

Race/Ethnicity and Income in Relation to the Home Food Environment in US Youth Aged 6 to 19 Years



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ABSTRACT

Background The home food environment is complex and has the potential to influence dietary habit development in young people. Several factors may influence the home food environment, including income and race/ethnicity.

Objective To examine the relationship of income and race/ethnicity with three home food environment factors (ie, food availability frequency, family meal patterns [frequency of family and home cooked meals], and family food expenditures).

Design A cross-sectional analysis of the National Health and Nutrition Examination Survey (NHANES).

Participants A total of 5,096 youth aged 6 to 19 years from a nationally representative sample of US individuals participating in NHANES 2007-10.

Statistical analyses performed Prevalence of food availability frequency was assessed for the entire sample, race/ethnicity, poverty income ratio (PIR), and race/ethnicity stratified by PIR. Mean values of family meal patterns and food expenditures were calculated based on race/ethnicity, PIR, and race/ethnicity stratified by PIR using analysis of variance and least squares means. Tests of main effects were used to assess differences in food availability prevalence and mean values of family meal patterns and food expenditures.

Results Non-Hispanic whites had the highest prevalence of salty snacks (51.1%±1.5%) and fat-free/low-fat milk (39.2%±1.7%) always available. High-income homes had the highest prevalence of fruits (75.4%±2.4%) and fat-free/low-fat milk (38.4%±2.1%) always available. Differences were found for prevalence of food availability when race/ethnicity was stratified by PIR. Non-Hispanic blacks had the lowest prevalence of fat-free/low-fat milk always available across PIR groups. Differences in mean levels of family meal patterns and food expenditures were found for race/ethnicity, PIR, and race/ethnicity stratified by PIR.

Conclusions Race/ethnicity and PIR appear to influence food availability, family meal patterns, and family food expenditures in homes of youth. Knowledge of factors that influence the home food environment could assist in developing effective strategies to improve food environments for young people.

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US DIETARY INTAKE DATA INDICATE THAT CHILDREN and adolescents fail to meet dietary recommendations.^{1,2} Consumption of snack foods, soft drinks, and total energy has increased in the past 30 years in youth.³⁻⁵ In addition, many children and adolescents are consuming inadequate amounts of fruits and vegetables.^{5,7} These diet trends can lead to short- and long-term health consequences for youth and may increase risk of developing obesity. Researchers have suggested that obesity is, in part, a normal response to an obesogenic environment.⁸ The home food environment is emerging as an influential environment in obesity and behavior development.⁹

The home food environment may strongly influence eating patterns in youth. Despite the growing trend of away-from-home food consumption, approximately 60% of

the food children and adolescents consume is from home.¹⁰ The home food environment includes the political and economic environment, the food physical environment, and the food social environment.^{9,11,12} Home availability of foods is one aspect of the food physical environment.^{11,12} Availability of food in the home is a gauge of exposure and may, thus, influence nutrient intake of youth.¹³ Several studies have demonstrated that availability of food in the home is related to food consumption in youth.¹⁴⁻²¹ Specifically, fruit and vegetable availability in the home has been found to be related to child and adolescent consumption of these foods.¹⁴⁻¹⁷ The same availability/consumption relationship has been reported for energy-dense foods like soft drinks and snack foods.^{18,19} Food available in the home is most often controlled by parents because youth have limited control

over food shopping for the family.^{22,23} Several parent/family factors may influence home food availability and ultimately, dietary intake in youth. These factors include parent education level, parent knowledge of and/or motivation for healthy behaviors, food shopping behaviors, food preparation skills, family food preferences, household size, family income level, and race/ethnicity.^{13,21-28}

Family meal patterns are a component of the food social environment in the home.^{9,11,12} More frequent family meals are associated with better dietary intake.^{26,29-36} Family meal patterns may be influenced by age of the youth in the home, race/ethnicity, and socioeconomic background.^{26,37,38}

Family food expenditures may also be influenced by various factors, including socioeconomic status (SES), differences in neighborhood food landscapes, race-ethnicity, family food preferences, and convenience.³⁹⁻⁴³ Family food expenditures have not been directly tied to the home food environment in current home food environment models.^{9,11,12} However, family SES has been defined as a component of the political and economic environment in the home⁹ and family SES has been shown to influence household food purchasing habits at both supermarkets and restaurants.³⁹⁻⁴¹ Household food purchases may influence dietary intake in youth due to the ability of food purchasing to influence both the availability of foods in the home and role modeling behaviors,⁴⁴ both of which are aspects of the home food environment.^{9,11,12} This indicates that family food expenditures likely influence the home food environment. Thus, in this study, family food expenditures will be considered as one aspect of the home food environment.

