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Feeding and mealtime correlates of maternal concern about children's weight

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Abstract

Objective—Examine differences within two domains of weight-related parenting: child feeding practices and family meal characteristics, among mothers of young children by concern about children becoming overweight.

Design—Cross-sectional study

Participants—Low-income mothers (N=264, 67% non-Hispanic white) and their children (51.5% male, age range: 4.02 – 8.06 years).

Variables measured—Maternal concern and feeding practices were measured using the Child Feeding Questionnaire (CFQ). Meal characteristics were assessed using video-recorded meals and meal information collected from mothers.

Analysis—MANOVA and logistic regression were used to identify differences in maternal feeding practices and family meal characteristics across levels of maternal concern (none, some, and high).

Results—Approximately half of mothers were not concerned about their child becoming overweight, 28.4% reported some concern and 19.0% high concern. Mothers reporting no concern reported lower restrictive feeding versus mothers who reported some or high concern (None:

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3.1(0.1), Some: 3.5(0.1), High: 3.6(0.1), $p=.004$). No differences in other feeding practices or family meal characteristics were observed by level of concern.

Conclusions and Implications—Concern regarding children becoming overweight was common. However, concern rarely translated into healthier feeding practices or family meal characteristics. Maternal concern alone may not be sufficient to motivate action to reduce children's risk of obesity. (200)

Keywords

childhood obesity; maternal concern; feeding practices; family meals

INTRODUCTION

Despite the heightened attention to childhood obesity over the past decade, several studies have documented that only a limited proportion of parents recognize that their children are overweight, and relatively few parents report concern about their children's current weight or future risk of becoming overweight.⁵⁻¹⁰ Parents of young children and lower socio-economic status in particular report less concern about their children's current or future risk of overweight than parents of older children or higher socio-economic status.^{5, 6, 8} This limited concern has prompted calls for programs and policies to elevate parents' concern about obesity and/or their children's weight.^{6, 7} Recent initiatives designed to increase parental concern about their children's weight include universal BMI screening during healthcare visits,¹¹ BMI "report cards",¹² and media campaigns highlighting the health risks of obesity.¹³

Interventions to elevate concern about childhood obesity assume that parents who are concerned about their children's weight are more likely to take action to improve their children's behavior and weight status.¹² For such interventions to be successful at reducing obesity, it's essential that concern prompts parents to participate in evidence-based approaches to improve children's energy balance, not actions that contribute to weight gain or other negative health problems. Evidence is mixed as to whether parental concern about children's weight is associated with healthy changes in child weight^{10, 14} or parents' participation in behaviors that promote children's healthy weight.^{5, 8, 15-18} Some studies have found that parents concerned about their child's weight are more likely to limit screen time, encourage physical activity, and change the family diet, as compared to parents who are not concerned.^{8, 15} These are evidence-based actions that have been recommended to address childhood obesity.¹¹ However, one study found that parental concern about children's weight was not associated with healthier food available in the home.⁵ Further, parents who are concerned report greater encouragement of skipping meals and dieting, as well as higher use of restrictive feeding practices.^{5, 15, 16, 18} These are practices that have been associated with low body satisfaction, poor self-regulation of eating, increased binge eating, and a greater risk of obesity.^{4, 19, 20} Based on this literature, evidence is insufficient to determine if promoting concern will prompt engagement in evidence-based parenting practices to improve children's weight status. This lack of evidence is particularly true for parents of young children, as the majority of studies of concern have been conducted among parents of older grade school or adolescent-aged children.^{5, 8, 15, 17}

Given the need to understand the association between parental concern about young children's weight and parents' participation in actions that promote healthy behavior and weight, the aim of the current study is to examine differences within two domains of weight-related parenting: child feeding practices and family meal characteristics, among mothers of young children by mothers' concern about their children becoming overweight. This study draws from data from ABC Feeding, which enrolled children eligible for Head Start and their caregivers. This study's population provides a unique perspective on how low-income mothers seek to address their children's risk for overweight and obesity. This insight is important given the increasing burden of childhood obesity among low-income families²¹ and the need to develop interventions that are effective in this context.²² We hypothesize that greater concern by mothers that their child will become overweight will be associated with more restrictive feeding and greater monitoring of child eating, but less pressuring feeding practices. Additionally, we hypothesize that concern will be associated with family meal characteristics that reflect current clinical guidance for child nutrition promotion and obesity prevention and treatment.^{11, 23}

METHODS

Study Design

The current cross-sectional study utilizes data from the first measurement of ABC Feeding, a longitudinal study of maternal feeding practices.

