The Protective Role of Family Meals for Youth Obesity: 10-Year Longitudinal Associations

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Objective To examine whether having family meals as an adolescent protects against becoming overweight or obese 10 years later as a young adult.

Study design Data from Project Eating and Activity in Teens -III, a longitudinal cohort study with emerging young adults, were used. At baseline (1998-1999), adolescents completed surveys in middle or high schools, and at 10-year follow-up (2008-2009) surveys were completed online or via mailed surveys. Young adult participants (n = 2117) were racially/ethnically and socioeconomically diverse (52% minority; 38% low income) between the ages of 19 and 31 years (mean age = 25.3; 55% female). Logistic regression was used to associate weight status at follow-up with family meal frequency 10 years earlier during adolescence, controlling and testing for interactions with demographic characteristics.

Results All levels of baseline family meal frequency (ie, 1-2, 3-4, ≥5 family meals/wk) during adolescence were significantly associated with reduced odds of overweight or obesity 10 years later in young adulthood compared with never having family meals as an adolescent. Interactions by race indicated that family meals had a stronger protective effect for obesity in black vs white young adults.

Conclusions Family meals during adolescence were protective against the development of overweight and obesity in young adulthood. Professionals who work with adolescents and parents may want to strategize with them how to successfully carry out at least 1 to 2 family meals per week in order to protect adolescents from overweight or obesity in young adulthood. *(J Pediatr 2015;166:296-301)*.

See editorial, p 220

Family meals have been suggested as one potential factor that may be protective against obesity.[1,2] Higher frequency of family meals are associated with more consumption of fruit and vegetables,[3-5] calcium and whole grains,[6-8] lower levels of extreme weight control behaviors and binge eating,[7,9] and better psychosocial health in adolescents.[10] These significant associations have held across diverse ethnic/racial backgrounds and sex. However, research examining the association between family meal frequency and adolescent body mass index (BMI) or weight status (ie, overweight, obese) has shown inconsistent findings.[11-21]

To date, the majority of research looking at the association between family meals and adolescent overweight/obesity has primarily been cross-sectional and found mixed results. More specifically, some cross-sectional studies have shown an inverse relationship between the frequency of family meals and adolescent BMI,[11-16] and others have shown no association.[18-20,22] Furthermore, these cross-section findings have often been specific to 1 sex[21] or age group,[17,21] race/ethnicity,[17] or social class.[17,21] A meta-analysis also noted the limitations of studies described above and further identified that research has mostly been conducted with children (ages 6-12 years) rather than adolescents (ages 13-18 years) or young adults (ages 18 years and older).[23]

Given the high prevalence of adolescent obesity in the US,[24,25] and the likelihood of obesity tracking into adulthood,[26] it is important to identify modifiable factors in the home environment that can protect against overweight/obesity through the transition to adulthood. Identifying whether race/ethnicity modifies the association between family meal frequency and young adult overweight/obesity is important in order to identify whether certain groups benefit more from having family meals. The current study addresses these gaps and, furthermore, examines an important developmental time frame, transitioning from

BMI	Body mass index
EAT	Eating and Activity in Teens
SES	Socioeconomic status

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Supported by the National Heart, Lung, and Blood Institute (R01 HL093247 [PI: D.N.-S.]) and *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (U01HD061940 [to M.W. and T.-F.H.; PI: M.W.]). The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Heart, Lung and Blood Institute or the National Institutes of Health. The authors declare no conflicts of interest.

http://dx.doi.org/10.1016/j.jpeds.2014.08.030

adolescence to young adulthood, which is a common time to gain weight and to have fewer family meals.[27]

The main aim of this study is to use longitudinal data from a 10-year population-based study (Project Eating and Activity in Teens [EAT] III) with racially/ethnically and socioeconomically diverse adolescents to investigate whether having frequent family meals as an adolescent is protective for overweight and obesity in young adulthood. In addition, interactions were examined to identify whether associations between family meal frequency in adolescence and overweight/obesity status in young adulthood differ by race/ethnicity. The specific hypotheses for the study are that higher family meal frequency during adolescence will predict lower odds of overweight and obesity longitudinally into young adulthood and race/ethnicity will modify this significant association.

Methods

Data were drawn from the first and third waves of a 10-year longitudinal cohort study designed to examine weight-related variables (eg, dietary intake, physical activity, weight control behaviors, weight status) among adolescents; Project EAT I and Project EAT III.[28] The EAT III sample includes participants (n = 2287) who responded to the 10-year follow-up survey. At baseline (ie, Project EAT I), middle school and high school students in 31 public schools in the Minneapolis/St. Paul metropolitan area of Minnesota completed anthropometric measures and surveys in class during the 1998-1999 academic school year. The 10-year follow-up (ie, EAT III) study was designed to follow-up on the original participants in 2008-2009 as they progressed from adolescence into emerging adulthood. Data collection for EAT III ran from November 2008 to October 2009 and was conducted by the Health Survey Research Center in the School of Public Health at the University of Minnesota, Minneapolis. The Institutional Review Board Human Subjects Committee at the University of Minnesota approved all protocols used in Project EAT at each time point.

Of the original Project EAT I participants (n = 4746), 27.5% (n = 1304) were lost to follow-up primarily for missing contact information at time 1 (n = 411) and no address found at follow-up (n = 712).[29] For Project EAT III, survey invitation letters were sent to participants with a web address and a unique password for completing the online version of the Project EAT III survey. Participants were able to select an option to be sent a paper version of the survey. Nonresponders were sent 3 reminder letters. All reminder letters included a postage-paid card for requesting paper copies. The second reminder letter additionally included paper copies of the survey. In addition, reminder postcards were sent to participants who did not complete the survey after logging into the online version or who requested paper copies at some point in the process. Internet tracking services were employed to identify correct addresses when mailings were returned due to incorrect addresses.

A total of 1257 females and 1030 males completed Project EAT III surveys that were determined to be valid and adequately complete for inclusion in analyses. This represented 66.4% of participants who could be contacted (48.2% of the original school-based sample). The majority (86.5%) of survey respondents completed the online survey. One-third of participants (29.9%) were in middle school at baseline (mean age = 12.8 ± 0.7 years) and were in emerging young adulthood (mean age = 23.2 ± 1.0 years) at follow-up. Two-thirds of participants (70.1%) were in high school at baseline (mean age = 15.9 ± 0.8 years) and were in young adulthood (mean age = 26.2 ± 0.9 years) at follow-up.[30]

The Project EAT survey was developed at baseline and revised for use at 10-year follow-up specifically to assess items of relevance to young people as they transitioned into young adulthood and developed more independent lifestyles. The survey is a 221-item survey assessing a range of socioenvironmental, personal, behavioral, and familial factors of potential relevance to nutritional health and obesity among adolescents. The survey development is described elsewhere.[28] Two-week survey test-retest reliability data were collected from 167 adolescents at baseline, and validity of the survey was established and details are previously published.[28]

To assess family meal frequency, the exposure variable, adolescents were asked, "During the past seven days, how many times did all, or most, of your family living in your house eat a meal together?" Response options included never, 1-2 times, 3-4 times, 5-6 times, 7 times, and more than 7 times (test-retest r = .83).[31] Although this measure is a single item, it has been used in the majority of prior studies looking at family meal frequency,[8,32,33] thus, increasing the ability to compare results across studies. It has also been shown to be reliable and valid with diverse populations.[6,31] The 3 highest categories were collapsed to allow for meaningful comparisons between parents who had infrequent or occasional family meals with families who had more regular family meals.[34]

To assess overweight and obesity status, the outcome variable, self-reported height and weight values were used to calculate BMI (weight [kg]/height [m^2]) at baseline and 10-year follow-up. At baseline, high correlations were found between self-reported and measured BMI in male (r = 0.88) and female (r = 0.85) adolescents.[35] In addition, at EAT III very high correlations between self-reported and measured BMI were found in a validation subsample of 63 male and 62 female EAT III study participants (r = 0.95 for males and r = 0.98 for females). At baseline, overweight status was determined based on a BMI at or above the 85th percentile for sex and age using reference data from the Centers for Disease Control and Prevention.[36] Weight status at 10-year follow-up was defined according to current BMI guidelines for adults (overweight: BMI ≥25 and <30 kg/m^2; obese: BMI ≥30 kg/m^2).[37]

Control variables included sex, age, race/ethnicity, and socioeconomic status (SES). These variables were assessed by self-report at EAT I. Race/ethnicity was assessed with one survey item: "Do you think of yourself as: (1) white; (2) black or African American; (3) Hispanic or Latino; (4) Asian American; (5) Hawaiian or Pacific Islander; or (6) American Indian or Native American" and respondents were asked to