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The Individual and Combined Influence of the ‘Quality’ and ‘Quantity’ of Family Meals on Adult Body Mass Index

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Abstract

Although there is a well-established literature showing a positive association between the frequency of family meals and child and adolescent healthful dietary intake and lower body mass index (BMI), little is known about the association between family meal frequency (quantity) and adult health outcomes and whether quality (distractions) of family meals influences adult BMI. This study investigates the association between the ‘quantity’ and ‘quality’ of family meals and adult BMI. Data were from a nationally representative sample of 4,885 adults ages 25 to 64 years (56% female), from which an analytic sample of 1779 parents was drawn for the current study. Multiple linear regression was used to test the relationship between family meal frequency and quality of family meals and adult BMI, controlling for socio-demographics. Interactions between family meal quantity and quality were also examined. The quantity of family meals and the quality of family meals were both independently related to adult BMI. Specifically, the frequency of family meals was associated with lower adult BMI and lower quality of family meals was associated with higher adult BMI. The interaction between quantity and quality was not statistically significant. Results suggest that both the quantity and quality of family meals matter for adult BMI, but one is not dependent on the other. Health care providers who work with families may want to consider promoting the importance of the quality and quantity of family meals to benefit the entire family.

Keywords

Family Meals; Distractions at Family Meals; Adults; BMI

The last decade of research has suggested that family meals play an important role in promoting healthful dietary intake in youth. Cross-sectional and longitudinal research on boys and girls from diverse ethnic/racial backgrounds suggests that family meals are associated with increased fruit and vegetable intake, (Gable & Lutz, 2000; Gillman, Rifas-Shiman, Frazier, Rockett, Camargo, Field, Berkley & Colditz, 2008; Larson, Neumark-Sztainer, Hannan, & Story, 2007; Neumark-Sztainer, Hannan, Story, Croll, & Perry, 2003) lower levels of extreme weight control behaviors (Neumark-Sztainer, Eisenberg, Fulkerson, Story, & Larson, 2008), and better psychosocial health independent of socio-economic status (SES) (Eisenberg, Olson, Neumark-Sztainer, Story, & Bearinger, 2004). There is also some evidence that family meals may be protective against obesity, (Campbell, 2006; Jacobs & Fiese, 2007; Moens, Braet & Soetens, 2007; Taveras, et al., 2005) although findings have been inconsistent across studies (Fulkerson, 2008).

Less is known about whether having frequent family meals is similarly associated with better dietary intake and other weight-related behaviors in adults. Given the state of the literature showing positive associations between the frequency of family meals and youth

health behaviors, it would be important to identify whether these same associations hold for parents in order to determine whether family meals benefit the entire family in regards to health behavior outcomes. In addition, it is unknown how the frequency of family meals, or 'quantity,' and the 'quality' of the meals (e.g. no distractions) work together in explaining the relationship between family meals and health outcomes. Identifying key factors related to the protective nature of family meals is important in order to pinpoint modifiable targets in interventions targeting obesity prevention and treatment.

Theoretical Framework

Family systems theory highlights naturally occurring family interactions as key factors in sustaining emotional connection among family members as well as promoting a sense of family coherence or shared meaning (Doherty & McDaniel, 2010; Whitchurch & Constantine, 1993). Theoretical work by Wolin and Bennet (1984), Fiese (2006) and others has distinguished between routine interactions (brief, episodic family interactions that carry no specific meaning) and ritual interactions that carry symbolic communication and significance such as family meals. Family rituals such as holiday celebrations, birthday parties, and family meals give structure, connection, meaning, and coherence to family life. Greater levels of family cohesion in turn are linked to better quality of life and personal health and well-being for individual family members. Although most of the application of these ideas has been with children's health outcomes, theoretically, similar results should hold for adult health outcomes as well.

Previous Research on Family Meals and Adult Health Outcomes

Limited studies have examined the association between the frequency of family meals, or quantity, and adult health behaviors (e.g., body mass index, fruit and vegetable intake). One study found there was no association between frequency of family meals and mothers' dietary intake (e.g. fruit, vegetables, fat), (Boutelle, Birkeland, Hannan, Story, & Neumark-Sztainer, 2007) while another study showed a positive association between the frequency of family meals and increased intake of fruits and vegetables for mothers and fathers (Berge, et al., 2012). Two other studies found that there was a significant inverse relationship between frequency of family meals and body mass index (BMI) for parents (Sobal & Hanson, 2011) and for children and their parents, (Chan & Sobal, 2011) while another study showed no association between the frequency of family meals and mother or father BMI (Berge, et al., 2012). While the mechanism of cause explaining the association between the frequency of family meals and adult BMI is not entirely clear, it could be hypothesized that meal planning, awareness of food eaten during the meal or healthier food served at family meals may be explanatory factors. For example, it may be the case that families who have frequent family meals are also more organized and plan their meals so that the meals include more healthful foods or families that have frequent family meals are more self-aware of what they are eating and may eat less. Thus, due to limited research and inconsistent findings across existing studies it is unclear whether frequency of family meals (i.e., quantity of family meals) is associated with lower BMI or healthier dietary intake for parents. In addition, these studies have not addressed the importance of looking at factors present during the family meal, such as distractions (i.e. quality of the family meal), that may moderate the association between the frequency of family meals and adult BMI and dietary intake.