Participants and Recruitment

The current study includes a sample of 264 low-income female primary caregivers (M age = 31.02 years; *SD* = 7.06; 67% non-Hispanic white; 45% single parent) and their children (M age = 5.39 years; *SD* = 0.75; range = 4.02 – 8.06 years; 153 males). The caregivers were predominantly (95%) biological mothers, therefore caregivers will be referred to as 'mothers.' These mother/child dyads were originally recruited via their participation in Head Start programs in South-Central Michigan and enrolled in ABC Preschool, a longitudinal study conducted between 2009 and 2011. All mothers enrolled were fluent in English and had less than a four-year college degree. Approximately two years after participation in ABC Preschool, mothers were invited to participate in a follow up study on child feeding, ABC Feeding. Of the 380 caregivers invited, 284 participated, and an additional 17 families were newly-recruited from Head Start, resulting in a final sample size of 301. Among these dyads, 5 were excluded because the primary caregiver was male and 32 had incomplete data, resulting in an analytic sample of 264 (87.7% of total sample). The study protocol was approved by the University of Michigan Institutional Review Board.

Measures

Mother/child dyads completed activities over the course of two study visits. Mothers were provided a video camera during the second visit and were asked to record three routine, weeknight, dinnertime meals within one week. Following each recorded meal, mothers received a telephone call from a trained interviewer to collect information on the foods available to the child during the meal. After the meals were recorded, the camera was collected by study staff. This protocol has been described in detail previously.²⁴

Maternal concern about child overweight—Maternal concern was measured using one item from the Child Feeding Questionnaire (CFQ)²⁵ that asked, “How concerned are you about your child becoming overweight?” Responses were rated on a 5-point scale with the response options ranging from “unconcerned” to “concerned.” Responses were then categorized into three levels of concern: “no concern” for mothers who reported they were “unconcerned”, “some concern” for mothers who reported the next two higher levels of concern, and “high concern” for mothers reporting the highest two levels of concern.

Maternal feeding practices—Three feeding practices were measured using the CFQ: Pressure to Eat (4 items, Cronbach’s $\alpha = 0.62$), Restriction (8 items, Cronbach’s $\alpha = 0.75$), and Monitoring (3 items, Cronbach’s $\alpha = 0.86$). Pressure to eat was assessed using items including, “My child should always eat all of the food on her plate.” Restriction was assessed using items including, “I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries).” For both scales, responses were measured using a 5-point scale ranging from “disagree” to “agree.” Monitoring was assessed using items including, “How much do you keep track of the snack food (potato chips, Doritos, cheese puffs) that your child eats?” Responses were measured using a 5-point scale ranging from “never” to “always.”

Meal characteristics—Characteristics of typical family meals were measured using video recorded meal observations and meal information collected from mothers. To collect the meal data, mothers were asked to video record three dinnertime family meals over the course of one week occurring when she was home and awake, when the meal occurred at home, and when the meal was prepared by the primary caregiver. To record the meals, mothers were instructed to set up the camera so that the child’s upper torso, plate, and drink were always visible, and to record the entirety of each meal. To quantify the data collected during the observations, the study team developed a coding scheme adapted from prior approaches^{26, 27} to code each meal with regard to whether the meal was pre-plated (versus served family style or eaten out of serving package), the TV was audible, the mother ate with the child for any portion of the meal, and, if requested by the child, the mother allowed second servings. Coders were trained to reliability; 12% of videos were coded by two raters and inter-rater reliability by Cohen’s κ exceeded 0.70 for all codes. Each family meal characteristic was coded affirmatively if it was observed in at least half of meals.

Foods served during family meals—Information on foods served during the meal was obtained from the meal report collected from mothers by interviewers following each recorded meal. Each meal report was coded into food and beverage categories determined by the groupings on ChooseMyPlate.gov in accordance with the current US Dietary Guidelines for Americans.²⁸ The presence or absence of each food or beverage group for each meal was coded. The preparation method for meats (i.e., deep frying versus not) was identified by the food name (i.e., chicken nuggets, fish sticks), and coded accordingly.²⁴

To obtain a composite measure of food and beverage types served during family meals, families were coded as typically serving fruits, vegetables, and refined grains if these foods were reported as present in at least half of meals. Food types that were overall less prevalent and would not be expected to be served at every meal were coded as typically served if they

were present in any of the meals. These included dark green vegetables, whole grains, deep fried proteins, low fat/skim milk, diet drinks, sugar-sweetened beverages, and dessert (including ice cream, frozen yogurt, pudding, and other non-dairy sweets).

