

What's Being Served for Dinner? An Exploratory Investigation of the Associations between the Healthfulness of Family Meals and Child Dietary Intake



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ABSTRACT

Background Little is known about the healthfulness of foods offered at family meals or the relationship between the food's healthfulness and child overall dietary intake.

Objective This exploratory study uses a newly developed Healthfulness of Meal Index to examine the association between the healthfulness of foods served at family dinners and child dietary intake.

Design Direct observational, cross-sectional study.

Participants/setting Primarily low-income, minority families (n=120) video recorded 8 days of family dinners and completed a corresponding meal screener. Dietary recalls were completed on the target child (6 to 12 years old). The Healthfulness of Meal Index was used to measure meal healthfulness and included component scores for whole fruit, 100% juice, vegetables, dark green vegetables, dairy, protein, added sugars, and high-sodium foods.

Main outcome measures Child dietary intake measured by three 24-hour dietary recalls.

Statistical analyses performed Linear regression models estimated the association between the healthfulness of foods served at dinner meals and overall child HEI.

Results The majority of coded meals included foods from protein and high-sodium components; more than half included foods from dairy and vegetable components. Nearly half of the meals had an added-sugar component food (eg, soda or dessert). Few meals served foods from fruit, 100% juice, or dark green vegetable components. Many components served at family dinner meals were significantly associated with child daily intake of those same foods (ie, dark green vegetable, non-dark green vegetables, dairy, and added sugars). The Healthfulness of Meal Index total score was significantly associated with child HEI score.

Conclusions This study represents the first report of a new methodology to collect data of foods served at family dinners. Results indicated a significant association between the majority of components served at family dinner meals and child overall dietary intake. Validation of the Healthfulness of Meal Index and video-recorded family meal methodology is needed to strengthen these research methods for use in future studies.

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FAMILY MEAL RESEARCH HAS CONSISTENTLY SHOWN that frequent family meals are associated with better dietary outcomes for children,¹ such as higher intake of fruits and vegetables²⁻⁵ and dairy,^{6,7} and lower intake of sugar-sweetened beverages (SSB) in children.^{5,8-10} Little is known about the types of foods children are served for dinner and whether these foods are associated with their overall dietary intake.

Existing data on foods served at family meals have generally been collected through self-report surveys¹¹⁻¹⁶ (eg, survey questions about frequency of vegetables served at

dinner) rather than direct observations. In addition, measures used to determine the foods served at family meals are often not comprehensive.¹¹⁻¹⁶ For example, one study asked only about vegetables served at dinner¹³; another study assessed whether children were served a dessert or a beverage¹⁵; and another study asked about green salad, vegetables, 100% juice, fruit, milk, SSB, and fast food at dinners.¹¹

Some previous research suggested that the foods served during family meals were associated with the foods consumed by children in their daily intake.¹⁷⁻¹⁹ For example, a longitudinal study found that parents' reports of serving

vegetables and milk at dinner were predictive of adolescents' intake of these foods at 5-year follow-up.¹⁷ Although multiple tools exist to determine diet quality,¹⁸⁻²⁰ there is not an exact definition of the "healthfulness" of a family meal. In addition, there are limited data regarding the overall healthfulness of family meals and associations with child overall dietary intake. One study developed a summary score using self-report data of the presence of green salad, vegetables, 100% fruit juice, fruit, milk, SSB, and fast food to assess the overall healthfulness of foods served at family dinners; however, this study did not examine the association between the healthfulness of family meals and the quality of a child's overall diet.¹¹

The current study builds upon previous studies of family meals^{1-17,21,22} and seeks to investigate the specific foods available at family meals, overall healthfulness of the meals, and their association with children's dietary intake. This study incrementally advances the study of family meals by developing a measurement tool that more thoroughly evaluates the foods served at family meals and the dietary healthfulness of family meals. This study employs the use of video-recorded family meals to investigate the following research questions: 1) What food components are served to children at family dinner meals and what is the dietary quality of these meals?, and 2) Is there an association between the food components served and the dietary quality of family dinner meals with children's overall dietary intake? The main hypothesis is that there will be a positive association between the food components served and overall dietary quality of family dinner meals with children's overall dietary intake and diet quality.