The majority of research looking at the quality of family meals has focused on watching TV during family meals. Previous research has shown mixed results with some studies indicating that watching TV during family meals was associated with decreased fruit and vegetable intake in adolescents, (Coon & Tucker, 2002; Crespo, et al., 2001; Gable, Chang, & Krull, 2007; Robinson, 2001) and other studies showing that the frequency of family

meals was protective for adolescent fruit and vegetable intake, even when the TV was on during the meals (Feldman, Eisenberg, Neumark-Sztainer, & Story, 2007). Thus, results are mixed and the majority of studies have been conducted with children and adolescents and not adults.

Given the increase in prevalence of obesity for adults in the US over the last two decades (Ogden, Carroll, Kit, & Flegal, 2012; Ogden, et al., 2006; Viner & Cole, 2005) and the limited state of the research related to family meals and parent health behaviors, there are many remaining questions. For example, more research is needed examining the separate and combined effects of quantity and quality of family meals on adult health outcomes such as BMI. For example, if results of the current study indicate that the quality of family meals moderates the relationship between the frequency of family meals and adult BMI, then interventions could focus on teaching families how to create distraction-free, meaningful family meals, rather than focusing solely on how often families eat family meals together. In addition, because few studies have included fathers, research is needed to examine both mothers' and fathers' weight and weight-related outcomes in connection with family meal frequency (Berge, et al., 2012; Sobal & Hanson, 2011). Furthermore, given the evidence to-date showing positive weight and weight-related health outcomes for youth, identifying whether family meal frequency is associated with more positive health-related outcomes in parents will be a first step in identifying whether family meals benefit the entire family. Thus, this study aims to address the following research questions: (1) Are more frequent family meals associated with lower parent body mass index (BMI), and (2) Does the quality of family meals moderate this association?

METHODS

Procedures and Study Sample

The sample for this study was taken from the 2009 Barilla “Come Back to the Table” research study of American attitudes and behaviors related to family/shared meals. The Barilla study was a nationally representative telephone survey of 4,885 adults ages 25 to 64 years living in the United States. Participants completed a 25-minute interview over the telephone regarding their beliefs about family/shared meals, family meal behavior (quality and quantity of family meals), potential barriers to family meals, and strategies used to increase/enhance family meals conducted by Taylor Nelson Sofres, a survey data collection company. Respondents lived in large cities across the United States, including those on the east and west coasts, the Midwest, and the South. The sample is census-representative in age, gender, income, education, ethnicity, and region.

Survey development—The survey was created in two phases. First, a comprehensive literature review was conducted examining the existing body of research and literature on family meals. This review helped determine the current state of knowledge on the topic and identified gaps that exist in the literature. Second, six focus groups were conducted in three cities across the US (Chicago, IL; Engelwood, NJ; Orange Co., CA), to explore issues related to family dinners and to pre-test the survey. All groups were national samples that were census-representative on age, gender, income, education, ethnicity, and region.

Sample—The analytic sample for the current study included 1779 respondents who reported having children who lived with them. Respondents ranged in age from 25 to 64, with males having a mean age of 48.34 (SD = 10.14), and females' mean age was 48.04 (SD = 10.00). The sample was reasonably well split by gender, with 43.60% males and 56.40% females. The majority of participants in the analytic sample were white (82%), married (82%), well-educated (48% had college degree or graduate school) and from middle-high

socio-economic status categories (48%) (Table 1). The large sample size allows for the detection of a small effect size (Cohen, 1992).

Measures

Dependent Variable

Body Mass Index (BMI): Adult BMI was the dependent variable in this study. BMI was self-reported by adults, which has been shown to be highly correlated with objectively measured values in adults (Kuczmarski, Kuczmarski, & Najjar, 2001; Palta, Prineas, Berman, & Hannan, 1982; Stewart, 1982; Tehard, van Liere, Com Nougue, & Clavel-Chapelon, 2002) BMI was calculated using the standard formula, weight (kg)/height (meters)². For participants in this study, adult BMI ranged from 13.88 to 59.06, with a mean of 28.40.

