Research Article

Food Consumption Patterns of Nigerian Adolescents and Effect on Body Weight

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ABSTRACT

Objective: Association between nutritional status of adolescents and food consumption pattern.

Design: Data on number of meals and snacks consumed daily were collected using structured questionnaires. Nutritional status was assessed as weight-for-age body mass index score less than fifth percentile of the National Center for Health Statistics/World Health Organization International Growth Reference.

Setting: Cross-sectional studies of adolescents using multistage random sampling procedure.

Participants: 401 adolescents from 32 secondary schools in Osun State, Nigeria.

Analysis: Frequency counts, percentages, and cross-tabulation analysis were used to analyze data, analysis of variance was used to test the differences, as well as chi-square analysis. Level of significance was taken at .05 and .01 levels.

Results: 66.1% of adolescents ate 3 meals daily; this percentage was higher among rural (75.4%) than urban (61.4%) children ($P < .001$). About 33.0% consumed snacks daily but to a varying degree, which was higher among urban than rural adolescents ($P = .002$). Prevalence of underweight was 20.1%, more common in rural (22.1%) than urban adolescents (18.7%). Underweight prevalence was highest among those who ate 3 meals and no snacks daily (28.6%) and least among those who ate 3 meals and snacks twice daily (15.9%).

Conclusion: Snacks are important in food consumption among adolescents; when snacks are consumed in addition to 3 meals, they will improve the nutritional status of adolescents.

Key Words: meals, snacks, consumption, underweight, adolescents (*J Nutr Educ Behav*. 2010;42:144-151.)

INTRODUCTION

Malnutrition is still a silent emergency in the 21st century. Undernutrition is related to an inadequate intake of nutrients, which results in weight loss and growth faltering, reflected as underweight, wasting, and stunting.[1] A child's growth is the most important indicator of health, which is influenced and measured by adequate intakes of food and nutrients and a decreased susceptibility to disease. The United Nations Children's Fund Conceptual Framework for Nutrition indicates that inadequate dietary intake results in growth failure, a condition referred to as chronic malnutrition.[2] The consequence of chronic malnutrition is poor physical, mental, and social development of the child, leading to chronic ill health, low productivity, and less opportunity for educational growth.[1]

For the purpose of this study, inadequate intake of food was assessed as inadequate meal and snack consumption. The meal consumption pattern in the study areas included breakfast, lunch, and dinner, all of which are important in adolescent nutrition. It has been reported that routinely eating meals may lead to more regular eating habits, healthful food choices, and consistent energy intake, which when taken together contribute to improved body mass index (BMI). Eating is important to adolescent health needs in general. The importance of daily meals has been shown in different subpopulations.[3-5] A regular meal rhythm and an increase in eating frequency seem to have a positive impact on weight management.[6,7]

Adolescents have not traditionally been considered to be at nutritional risk. Nonetheless, because of rapid growth in stature, muscle mass, and fat mass during the peak of the adolescent growth spurt, the requirements for some nutrients are as high as or higher in adolescents than in other stages of life.[8] The question which now arises is: Why is it that improvement in the nutritional situation has been slow despite decades of nutrition programs and projects? Programs such as the School Meal Programme (SMP), targeted toward school children; Poverty Alleviation Programmes (PAP), targeted toward heads of households; the Family Support Programme (FSP); and Women Empowerment Programmes (WEP) are not sustainable over time, and some have limited effects.[9-11]

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Numerous studies have investigated the linkages between the nutritional status of adolescents and reproductive health pattern and dietary intakes.[8,12] Dietary intakes refer generally to the intake of nutrients from food. However, little has elucidated linkages between BMI and pattern of food consumption. Food consumption pattern in this context and in the study area refers to occasion and frequency of eating routine meals, which is truncated into 6 eating moments, namely, breakfast, lunch, dinner, and snacks. The latter is divided into morning, afternoon, and late evening snacks.[13]

The frequency at which meals and snacks were eaten in a day was determined and a comparison was made between urban and rural adolescents. It is expected that individuals in the study area should eat at least 3 meals a day. The physical activity level of adolescents is high, therefore they may require even more than the 3 routine meals.[13,14]

Each culture distinguishes between eating occasions according to when and how often the occasion takes place (routinization), what food is served (content), who is involved (participation), how the food is consumed (method), and the significance of the event (function).[15] Consumers learn which food items are appropriate for which occasions, for example, children by the age of 10 can recognize which food item belongs in which meal.[15] Meal patterns relate to the organization of food and drink and can include the time at which the meal was served, the frequency of the event, where it was eaten, who was present, the order of the dishes, and the food served at the meal.[12,15] The meal itself can be differentiated by the number of courses, the dishes in each course, food presentation, meal duration, use of accompliment, and much more.[16]

The implicit rules for constructing and scheduling meals provide continuity in the food. They do not specify the use of particular food items but how to combine food items in distinct dishes that are recognized and appropriate for the occasion.[16] The daily meal pattern, which forms a "skeletal structure" for the day's activities, is highly dependent on the employment status of mothers in households composed of nuclear families.[16]

In Nigeria, available statistics indicated that over 65% of the population is under 25 years old,[17] and of this percentage, 45% are girls aged 11-19 years. Therefore, there is an identified need to study the extent to which the food consumption pattern of adolescents affects their body weight.

METHODS

This is a cross-sectional study of adolescents between the ages of 10 and 19 years. The study was school based, since contacts with adolescents are scarce except in schools. The adolescents were found in the public secondary schools in Osun State, Nigeria. Osun State presently consists of 30 Local Government Areas (LGAs), which are grouped into 3 senatorial districts, namely, Osun Central, Osun East, and Osun West. There are 10 LGAs in each district. Random selection (table of random numbers) of 2 LGAs from each stratum (district) was done by balloting to ensure that all LGAs had equal chances of being chosen. Consequently, 6 LGAs (Ifelodun, Ila, Ejigbo, Aiyedade, Ilesa West, and Oriade) were selected. A list of government-owned secondary schools (public secondary schools) was obtained from the Department of Planning, Research, and Statistics, Ministry of Education, Oshogbo, Osun State. There are 319 public secondary schools in the state. The selected LGAs consisted of 10, 12, 15, 16, 9, and 20 schools, respectively.

Multistage random sampling technique was used to select the adolescents. Each of the selected LGAs was stratified into urban and rural areas. Out of the 319 schools in the state, 32 schools were selected using simple random technique. Five schools each were selected in Ifelodun and Ila LGAs (Osun Central). Five schools each were also selected in the Ejigbo and Ayedaade LGAs (Osun West). Four schools were selected in Ilesa West, and 8 schools in Oriade LGA (Osun East). One school from a predominantly rural area was purposively selected from each LGA. The schools that operated a boarding school system were excluded from the survey.

The total calculated minimum sample size was divided among the representative study schools using a simple percentage. The number of students selected from each school was determined according to the total number of students in each school. Finally, classrooms were chosen on a systematic random basis, and each adolescent was selected randomly from a classroom. School register was used to randomly select each adolescent from a classroom. Data from 401 subjects were included for analysis. Institutional Review Board approval was obtained before carrying out the research.

Anthropometric Measurements

Weight and height measurements were obtained. A locally adapted height-measuring board was used for the height measurement/stadiometer.[18] This measurement was done by experts trained in measuring techniques. Height was measured without wearing footwear. The adolescents were asked to stand on a flat surface, heels together and head positioned so that the line of vision was perpendicular to the body. The arms hung freely by the side, and the head, back, buttocks, and heels were in contact with the vertical measuring rods. The individuals were asked to inhale deeply and maintain a fully erect position. The movable headpiece was brought onto the topmost point on the head with sufficient pressure to compress the hair. Height was recorded to the nearest centimeter.

Weight was recorded using a digital Portable Hanson floor bathroom balance. The accuracy of weighing equipment was checked in every session against known weight. The adolescents were asked to stand still in the center of the weighing machine platform without support, with the body weight evenly distributed between both feet. Weights were taken with standard minimal clothing required to maintain privacy. They were also asked to remove shoes, socks, and so on. Weight was recorded to the nearest kilogram.

Body Mass Index

The World Health Organization (WHO) recommends age-specific cutoff points of BMI based on National Health and Nutrition Examination Survey (NHANES) reference data.[19,20] BMI-