every student and the plate waste also was taken. The meals included breakfast, 10 o'clock tea, lunch, evening tea and super.

Data from the questionnaires were checked, verified and entered into computer database and statistical Package for Social Sciences Version 19 (SPSS) was used for analysis. Descriptive analysis included use of frequencies, mean and standard deviations. Means were compared using independent t-test at a significance level of 0.05.

3.0 RESULTS

3.1 Distribution of study participants by school

Almost a half (49%) and slightly over a half (51%) of the study participants were of Alliance Girls High School (AGHS) and Alliance High School (AHS) respectively (Figure 3.1).

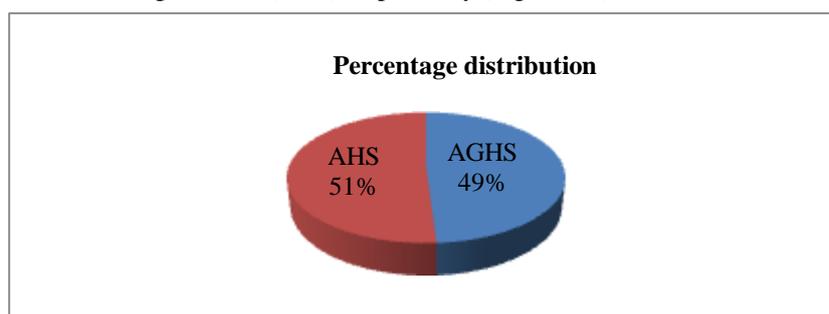


Figure 3.1: Distribution of study participants by schools

3.2 Dietary intake

Table 3.1 shows food intake of study participants as assessed by food frequency questionnaire.

Table 3.1: Frequency of food consumption

Food type consumed	Average weekly consumption		t-test p-value
	Girls (n=90)	Boys (n=93)	
Carbohydrates			
Bread	2.4±1.0	2.4±.0	0.019*
Chapatti	3.5±0.9	3.5±1.0	0.000*
Buns	1.8±0.2	1.7±0.2	0.037*
Hotdog	2.4±3.2	2.9±4.0	0.201
Proteins			
Sausages	2.1±0.3	2.2±0.4	0.271
Yoghurt	2.7±0.9	2.8±1.0	0.276
Fresh milk	1.9±0.1	2.0±0.2	0.768
Fats			
Ice cream	1.8±1.1	1.9±1.3	0.036*
Fruits			
Mangoes	4.9±5.5	4.9±3.7	0.903
Oranges	1.6±1.2	1.8± 2.4	0.024*
High calorie foods			
French fries	2.8±1.5	2.3±0.5	0.000*
Cakes	1.2±0.2	1.3±0.2	0.020*
Pizza	1.9±0.1	2.0±0.2	0.4
Hamburger	2.3±0.9	2.7±1.0	0.6
Soft drinks			
Soda & sugar			
Sweetened beverages	2.3±0.9	3.3±1.0	0.000*

*- significance

Of the carbohydrate sources, intake of bread, chapatti and buns were significantly ($p < 0.05$) different between girls and boys. In addition, intake of ice cream, oranges, french fries, cakes, soda and sugar sweetened beverages were significantly ($p < 0.05$) different between girls and boys. Other foods were found not to be significantly different in terms of consumption between girls and boys.

3.3 Intake of energy and protein

Adequacy of the two nutrients was then determined indicated in Table 3.2.

Table 3.2: Energy and protein adequacy

Type of nutrient RDA	AGHS Number (%)	AHS Number (%)
Energy		
≤RDA	19(17.3)	12(14.8)
≥RDA	13(11.8)	17(21)
Protein		
≤RDA	20(18.2)	18(22)
≥RDA	12 (10.9)	11(13.6)

RDA- Recommended Daily Allowance, AGHS- Alliance Girls High School, AHS- Alliance High School

Table 3.3 shows the results of t-test when adequacy of the two nutrients was compared between the two schools.