Independent Variables

Quantity of family meals: Frequency (i.e., quantity) of family meals was calculated as number of days in a typical week participants reported that they ate dinner “with your core family.” Frequency of family meals for participants in this study ranged from zero to seven, with an average frequency of 4.28 meals per week.

Quality of family meals: The quality of family meals was measured by identifying the number of distractions during family meals. Participants were asked to identify what activities usually happened during a typical family meal. The activities were watching television, telephone or cell phone conversations, homework, playing games, using technology (i.e. computer, smart phone, MP3 player, etc.), and reading. They were also given the chance to specify other activities. The number of distractions ranged from zero to six, with an average frequency of 0.13.

Control Variables—All analyses were adjusted for household income, education, race, and gender. *Household income* was assessed by asking participants the following question, “Which of the following income groups includes your household’s total income from all sources before taxes in 2007?” There were ten response options that ranged from less than \$15,000, to over \$250,000. Categories were collapsed into four \$25,000 increments and one category indicating over \$100,000. *Education* was assessed with the following question, “What is the highest level of education that you have completed?” Response options included: Less than high school, Some high school, High school graduate or equivalent (e.g., GED), Some college, but no degree, Associate’s degree, Technical school, College graduate (e.g., B.A., B.S.), Some graduate school, but no degree, or Graduate school (e.g., M.S., M.D., Ph.D.). *Race* was assessed by asking participants the following question, “Do you consider yourself...?” Response options included: Caucasian or White, African-American or Black, Hispanic/Spanish American/Chicano, Asian or Pacific Islander, American Indian/Native American, Mixed racial background, Other (please specify). *Gender* was assessed by asking, “Are you male or female?”

Statistical Analysis—Using PASW 18.0, multiple linear regression was used to estimate and test the relationship of the frequency of family meals (quantity) and distractions at family meals (quality) with body mass index (BMI). All analyses were controlled for potential confounders including household income, parent education, gender and race/ethnicity. An additional regression model was fit to test for an interaction between family meal frequency and distractions during family meals. Interactions by family structure (e.g., dual-headed household, single-headed households, etc.) and gender were also tested, but

were insignificant and results are reported without stratification by gender or family structure.

RESULTS

Quantity of Family Meals

Descriptive results indicated that parents reported having approximately four family meals per week (Table 2). Analytic results indicated that there was a statistically significant negative association between the frequency of family meals and adult BMI after adjusting for household income, education, race and gender ($p = 0.04$). Specifically, the -0.12 beta represents that for every one additional family meal per week, adults' BMI decreased by 0.12 BMI units.

Quality of Family Meals

Descriptive results indicated that about 10% of families reported having at least one distraction during their family meals. Analytic results indicated a statistically significant positive association between distractions during family meals and higher adult BMI after adjusting for household income, education, race and gender ($p = 0.04$). Specifically, the 0.54 beta represents that for every one additional increase in family meal distractions, adults' BMI increased by 0.54 BMI units.

Interaction between Quantity and Quality of Family Meals

The interaction between frequency of family meals and quality of family meals was not significant ($p = 0.39$) (Table 2). Thus, the quality of family meals did not moderate the association between the frequency of family meals and adult BMI.

DISCUSSION

The main aim of this cross-sectional study was to investigate the independent and combined association between the quantity and quality of family meals and adult BMI. Results indicated that the frequency of family meals was associated with reduced adult BMI. In addition, more distractions at family meals was associated with higher adult BMI. While the independent associations between the quantity and quality of family meals and adult BMI were significant, there was no moderator effect in which quality influenced the association between quantity and BMI. This suggests that the quantity of family meals (i.e., frequency) and quality (i.e., fewer distractions) of family meals are individually important in determining adult BMI, but not necessarily in combination.

The findings in the current study corroborate earlier studies indicating a significant inverse association between the frequency of family meals and adult BMI (Chan & Sobal, 2011; Sobal & Hanson, 2011). Furthermore, these results combined with results from research showing associations between family meal frequency and child and adolescent healthful dietary intake, (Gable & Lutz, 2000; Gillman, Rifas-Shiman, Frazier, Rockett, Camargo, Field, Berkley & Colditz, 2008; Larson, et al., 2007; Neumark-Sztainer, Hannan, et al., 2003) lower levels of extreme weight control behaviors, (Neumark-Sztainer, et al., 2008) and better psychosocial health independent of household income, (Eisenberg, et al., 2004) suggest that having frequent family meals may be beneficial to the entire family. The results from this study also extend previous studies indicating that the quality of the family meal also matters in relation to adult weight outcomes.

