

Original Research

Young Adults and Eating Away from Home: Associations with Dietary Intake Patterns and Weight Status Differ by Choice of Restaurant

NICOLE LARSON, PhD, MPH, RD; DIANNE NEUMARK-SZTAINER, PhD, MPH, RD; MELISSA NELSON LASKA, PhD, RD; MARY STORY, PhD, RD

ABSTRACT

Background Young adults report frequent away-from-home eating; however, little is known regarding what types of restaurants are patronized or whether associations with dietary intake and weight status differ according to restaurant type.

Objective This cross-sectional study in a diverse sample of young adults examines sociodemographic differences in the frequency of eating at different types of fast-food and full-service (server brings food to table) restaurants. In addition, this study examines whether associations between away-from-home eating, dietary intake, and weight status differ according to restaurant type.

Design There were 1,030 men and 1,257 women (mean age = 25.3 years) who participated in Project EAT-III (Eating and Activity in Teens and Young Adults). Participants were members of a longitudinal cohort who completed baseline surveys at schools in Minneapolis/St Paul, MN, and completed the EAT-III surveys online or by mail in 2008-2009.

Main outcome measures Height, weight, and usual dietary intake were self-reported.

Statistical analyses performed Regression models adjusted for sociodemographic characteristics were used to examine associations between frequency of restaurant use, dietary intake, and weight status.

Results More frequent use of fast-food restaurants that primarily served burgers and french fries was associated with higher risk for overweight/obesity; higher intake of total energy, sugar-sweetened beverages, and fat; and with lower intake of healthful foods and key nutrients. For example, those who reported burger-and-fries restau-

rant use on three or more occasions per week consumed nearly one additional sugar-sweetened beverage per day compared to those who reported burger-and-fries restaurant use on less than one occasion per week. More frequent use of fast-food restaurants that primarily served sandwiches/subs was related to a few markers of poorer diet quality, but unrelated to weight status. More frequent use of full-service restaurants was also unrelated to weight status and related to higher intake of vegetables.

Conclusions There may be a need for interventions to promote healthier food choices among young adults who report frequent burger-and-fries restaurant use.

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Young adults (aged 20 to 29 years) consume approximately 40% of their total daily energy away from home; thus, the foods and beverages selected at restaurants may have a considerable influence on overall dietary quality (1). Research investigating dietary patterns during young adulthood has found that eating at fast-food restaurants occurs an average of two to three times per week (2); however, few studies have examined what types of fast-food restaurants are patronized or how frequently young adults purchase food at full-service restaurants (3). The availability of healthful and energy-dense menu options likely differs between fast-food restaurants and full-service restaurants (4), and among fast-food restaurants according to the type of food served (eg, burgers and french fries, deli sandwiches, or Mexican entrees). Therefore, the implications of eating away from home for dietary intake and weight status could differ according to the types of restaurants patronized by young adults.

Although several studies have found frequent away-from-home eating is associated with higher daily energy intake (5-10), poorer diet quality (5-7,10-13), and greater weight gain (2,14-16), few studies have considered if these associations differ according to restaurant type. One study among adults, adolescents, and children found that meals consumed away from home were higher in energy compared to meals prepared at home, regardless of if they were purchased at a fast-food or full-service restaurant (9). However, another study found that dining at nonfast-food restaurants (eg, full-service restaurants) was associated with higher fruit and vegetable consumption among non-Hispanic black adolescents (17). Furthermore, studies suggest that residents in communities with greater access to full-service restaurants have lower risk

N. Larson is a research associate, D. Neumark-Sztainer and M. Story are professors, and M. Laska is an assistant professor, Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, Minneapolis.

Address correspondence to: Nicole Larson, PhD, MPH, RD, Division of Epidemiology and Community Health, School of Public Health, University of Minnesota, 1300 S Second St, Suite 300, Minneapolis, MN 55454.

E-mail: larsonn@umn.edu

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for obesity, consume more fruits and vegetables, and are more likely to meet dietary recommendations for saturated fat (18-20). These relationships were found to exist above and beyond differences in the sociodemographic characteristics of neighborhood residents, suggesting the findings were not simply an artifact of disparities in the availability of healthy foods (21). Additional studies are needed to clarify these findings as proximity to restaurants may not be a major influence on patterns of actual restaurant use among young adults (22).