Table 3.3: A comparison nutrient adequacy between the two schools

Variable	Statistical test
% of Energy RDA consumed	$t = -1.77, p = 0.083$
% of protein RDA consumed	$t = 0.174, p = 0.863$

% - percent, RDA- Recommended Daily Allowance

When adequacy of the two nutrients was compared between the two schools it was established that there was no significant differences between the two schools.

3.4 Weighed food school record

During different meals in a day, foods were weighed before eating for every student and the plate waste was measured. RDA determined was in both girls and boys. The meals included breakfast, 10 o'clock tea, lunch, evening tea and super. Table 3.4 shows the average contribution of meals to energy and protein RDAs.

Table 3.4: Meals mean contribution to RDA

Type of nutrient	Mean RDA for Girls	Mean RDA for Boys
Energy (kcal)	2192 ± 3.2	2184 ± 3.4
Protein (g)	38.9 ± 1.75	38.3 ± 1.46

RDA- Recommended Daily Allowance, kcal- kilocalories, g- grams

Contribution of school meals to the student's energy intake is high. The two schools had adequate energy as per RDA.

4.0 DISCUSSION

Adolescents are quite fussy about what they eat and the family background remains a major influence on diet. A number of factors seem to affect adolescents' food choices and eating patterns, perhaps the most obvious of these being the accessibility of various foods, with peers and television commercials also playing a significant role.

WHO (2006) reckons that one of the causes of overweight and obesity has been increased intake of energy-dense foods that are high in fat and sugar, but low in vitamins, minerals and other micronutrients. In line with literature, there is a significance difference between boys and girls in consumption of foods such as bread, cakes, ice cream and french fries which may contribute to obesity and overweight cases in national high school students. Moreover, consumption of high calorie foods among adolescents can be attributed to increase in overweight and obesity.

Eating a lot of high Glycemic Index (GI) foods can be detrimental to one's health because it pushes the body to extremes (Foster, et al., 2002). This is especially true if one is overweight and sedentary. These include foods such as white bread (70), French fries (75). Other foods such as ice cream are of medium GI (61) though the high amount of sugar increases its caloric content. There are no GI values for meats and eggs as these contain little or no carbohydrates though foods such as sausages are high in fat and salt. Foods rich in fat and protein tend to slow down foods from leaving stomach; therefore foods containing fat and protein such as beans and milk have lower GI values (Ibid). Adolescents are therefore encouraged to eat more of low GI foods and less of the high GI foods.

Other studies have shown that consumption of high GI foods induces a sequence of reactions that promote excessive food intake in obese subjects. Hence, in addition to inducing obesity, the consumption of high GI foods creates a cycle of overeating due to the high serum insulin concentration following such a meal that has the effect of inducing hunger (Ludwig, 2000). Low GI diets, on the other hand, lessen hunger by slowing the rate of nutrient absorption. It is therefore suggested that diets with abundant vegetables, decreased amounts of high GI carbohydrates and moderate intake of proteins and fat be adopted to prevent and also treat obesity.

According to FAO/WHO (2001), rapid growth in stature, muscle mass and fat mass during adolescents results in greater daily requirement for iron and vitamin A than among persons of other age groups. If these nutrients are not replaced by the diet or supplementation a deficiency occurs as explained by Jukes, et al. (2008). Those micro-nutrients are mostly available in fruits and vegetables foods less consumed by students and known to lower GI when eaten with foods high in calories.

5.0 CONCLUSION AND RECOMMENDATIONS

From the study findings, intake of bread, chapatti, buns, ice cream, oranges, french fries, cakes, soda and sugar sweetened beverages were significantly ($p < 0.05$) different between girls and boys. Other foods were found not to be significantly different in terms of consumption between girls and boys. Further, there was no significant difference in dietary intake of energy and protein between male and female students with regard to RDAs.

To change the adolescent's attitude towards nutrition and general health, nutrition health education should be introduced in the school curriculum as a mandatory course. Health and nutrition education programs that involve students, teachers and parents should be introduced in schools. Head teachers and students need to have forums that address issues on proper diet as a way to curb the risks of non-communicable diseases. In addition, sale of snacks in school tack shops should be restricted to include mainly healthy ones, low in sugar and fat.

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