Food availability, family meal patterns, and family food expenditures are modifiable areas that could possibly aid in obesity prevention in youth. SES and race/ethnicity are two factors that have been shown to influence food availability, family meal patterns, and family food expenditures.^{13,25-27,37,39-43} No studies to date have assessed the relationship of these factors with variables of the home food environment in a nationally representative sample of youth. These relationships should be examined in a nationally representative sample to gain a more comprehensive understanding of differences in home food environments across SES and race/ethnicity groups. Knowledge of factors that influence the home food environment may assist in tailoring nutrition education programs and public policy to meet the needs of different populations. Therefore, the purpose of our study was to assess the relationship of income level, a measure of SES, and race/ethnicity with three aspects of the home food environment (ie, food availability, family meal patterns, and family food expenditures) in a nationally representative sample of US youth using data from the National Health and Nutrition Examination Survey (NHANES).

METHODS

Study Design and Population

The NHANES is conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention. The NHANES is a cross-sectional, nationally representative health and nutrition survey of the US civilian noninstitutionalized population and includes a home interview and standardized physical examination at a mobile examination center. Since 1999, the NHANES data have been released in 2-year

increments. The NHANES protocol was approved by the National Center for Health Statistics Institutional Review Board and all participants provided written informed consent. Participants younger than age 18 years provided parent or guardian consent. Details regarding the survey design, content, operations, and procedures are available online.⁴⁵ The NHANES 2007-10 sample consisted of 5,096 participants aged 6 to 19 years, all of whom were interviewed. Demographic data and Consumer Behavior Questionnaire data from the NHANES 2007-10 were used in this study.

Data Collection and Measurements

Demographic Questionnaire Data. The NHANES Demographic Questionnaire data were obtained in the home and were used to assess the distribution of demographic information in the youth population. The household interview was conducted in person with a trained interviewer. Participants aged 16 years and older were interviewed directly and a proxy respondent (a responsible adult) provided information for survey participants younger than age 16 years. The NHANES demographic variables used in this study included age, sex, race/ethnicity, and poverty income ratio (PIR). Race/ethnicity were self-reported and categorized as non-Hispanic white, non-Hispanic black, Mexican American, other Hispanic, and other. The "other" category included Asian and multiracial participants and was used in total estimates in this study but not in separate analyses due to small sample size. Specific race/ethnicity categories used in this study included white (non-Hispanic white), black (non-Hispanic black), and Hispanic (Mexican American and other Hispanic). PIR was provided in the NHANES demographic survey information and was calculated using a ratio of the family's income to their poverty threshold as defined by the US Census Bureau. PIR accounts for inflation and family size. In 2008, a PIR of 350% was equivalent to approximately \$77,000 for a family of four and a PIR of 130% was equivalent to approximately \$29,000 for a family of four. The cut point for participation in the Supplemental Nutrition Assistance Program is 130% of the poverty level.⁴⁶ Poverty income categories used in this study were identical to those used in NHANES analyses conducted by the Centers for Disease Control and Prevention⁴⁷ and were <130% (low income), 130% to 349% (middle income), and ≥350% (high income).

Consumer Behavior Questionnaire Data. Consumer Behavior Questionnaire data were obtained in the home as part of the Flexible Consumer Behavior Survey module which was added to NHANES in 2007 and developed in collaboration with the Economic Research Service of the US Department of Agriculture.⁴⁵ The core of the Flexible Consumer Behavior Survey module included the NHANES Consumer Behavior Questionnaire, which was conducted in the home as part of the NHANES Family Questionnaire to obtain data on diet-related consumer behavior at the family level.⁴⁵ Diet-related consumer behaviors addressed included three aspects of the home food environment: home food availability, food expenditures, and family meal patterns.⁴⁵ Food availability was measured using a predefined inventory checklist. One adult respondent from each family answered questions regarding the frequency of availability of fruits, dark green vegetables, salty snacks, fat-free/low-fat milk, and soft drinks

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