Appetite 75 (2014) 64–70

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Research report

Family food involvement and frequency of family dinner meals among Australian children aged 10–12 years. Cross-sectional and longitudinal associations with dietary patterns ☆

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ARTICLE INFO

Article history:
Received 31 March 2013
Received in revised form 9 October 2013
Accepted 19 December 2013
Available online 31 December 2013

Keywords:
Food preparation
Family meal
Dietary patterns
Child
Adolescents
Longitudinal

ABSTRACT

Involvement in meal preparation and eating meals with the family are associated with better dietary patterns in adolescents, however little research has included older children or longitudinal study designs. This 3-year longitudinal study examines cross-sectional and longitudinal associations between family food involvement, family dinner meal frequency and dietary patterns during late childhood. Questionnaires were completed by parents of 188 children from Greater Melbourne, Australia at baseline in 2002 (mean age = 11.25 years) and at follow-up in 2006 (mean age = 14.16 years). Principal components analysis (PCA) was used to identify dietary patterns. Factor analysis (FA) was used to determine the principal factors from six indicators of family food involvement. Multiple linear regression models were used to predict the dietary patterns of children and adolescents at baseline and at follow-up, 3 years later, from baseline indicators of family food involvement and frequency of family dinner meals. PCA revealed two dietary patterns, labeled a healthful pattern and an energy-dense pattern. FA revealed one factor for family food involvement. Cross-sectionally among boys, family food involvement score ($\beta = 0.55$, 95% CI: 0.02, 1.07) and eating family dinner meals daily ($\beta = 1.11$, 95% CI: 0.27, 1.96) during late childhood were positively associated with the healthful pattern. Eating family dinner meals daily was inversely associated with the energy-dense pattern, cross-sectionally among boys ($\beta = -0.56$, 95% CI: −1.06, −0.06). No significant cross-sectional associations were found among girls and no significant longitudinal associations were found for either gender. Involvement in family food and eating dinner with the family during late childhood may have a positive influence on dietary patterns of boys. No evidence was found to suggest the effects on dietary patterns persist into adolescence.

Introduction

Recent national nutrition data indicate that the dietary behaviors of Australian children are not conducive to good health and are likely to promote adiposity (Department of Health and Ageing, Department of Agriculture Fisheries and Forestry, & Australian Food and Grocery Council, 2007; Swinburn, Caterson, Seidell, & James, 2004). As dietary behaviors established during childhood have been shown to track into adulthood (Lake, Mathers, Rugg-Gunn, & Adamson, 2006; Lien, Lytle, & Klepp, 2001), it is crucial to understand the factors that influence children's and adolescents' dietary behaviors in order to inform the development of effective interventions that promote healthy eating during these important life stages (Eccles, 1999).

There is a mounting body of research highlighting the important influence that parents and the family home environment have over children's and adolescents' dietary choices and other health-related behaviors (Gillman et al., 2000; Macfarlane, Crawford, & Worsley, 2010; Pearson, Salmon, Crawford, Campbell, & Timperio, 2011; Pearson, Timperio, Salmon, Crawford, & Biddle, 2009; Salmon, Campbell, & Crawford, 2006; Story, Neumark-Sztainer, & French, 2002; Utter, Scragg, Schaaf, & Mhurchu, 2008; Videon &

Abbreviations: BMI, body mass index; CI, confidence interval; ED, energy-dense; FA, factor analysis; FFQ, food frequency questionnaire; HEAPS, Health Eating and Play Study; PCA, principal component analysis.

☆ *Conflict of interest disclosure:* All authors declare that they have no conflict of interest.

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0195-6663/$ - see front matter © 2014 Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.appet.2013.12.021

Manning, 2003). For example, among children and adolescents, a higher frequency of eating meals with the family is associated with healthier dietary patterns (Gillman et al., 2000; Larson, Story, Eisenberg, & Neumark-Sztainer, 2006; Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003; Utter et al., 2008; Videon & Manning, 2003). Project EAT (Eating Among Teens), one of the few longitudinal studies in this area, suggests that higher frequency of dinner meals with the family is predictive of meeting current dietary guidelines for fruits and vegetables during the transition from early to middle adolescence (Burgess-Champoux, Larson, Neumark-Sztainer, Hannan, & Story, 2009), and from late adolescence to early adulthood (Larson, Neumark-Sztainer, Hannan, & Story, 2007). However, longitudinal research examining the influence of family meals during the transition from childhood to adolescence is currently lacking.

Involvement in food-related activities represents an opportunity for children to learn new skills and to engage in discussions around preparing and cooking food. This may increase children's confidence to make positive food choices and prepare healthy meals as they gain more independence. Indeed, in a large study of Canadian children in grade 5, a higher frequency of helping to prepare and cook food was associated with an increased perception of their ability to select and eat healthy foods (Chu et al., 2013). In another study, children's frequency of preparing food was positively associated with self-efficacy for cooking and preparing food (Woodruff & Kirby, 2013).