Socio-demographic characteristics—Mothers reported their child’s sex and birthdate, and maternal education and race/ethnicity. Child birthdate was used to calculate child age by subtracting the birthdate from date of the first study visit. Maternal education was included as “ high school diploma or equivalent” vs. “> high school diploma,” with the highest educational level in this sample being less than a four-year college degree. Maternal race/ethnicity was included as “non-Hispanic white” vs. “Hispanic and/or not white.”

Maternal and child anthropometrics—Heights and weights of mothers and children were measured according to standardized procedures.²⁹ BMI was calculated as weight in kilograms divided by height in meters squared. For 12 mothers who were pregnant or had given birth within the last three months, self-reported pre-pregnancy weight was used. BMI z-scores and percentiles were calculated for children, and children were categorized as being underweight or normal weight (BMI <85th percentile for age and sex), or overweight or obese (BMI ≥ 85th percentile for age and sex) based on the United States Center for Disease Control and Prevention growth charts.³⁰ Only 3 children were underweight, and therefore underweight and normal weight were combined.

Data Analysis

Bivariate differences in socio-demographic and anthropometric characteristics by level of maternal concern were examined using ANOVA and Pearson chi-square tests. MANOVA was used to identify differences in mean maternal feeding practices by level of maternal concern adjusted for child sex, age, race/ethnicity, BMI z-score, and maternal education and BMI, and adjusted means for each level of maternal concern were calculated. For feeding practices where overall differences in means were detected, pairwise comparisons were used to identify differences between levels of concern. Unadjusted prevalence of family meal characteristics and foods served were calculated for each level of concern. Multivariable logistic regression was then used to examine associations between level of maternal concern and each meal characteristic/food served, adjusted for covariates. All analyses were run for the full sample as well as limited to the dyads with overweight and obese children. Findings did not differ, therefore results from the full sample are presented. All analyses were conducted using SAS 9.3 and $p < .05$ was used to indicate statistical significance.

RESULTS

Characteristics of maternal concern

Among this sample of low-income mothers, 52.7% reported that they were not concerned about their child becoming overweight, 28.4% reported some concern, and 18.9% reported high concern (Table 1). Concern about the child becoming overweight did not differ by maternal education ($p = .89$) or child sex ($p = .52$), race/ethnicity ($p = .21$), or age ($p = .76$). Differences in maternal concern were observed by child BMI z-score ($p < .001$) and weight status ($p < .001$), and maternal BMI ($p < .001$). Among mothers of underweight/normal weight

children, 7.2% reported high concern about their child becoming overweight while 34.9% of mothers of children with overweight/obesity reported high concern. Twenty-nine percent of mothers of children with overweight/obesity reported no concern about their child becoming overweight.

Maternal concern and child feeding practices

Maternal concern about her child becoming overweight was associated with greater use of restrictive feeding practices (Table 2). Among mothers reporting no concern, mean restrictive feeding was significantly lower than that for mothers reporting some or high concern ($M(SE)=3.1(0.08)$, $3.5(0.11)$, and $3.6(0.14)$, respectively, $p=.004$). Mean restrictive feeding scores did not differ between mothers reporting some versus high concern. No differences in mothers' report of monitoring or pressure to eat by level of concern were observed.

Maternal concern and meal characteristics

No differences in characteristics or content of family meals were observed by level of mothers' concern (Table 3). For example, the prevalence of mothers pre-plating their children's meals, eating with children, allowing second servings, and serving fruits, vegetables, sugar-sweetened beverages, and desserts were similar across levels of concern. Overall, vegetables, refined grains, and fried proteins were commonly available during meals. For example, vegetables were served at 89.2–94.0% of meals. Sugar-sweetened beverages were also typically available during meals; 60.0–68.0% of families served a sugar-sweetened beverage during at least one meal. Fruit, whole grains, and low fat/skim milk were less commonly served during observed meals.

DISCUSSION

The objective of the current study was to examine maternal concern regarding their young children's risk for becoming overweight, and identify differences in child feeding practices and family meal routines among mothers with differing levels of concern. Approximately half of mothers reported some level of concern about their child becoming overweight, with over 70% of mothers of currently overweight/obese children reporting at least some concern. These findings run counter to the prominent belief that mothers, especially mothers of young children and of low socio-economic status, have limited concern about obesity among their children.^{5–10, 18} This difference may be due to the use of a relatively contemporary sample of mothers among whom obesity is discussed. For example, Head Start regularly provides parental education regarding child nutrition and obesity prevention. Maternal concern about her child becoming overweight was also positively associated with mothers' own BMI. This heightened concern may reflect that mothers with higher BMIs are more likely to have children with higher BMIs. Mothers with higher BMIs may recognize that their children are at risk of overweight and obesity in the future due to a family history of obesity.

Despite the high levels of concern about future overweight among low-income mothers, few differences in maternal behavior were observed by level of concern. In particular, concern about children's risk of becoming overweight did not manifest as differences in family meal

practices or food availability. These findings differ from previous studies in which maternal concern about child weight was associated with parental reports that they engage in actions to try to improve their children's diets.^{8, 15} The current study differed from these previous studies in the use of observed mealtime characteristics, versus parent-reported behaviors, which may explain the difference in findings. Social desirability may lead parents with high concern over their child's weight to report they are engaging in action, even if they are not. Alternatively, our measurement of family meals may not represent behaviors that occurred outside of these meals, for example at other meals or snacks. Further, the current study drew from an exclusively low-income sample, which may explain differences in findings. Findings do demonstrate that regardless of maternal concern, many family meals do not reflect recommendations to promote healthy weight among children. Family meals with sugar-sweetened beverages, refined grains, and fried proteins available, and television audible, were common, while meals with dark green vegetables, whole grains, and low-fat/skim milk were relatively uncommon. These meal characteristics, even among mothers who report high concern that their children will become overweight, may reflect unclear guidance regarding what constitutes a healthy meal. These meals may also be a product of time or financial limitations, or competing food preferences among children or other family members in the home.

In the current study, mothers reporting any level of concern about their child becoming overweight reported greater use of restrictive feeding practices compared to mothers reporting no concern. Similar associations between concern about child weight and restrictive feeding have been demonstrated in other studies.^{5, 16–18} Restrictive feeding practices have been associated with increased disinhibited eating and weight gain among children,^{31–34} and therefore current obesity prevention and treatment guidelines recommend that parents avoid overly restrictive feeding practices.¹¹ However, additional evidence suggests that mothers' restrictive feeding is often a response to concern about children's weight and obesogenic eating and weight gain among children, not a cause of these outcomes.^{17, 35} Given the consistency with which maternal concern about child weight and use of restrictive feeding practices are associated, further research is needed to understand how mothers can effectively limit children's eating without promoting negative outcomes.

Limitations

There were several limitations to the current study. First, only 2–3 meals were observed per family and the meals may not be representative of typical meals. Families may have served different foods or conducted the family meal differently than they typically would because they were being recorded. Additionally, we were not able to validly capture the portion sizes available or served. While parents with high concern for child weight may not alter what is served, they may modify the amount of each food available to the child. Despite these limitations, objective observations of family meals provides unique information about behavior and food availability during meals that may not be captured through self-report. Second, the study sample was exclusively low-income families, who often experience unique barriers to providing health-promoting meals, therefore findings may not be generalizable to higher-income families. Finally, our measure of maternal concern about child weight captured concern about future risk of overweight. This measure is commonly

used to examine maternal concern about child weight, but it doesn't capture concern about current weight. Parents who are concerned that their child is currently overweight may be more likely to support children's healthy eating and modify family meals, while parents who are concerned their child may become overweight in the future may see less immediate need to implement these changes.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Among low-income mothers, concern over children becoming overweight was common, and highly prevalent among mothers of children who were already overweight or obese. While restrictive feeding practices were more likely to be reported by mothers who were concerned about their children's future risk of overweight, maternal concern was not associated with greater monitoring of child eating or healthier characteristics of family meals. Further research is needed to understand the characteristics of families among whom concern over child weight does prompt healthy actions to prevent obesity. Additionally, as the existing literature, including this study, have used a variety of measures of parental concern about child weight, greater consistency in use of measures that validly capture both concern about current weight and future weight may help clarify what types of concern prompt parental action. Currently, our findings suggest that future family-based interventions to address childhood obesity may be more likely to be beneficial if they don't focus merely on raising parental concern about children's risk of becoming overweight, but assist parents with overcoming barriers to engaging in health-promoting practices.

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Socio-demographic and weight characteristics of children and mothers, total and by maternal concern

Table 1

	Total Sample	Maternal Concern about Child Becoming Overweight			p-value
		None	Some	High	
TOTAL SAMPLE, % (n)	100.0 (264)	52.7 (139)	28.4 (75)	18.9 (50)	
CHILD CHARACTERISTICS					
Child gender, % (n)					.52
Male	51.5 (136)	55.9 (76)	25.7 (35)	18.4 (25)	
Female	48.5 (128)	49.2 (63)	31.3 (40)	19.5 (25)	
Child race/ethnicity, % (n)					.21
Non-Hispanic white	55.3 (146)	57.5 (84)	25.3 (37)	17.1 (25)	
Hispanic or not white	44.7 (118)	46.6 (55)	32.2 (38)	21.2 (25)	
Child age in months, mean (SD)	70.8 (8.4)	70.8 (0.7)	70.3 (1.0)	71.5 (1.2)	.76
Child BMI z-score, mean (SD)	0.9 (1.0)	0.4 (0.1)	1.1 (0.1)	1.7 (0.1)	<.001
Child weight status, % (n)					<.001
Underweight/normal weight	58.4 (153)	69.9 (107)	22.9 (35)	7.2 (11)	
Overweight/obese	41.6 (109)	29.4 (32)	35.8 (39)	34.9 (38)	
MATERNAL CHARACTERISTICS					
Maternal education, % (n)					.89
High school diploma/GED/ or less	47.0 (124)	51.6 (64)	30.0 (37)	18.6 (23)	
At least some college education	53.0 (140)	53.6 (75)	27.1 (38)	19.3 (27)	
Maternal BMI, mean (SD)	33.2 (9.4)	30.8 (0.8)	34.7 (1.0)	37.8 (1.3)	<.001

Pearson chi-square and ANOVA were used to examine differences in child and maternal characteristics by level of maternal concern.

Table 2

Associations between maternal concern about child becoming overweight and maternal feeding practices

Maternal Concern about Child Becoming Overweight	Restrictive Feeding Practices (Range: 1–5)	Monitoring Child Eating (Range: 1–5)	Pressuring Feeding Practices (Range 1–5)
	Mean (SE)	Mean (SE)	Mean (SE)
None	3.1 (0.1) ^a	3.9 (0.1)	2.7 (0.1)
Some	3.5 (0.1) ^b	4.0 (0.1)	2.8 (0.1)
High	3.6 (0.1) ^b	4.3 (0.2)	2.8 (0.2)
F _{df=2}	5.7	1.6	0.04
p-value	.004	.20	.96

MANOVA adjusted for child gender, age, race/ethnicity, BMI z-score, and maternal education and BMI was used to examine differences by level of maternal concern.

Differing superscripts indicate statistically significantly different values by level of concern at $p < .05$.

Associations between maternal concern about child becoming overweight and family meal characteristics

Table 3

	Maternal Concern about Child Becoming Overweight				Adjusted Comparisons ^a				
	Unadjusted Prevalence		OR (95% CI)		P		OR (95% CI)		P
	None	Low	High	Low vs. None	High vs. None	High vs. None	High vs. None		
Meal characteristics									
Dinner pre-plated	87.6	80.3	79.1	0.6 (0.2-1.4)	0.23	0.8 (0.2-2.5)	0.66		
TV audible during dinner	64.6	68.1	72.7	0.9 (0.4-2.1)	0.78	1.5 (0.5-4.5)	0.44		
Mother eats with child	82.4	84.1	88.1	1.1 (0.4-2.7)	0.92	1.5 (0.4-5.8)	0.53		
Mother allows second serving	46.8	44.0	46.0	0.93 (0.5-1.7)	0.82	1.1 (0.5-2.5)	0.78		
Foods served during meals									
Fruit	13.0	13.3	18.0	0.9 (0.4-2.2)	0.78	0.9 (0.3-2.7)	0.83		
Vegetables	89.2	92.0	94.0	1.2 (0.4-3.4)	0.78	1.5 (0.3-6.4)	0.61		
Dark green vegetables	18.0	24.0	16.0	1.5 (0.7-3.4)	0.28	0.9 (0.3-2.6)	0.87		
Refined grains	71.9	80.0	72.0	1.1 (0.5-2.4)	0.75	0.6 (0.3-1.5)	0.28		
Whole grains	12.2	13.3	14.0	1.1 (0.4-2.8)	0.86	1.5 (0.5-4.5)	0.51		
Fried protein	32.4	44.0	28.0	1.9 (1.0-3.6)	0.05	1.1 (0.4-2.5)	0.92		
Low fat/skim milk	6.2	9.0	16.3	1.5 (0.5-4.7)	0.53	2.7 (0.7-10.5)	0.15		
Diet beverages	2.2	2.7	4.0	0.9 (0.1-6.5)	0.88	1.0 (0.1-10.6)	0.99		
Sugar-sweetened beverages	62.6	68.0	60.0	1.2 (0.6-2.2)	0.68	0.8 (0.3-1.7)	0.52		
Dessert	19.4	17.3	20.0	0.8 (0.4, 1.9)	0.67	0.8 (0.3-2.3)	0.73		

^aLogistic regression models adjusted for child gender, age, race/ethnicity, BMI z-score, and maternal education and BMI were used to examine the odds of foods/drinks served given level of maternal concern.