Our study was designed to examine sociodemographic differences in the frequency of eating at different types of fast-food and full-service restaurants in a diverse sample of young adults. Fast-food restaurants were defined as establishments that provide limited service and require customers to place orders and pay before eating at a counter or table. Full-service restaurants were, in contrast, defined as establishments where customers are seated and meals are brought to a table by a server. In addition, this study aimed to examine whether associations between away-from-home eating, dietary intake, and weight status differ according to restaurant type. A better understanding of these relationships can help to inform the design of nutrition interventions and target relevant health behavior messages for young adults.

METHODS

Sample and Study Design

Data for this cross-sectional analysis were drawn from Project EAT-III (Eating and Activity in Teens and Young Adults), the third wave of an observational study designed to examine dietary intake, physical activity, weight-control behaviors, weight status, and factors associated with these outcomes among diverse young adults. At baseline (1998-1999), a total of 4,746 junior and senior high school students at 31 public schools in the Minneapolis/St Paul metropolitan area of Minnesota completed surveys and anthropometric measures (23,24). Ten years later, original participants were mailed letters inviting them to complete online or paper versions of the Project EAT-III survey and a food frequency questionnaire (FFQ). A total of 2,287 young adults completed the Project EAT-III survey between November 2008 and October 2009, representing 66.4% of participants who could be contacted (48.2% of the original school-based sample) (25). All study protocols were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee.

Survey Development

The original Project EAT survey (24) that was used to assess determinants of dietary intake and weight status among adolescents was modified at follow-up to improve the relevance of items for young adults. New items were also added to the Project EAT-III survey to allow for investigating areas of growing research interest such as frequency of restaurant use. Four focus groups were conducted to pretest an initial draft of the Project EAT-III survey. Feedback from the 27 young adult participants was used to reword or eliminate problematic survey measures and expand on topic areas of perceived importance

prior to additional pilot testing. A revised survey was pilot tested with a different sample of 66 young adults to examine test-retest reliability over a period of 1 to 3 weeks. Additional details of the survey development process are described elsewhere (26).

Restaurant Use. Frequency of eating food from full-service restaurants and five categories of fast-food restaurants (ie, burger-and-fries, fried chicken, Mexican, pizza, and sandwich/sub) was assessed on the Project EAT-III survey with the question: "In the past month, how often did you eat something from the following types of restaurants (include take-out and delivery)?" Examples of quick-service and fast casual (eg, Panera Bread, St Louis, MO) restaurant chains were provided for each type of fast-food restaurant. Response options were "never/rarely," "one to three times per month," "one to two times per week," "three to four times per week," "five to six times per week," and "one or more times per day." This measure was adapted from a screener previously developed to assess restaurant use among adolescents (27). The test-retest reliability of reported frequencies among young adults varied according to the type of food served at restaurants, ranging from $r=0.43$ (pizza) to $r=0.83$ (fried chicken) (26).

Dietary Intake. A semi-quantitative FFQ was administered at the same time as the Project EAT-III survey to assess usual past year intake of fruit, vegetables, dark green/orange vegetables, whole grains, milk products, and sugar-sweetened beverages (28). A daily serving was defined as the equivalent of $\frac{1}{2}$ c for fruit and vegetables, 16 g for whole grains, and 1 c for milk products. For sugar-sweetened beverages, a serving was defined as the equivalent of 1 glass, bottle, or can. In addition, the FFQ was used to assess usual daily intake of total energy, total fat (percent of total energy), saturated fat (percent of total energy), sodium (milligrams), fiber (grams), and calcium (milligrams). Nutrient intakes were determined in 2009 by the Nutrition Questionnaire Service Center at the Harvard School of Public Health using a specially designed database, primarily based on the United States Department of Agriculture's Nutrient Database for Standard Reference (release 19). Previous studies have examined and reported on the reliability and validity of intake estimates (29,30). Responses to the FFQ were excluded if participants reported a biologically implausible level of total energy intake (<500 kcal/day or $>5,000$ kcal/day).

Weight Status. Weight status was assessed using self-reported height and weight, from which body mass index (BMI) was calculated. Self-report of height and weight (test-retest $r=0.99$ for height and weight) were validated in a subsample of 63 male and 62 female participants in Project EAT-III for whom height and weight measurements were completed by trained research staff. Results showed very high correlations between self-reported BMI and measured BMI in males ($r=0.95$) and females ($r=0.98$). Weight status was defined according to current BMI guidelines for adults (overweight or obese: $\text{BMI} \geq 25$; obese: $\text{BMI} \geq 30$) (31).

Sociodemographic Characteristics. Sociodemographic characteristics were self-reported and included sex, age, race/ethnicity, family socioeconomic status (SES), current employment, post-secondary student status, and parental

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