STRENGTHS AND LIMITATIONS

Study strengths and limitations should be taken into account when interpreting the study findings. The current study had several strengths, including: the use of a large national sample; the high response rate of participating parents; statistical adjustments for potential confounders (gender, household income, education, race/ethnicity); and the inclusion of data on both mother and fathers. One limitation of this study is the cross-sectional design. Because we were unable to examine longitudinal associations, we cannot determine causality or temporality of associations. For example, it may be the case that our results suggesting that parents who had more frequent family meals had lower BMI may be related to the fact that parents who have healthier BMI's are more likely to have family meals, or that parents with healthier BMI's are more likely to enforce family meals at home. In addition, the majority of the sample were white, well-educated and middle to high socio-economic status. Thus, findings from the current study cannot be generalized to more diverse socio-economic and ethnic/racial populations. The results cannot be generalized to all adults because the sample consisted of parents raising children in the home. Furthermore, measurement limitations include potential self-report bias, particularly socially desirable responses to questions about family meals and body weight (BMI), and the narrow scope of the quality measure which included only distractions. More robust measures of quality are needed in future studies.

IMPLICATIONS

Findings from the current study, in conjunction with other studies on family meals, can be useful in guiding clinical work with families and interventions around family meals. It may be useful for health care providers (e.g., family physicians, pediatricians, nurses, mental health providers) who work with families to discuss the potential value of family meals for the entire family. Pointing out that family meals have been found to be associated with better eating patterns in children, (Ackard & Neumark-Sztainer, 2001; M. P. Jacobs & Fiese, 2007; E. Moens, Braet, & Soetens, 2007) adolescents, (Gillman, et al., 2000; Larson, et al., 2007; Larson, et al., 2008; Larson, Story, Wall, & Neumark-Sztainer, 2006; Neumark-Sztainer, Wall, et al., 2003; Videon, & Manning, 2003; Videon & Manning, 2003) and parents (Boutelle, Fulkerson, Neumark-Sztainer, Story, & French, 2007; Boutelle, Birnbaum, Lytle, Murray, & Story, 2003; Sobal & Hanson, 2011) may motivate parents to make the effort to have regular family meals. In addition, researchers who are conducting family-based interventions may want to target family meals as a modifiable family home environment factor that may be protective for adult BMI and youth dietary intake. Targeting both parents and children with the same intervention would be an efficient use of resources. Future research is needed to look longitudinally at the association between the quantity and quality of family meals and adult BMI in order to clarify temporality of associations. In addition, more detailed measures of the quality of the family meal are warranted in order to more comprehensively define the 'quality' of a family meal and to further explore moderation of the association between the frequency of family meals and adult BMI.

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Table 1

Demographics table

	N	%
<i>Gender</i>		
Male	775	43.60
Female	1004	56.4
<i>Income</i>		
Less than \$24,999	167	9.40
\$25,000–\$49,999	296	16.60
\$50,000–\$74,999	316	17.80
\$75,000–\$99,999	339	19.10
More than \$100,000	512	28.80
Don't know or refused to answer	149	8.40
<i>Education Level</i>		
Some or less than high school	54	3.00
High school graduate or equivalent	373	21.10
Some college, but no degree	304	17.1
Associate's degree or Technical school	187	10.5
College graduate	456	25.60
Some graduate school, but no degree	63	3.50
Graduate school	339	19.10
Don't know or refused to answer	1	.10
<i>Race</i>		
Caucasian/White	1455	81.80
African American/Black	167	9.40
Asian or Pacific Islander	32	1.80
American Indian/Native American	21	1.20
Mixed racial background	60	3.40
Other	35	2.00
Refused	9	.50
<i>Age</i>		
25–34 years	214	12.00
35–44 years	444	25.00
45–54 years	557	31.30
55–64 years	564	31.70
<i>Marital Status</i>		
Single, Never Married	91	5.1
Engaged	17	1.00
Married	1448	81.40
Separated	20	1.10
Divorced	160	9.00
Widowed	42	2.40

	N	%
Don't know or refused to answer	1	.10

Table 2
 Association between Family Meal Frequency and Distractions at Family Meals Predicting Adult BMI*

Variable	M(SD)	B	SEB	B	t	p
Frequency of Family Meals	4.28 (2.66)	-.12	.06	-.05	-2.09	.04
Distractions During Family Meals	.13(.59)	.54	.26	.05	2.12	.04
Interaction Between Frequency of Family Meals and Distractions at Family Meals	-.09(1.63)	-.08	.09	-.02	-.87	.39

Note:

* All analyses adjusted for household income, education, race and gender