METHODS

Family Meals LIVE!²³—a mixed-methods cross-sectional study—recruited a sample of families (n=120) with 6- to 12-year-olds from low-income and racially and ethnically diverse households in Minneapolis/St Paul, MN. Children were stratified by weight status so that there were 60 non-overweight children (>5th and <85th body mass index percentile) and 60 overweight/obese children (≥85th percentile). Participants (ie, children and their families) needed to speak and read English and have a minimum of three family dinner meals per week to be eligible for the study. Data were collected from families during two home visits, which were approximately 2 weeks apart. Direct observational data utilized in the current study included anthropometric measurements, video-recorded family dinner meals, meal screeners, and 24-hour dietary recalls. The University of Minnesota's Institutional Review Board Human Subjects Committee approved the study protocol. Participants older than 18 years who were measured or participated in video-recorded meals provided written consent; children aged 8 to 17 years old provided written assent. All participating children younger than 18 years were provided written parental consent by their parent/primary guardian.

Research staff trained families on how to video record family meals using a tablet computer and helped identify the best location in the home for video recording family meals. Families were able to move the tablet if meals occurred in different rooms throughout the week; however, they were not able to take the tablet outside of the home (eg, to a

restaurant). After the initial home visit, families self-recorded 8 days of family dinner meals, with a minimum of two weekend meals. Families were asked to complete consecutive days as much as possible.

Families were told to say into the camera what was served for dinner every night. After each meal, families completed a meal screener, which is a self-report, open-ended written measure of what was served at the meal used to confirm the verbally reported foods. To obtain authentic footage, families were asked not to alter the foods served at the meals or where meals were consumed. The first day of the video-recorded meals was not utilized in coding to allow participants to acclimate to being video recorded.^{24,25}

Overall dietary intake of the target child was assessed with three 24-hour dietary recalls using Nutrition Data System for Research (NDSR) software, version 2012.²⁶ Recalls were conducted by trained staff on 2 weekdays and 1 weekend day. The first and third recalls were conducted during home visits; the second was a telephone recall in between visits. Recalls for 6- to 8-year-old were conducted with the child's parent/guardian with child's assistance. Recalls for 9- to 12-year-olds were conducted with the child, with parental assistance permitted for clarification. The 24-hour dietary recalls, which assess child dietary intake, were not necessarily gathered on the same days that the family videorecorded a dinner meal. All target children completed three dietary recall interviews; 100% of recalls were reviewed for accuracy and completeness by registered dietitian nutritionists (RDNs). Comprehensive study procedures, including demographic information, have been documented previously.^{23,27}

Coding Index Development

To better understand the types of foods being offered at family meals, staff RDNs with guidance from experts in nutrition assessment created a family meal healthfulness index (Healthfulness of Meal Index) (Table 1) using the Healthy Eating Index-2010 (HEI) as a guide. The HEI was chosen as a guide because it has been shown to be both reliable and valid in assessing diet quality.²⁸ The HEI is broken into 12 components: 9 that assess adequacy of diet and 3 that assess components to be consumed in moderation. The Healthfulness of Meal Index is able to represent components similar to the HEI adequacy components, including whole fruit, vegetables, dark green vegetables, dairy, protein, and an overall healthfulness score. Because juice is often served to children,²⁹ the presence of 100% juice is evaluated as an individual component. HEI moderation components are also represented in the Healthfulness of Meal Index. The HEI's empty calories component is reflected in the Healthfulness of Meal Index by assessing high-fat meats and including an added-sugars component.³⁰ High-sodium foods were identified for the high-sodium foods component by examining the US Department of Agriculture's National Nutrient Database for Standard Research,³¹ Nutrition Facts labels of specific foods and by using NDSR as a guide. For example, if the sodium content of a food was unknown (eg, gravy), a serving was entered into NDSR. If the serving had >140 mg sodium, it was considered a high-sodium food.³² Given the data available through the meal screener and video-recorded meals, we were unable to mimic some of the HEI components (eg, whole/refined grains and fatty acids).

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