There is also preliminary evidence to suggest that involvement in food preparation tasks is positively associated with dietary patterns in adolescence (Larson, Story, et al., 2006) and young adulthood (Neumark-Sztainer et al., 2003; Smith et al., 2010); however, there are some inconsistencies in the literature. Among the Project EAT cohort of middle and high school adolescents, greater involvement in dinner preparation was associated cross-sectionally with higher fruit consumption, higher vegetable consumption among girls, and lower intakes of soft drink among girls and fried foods among boys (Larson, Story, et al., 2006). Conversely, a higher frequency of shopping for groceries was correlated with a higher consumption of fried foods among girls only. Longitudinal research in this area is sparse. Data from Project EAT showed no association between adolescent food preparation at 15–18 years and dietary patterns ten years later (Laska, Larson, Neumark-Sztainer, & Story, 2012).

Currently, existing evidence on food involvement and dietary patterns is informed mostly by cross-sectional studies that include adolescents or young adults. Additionally, involvement in food-related tasks such as cleaning-up after a meal and preparation of meals other than dinner have rarely been explored. Insight into how children's involvement in family food might influence dietary patterns will help inform the timing and design of nutrition interventions. Moreover, to the best of our knowledge, there has been little longitudinal research examining associations between level of involvement in food-related tasks and dietary patterns during the transition from childhood to adolescence.

The aim of this study is to examine cross-sectional and longitudinal associations between food involvement, frequency of family dinner meals and dietary patterns among children aged 10–12 years. This study builds on the limited research in this area by investigating associations among children, examining the transition period between childhood and adolescence, and including novel indicators of family food involvement.

Materials and methods

Data for the cross-sectional and longitudinal analyses were drawn from the baseline and first follow-up data of the Health, Eating and Play Study (HEAPS) conducted in 2002/03 and 2006, respectively (Macfarlane, Cleland, Crawford, Campbell, & Timperio, 2009; Salmon et al., 2006). This study was conducted according to the guidelines set out in *The Code of Ethics of the World Medical Association* (Declaration of Helsinki) and all procedures involving human subjects were approved by the Deakin University Human Research Ethics Committee, the Victorian Department of Education and Training and the Catholic Education Office.

Sample and study design

In 2002/03, state and Catholic primary (elementary) schools that incorporate seven years of schooling (Preparatory to Grade 6), in greater Melbourne, Australia, with more than 200 enrolled students were eligible for selection. Schools were randomly selected from postcodes with the highest, middle and lowest quintiles of socio-economic (SE) disadvantage using the Australian Bureau of Statistic's Socioeconomic Index for Areas (SEIFA) (Australian Bureau of Statistics, 1998). Consent to participate was received from 24 schools: 9 from high, 7 from middle and 8 from low SEIFAs. Families of 2085 children in Grades 5 and 6 (the final two years of primary school) were invited to participate. Under existing ethical guidelines active consent must be obtained from parents for each child's participation. Active consent was received for 947 children (46% response rate; mean age = 11.25 ± 0.64 - years). Response rates by schools in low, middle and high SEIFAs were 24%, 31% and 42%, respectively. Active consent to participate at follow-up (mean length of follow-up = 3.03 ± 0.14 years) was received for 188 (20% follow-up rate; mean age = 14.16 ± 0.58 years) of the 474 children (50% of the baseline sample) whose parents agreed to be re-contacted for future research. At each time-point, questionnaires were sent home for parents to complete in their own time. Test–retest reliability was established for all questionnaire items in a subsample of 133 parents who completed the questionnaire a second time 2–3 weeks later.

Measures

Dietary intake

At each time point, parents were asked to report their child's frequency of consumption of 56 food and drink items over the past week in a food frequency questionnaire (FFQ) at baseline and follow-up. These items were identified from the 1995 Australian National Nutrition Survey, the most recent national survey at the time of the study, as important contributors to energy and fat intakes (and therefore the energy–density of the diet) for the target age group (Australian Bureau of Statistics, 1997). Response categories were converted to daily frequencies (score presented in parenthesis) and included: not eaten or drunk (0); once/week (0.143); 2–3 times/week (0.357); 4–6 times/week (0.714); once/day (1); twice/day (2); three times/day (3); and four or more times/day (4).

Family food involvement

At baseline, parents were asked how often their children did the following six tasks over the past few months: made or helped to make breakfast; made or helped to make lunch; made or helped to make dinner; shopped or helped to shop for food and other groceries; cleaned-up or helped clean-up after a meal, and decided or helped to decide what their family would eat for a meal. Items were measured on a six-point Likert scale and were recoded to frequency per week (test–retest reliability: ICC = 0.28–0.81; $n = 55$). The response categories (scores presented in parenthesis) were: