Maternal Concern for Child Undereating

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ABSTRACT

OBJECTIVE: To describe features of maternal concern for her child undereating; examine maternal and child correlates of maternal concern for undereating; and determine whether maternal concern for undereating is associated with feeding practices.

METHODS: This was a cross-sectional analysis of an observational study with 286 mother–child dyads (mean child age, 71 months). Maternal concern for undereating was assessed using a semistructured interview. Mothers completed questionnaires to assess picky eating, food neophobia, and feeding practices. Feeding practices were further assessed using videotaped mealtime observations. Logistic regression was used to assess the association of maternal and child characteristics with maternal concern for undereating. Regression was used to assess the association of maternal concern for undereating with feeding practices, controlling for covariates.

RESULTS: Over a third of mothers (36.5%) expressed concern that their child does not eat enough. Correlates of concern for undereating included child body mass index z-score (BMIz; odds ratio [OR] = 0.58; 95% confidence interval [CI], 0.43–0.77) and picky eating (OR = 2.41; 95% CI, 1.26–4.59). Maternal concern for undereating was associated with greater reported pressure to eat (relative risk [RR] = 1.97; 95% CI, 1.55–2.50), greater observed bribery (OR = 2.63; 95% CI, 1.50–4.60), and higher observed pressure (OR = 1.90; 95% CI, 1.08–3.36) during mealtimes.

CONCLUSIONS: Mothers of children who are picky eaters and have a lower BMIz are more likely to be concerned that their children do not eat enough, and maternal concern for undereating is associated with pressuring and bribing children to eat. Pediatricians might address maternal concern for undereating by advising feeding practices that do not involve pressure and bribery, particularly among healthy weight children.

KEYWORDS: body weight; child eating behaviors; children; feeding practices; pressure to eat

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WHAT'S NEW

Mothers commonly (36%) report that their child does not eat enough. Mothers of children who are picky eaters and have a lower body mass index z-score are more likely concerned about undereating, which was associated with pressuring and bribing their children to eat.

MOTHERS OF YOUNG children are often concerned that their children do not eat enough,[1–3] and this is a common concern raised at pediatric primary care visits. Pediatric providers are motivated to assuage this maternal concern because excessive concern is believed to potentially contribute to maladaptive feeding practices,[4–6] such as excessive control,[7,8] or pressuring the child to eat.[9] Furthermore, unnecessary maternal concern about child undereating might detract the mother's cognitive and emotional energy from more salient issues that affect child health and development. Unfortunately, reducing maternal concern about child undereating might be difficult to achieve in pediatric practice.

To effectively reduce excessive maternal concern for child undereating, the pediatric provider needs several additional pieces of information. First, a more textured understanding of a mother's meaning when she describes concern for her child undereating is needed. Most previous work to examine maternal concern for child undereating has done so using questionnaires with researcher-defined response categories that did not allow mothers to explain

their beliefs and practices.[9–12] To our knowledge, no previous studies have taken a qualitative approach to understanding this maternal concern. Second, understanding the mother and child characteristics that are associated with maternal concern for child undereating would allow the pediatric provider to better identify dyads in whom this concern is likely to be present. In addition, identifying the characteristics associated with maternal concern for child undereating might also clarify factors generating the mother's concern, and therefore provide targets for counseling. Previous related literature suggests that the concern might be more common among mothers of boys[13] and children who are thinner.[14] However, whether maternal report of child picky eating (ie, an unwillingness to eat familiar foods) or food neophobia (ie, an unwillingness to try new foods) is associated with maternal concern for child undereating has not been tested. If maternal concern for undereating is driven primarily by one of these behavioral features of the child, independent of child weight status, this would suggest that counseling to reduce maternal concern for child undereating should focus on demystifying or addressing these child eating behavior traits, as opposed to reassurance about the child's weight status and growth.

Reassurance to mothers about child undereating is a valuable goal because it could reduce maternal anxiety and encourage mothers to focus on parenting behaviors with a greater effect on child health and well-being. However, if the maternal concern about undereating is not associated with the mother pressuring the child to eat, the pediatric provider might opt not to focus limited counseling time and efforts assuaging maternal concern. Thus, determining whether maternal concern for child undereating is associated with maternal feeding practices might help guide whether and how to respond to the concern.

Therefore, within a cohort of low-income mothers of 4- to 8-year-old children, this study sought to address 3 objectives: 1) to describe in detail features of maternal concern for child undereating using a qualitative approach, 2) to examine maternal and child correlates of maternal concern for child undereating, and 3) to determine whether maternal concern for child undereating is associated with maternal feeding practices.

METHODS

PARTICIPANTS

Participants were a convenience sample of 286 low-income, female primary caregiver–child dyads from South-central Michigan, who were enrolled in a previous longitudinal study in 2009 to 2011. Participants from the original study were invited through their child's Head Start program (free, federally subsidized preschool programs for low-income children) to participate in a study seeking to understand how stress is associated with children's eating behaviors. Participants were followed longitudinally, and approximately 2 years later invited to participate in this follow-up study, which was explained as seeking to "understand how mothers and caregivers feed their children." Of the parent sample, 95% were biological mothers. The remaining 5% were adoptive mothers and grandmothers; henceforth we refer to the entire group as "mothers."

Eligible mothers were fluent in English and had less than a 4-year college degree. Exclusion criteria for the parent study included the child having a gestational age younger than 35 weeks, significant perinatal or neonatal complications, serious medical problems or food allergies, any form of disordered eating, or being in foster care. Because all child participants from the original study were originally recruited from Head Start, they were living in low-income families at the time of recruitment.

STUDY DESIGN

This was a cross-sectional analysis of an observational study conducted between May of 2011 and June of 2013. Mothers participated in a semistructured interview with a trained interviewer and completed questionnaires, all without the child present. Mother and child anthropometrics were measured at a second visit, which occurred on average 4.32 (±10.53 SD; range, 0–50) days later. The University of Michigan institutional review board approved the study protocol. Mothers provided written informed consent and were each compensated $150.

MEASURES

Maternal Concern for Child Undereating

Maternal concern about her child undereating was determined through an audio-recorded semistructured interview about the mother's beliefs about feeding her child. The development and administration of the semistructured interview has been previously described.[15–19] This report describes mothers' responses to a single open-ended question that occurred near the middle of the interview, after a series of questions asking the mother to describe a typical dinner mealtime in the household: "Do you ever worry that [your child] doesn't or might not eat enough?" If the mother answered in the affirmative, the interviewers asked, "Tell me more about that. What do you worry about?"

Interviews were transcribed verbatim and transcripts were systematically analyzed for themes using the constant comparative method by 2 study team members.[20] A coding scheme was developed to reliably categorize the presence or absence of a theme in each mother's response (yes vs no); this approach to transforming qualitative data to quantitative data has been described previously.[21] Staff independently applied the coding scheme to a set of 40 interviews to establish reliability (Cohen $\kappa > .70$). When inter-rater reliability was established, the remainder of the interviews were coded.

Maternal and Child Characteristics

Mothers reported the child's sex and age and their own education (categorized for this analysis as high school or less vs more than high school) and race/ethnicity (categorized for this analysis as Hispanic or nonwhite vs non-Hispanic white). These dichotomizations were chosen because the population from which we recruited consisted of mothers living in poverty with very little postsecondary education

and included relatively few Hispanic or non-white families. Children and mothers were weighed and measured according to standardized procedures[22] and body mass index (BMI) was calculated. United States Centers for Disease Control and Prevention growth charts for age and sex were used to generate BMI z-scores (BMIz) and to categorize children as underweight (BMI $<$ 5th percentile), healthy weight (BMI 5th to $<$85th percentile), overweight (BMI $\geq$ 85th to $<$ 95th percentile), or obese (BMI $\geq$ 95th percentile). Maternal report of child picky eating was captured using the Food Fussiness subscale of the Child Eating Behavior Questionnaire (CEBQ),[23] which consists of 6 items (Cronbach $\alpha = 0.91$) answered on a Likert scale (range = 1–5), averaged to produce a mean score with a higher score indicating more picky eating. Food neophobia was captured using the Child Food Neophobia Scale,[24] from which the total score is calculated as the sum of 10 items on a Likert scale (range = 1–7), such that higher scores reflect greater food neophobia (Cronbach $\alpha = 0.92$).

Maternal Feeding Practices

Maternal feeding practices were captured using self-report and observation. Maternal self-report of pressuring the child to eat was captured using the 4-item Pressure to Eat subscale (Cronbach $\alpha = 0.86$) of the Child Feeding Questionnaire (CFQ)[25]; items were answered on a Likert scale (range = 1–5) and a mean score computed such that a higher score indicates more pressure to eat. Mothers' pressuring feeding practices were observed in 2 different videotaped protocols. Videotaped protocols were coded by staff trained to reliability (Cohen $\kappa > 0.70$ or intraclass correlation coefficient > 0.80). In one protocol, mothers were loaned a video camera and asked to videotape 3 typical dinnertime meals at home over 1 week. From these videos, coders rated bribery and pressure. Bribery was defined as negotiating, bargaining, bribing or rewarding the child for eating during the meal. For this analysis, mothers were categorized as "ever bribing" across the 3 meals versus not. Pressure was defined as encouraging the child to eat food or drink and categorized as low, medium, or high for each meal. For this analysis, mothers were categorized as "high pressure" or not, defined as pressuring the child to eat through most of the meal at all 3 meals versus not. In the second videotaped protocol, described in detail elsewhere,[17] mother–child dyads were presented with a series of 4 different foods in randomized order. The 4 foods included artichoke hearts (unfamiliar vegetable), green beans (familiar vegetable), halva (unfamiliar dessert), and a chocolate cupcake (familiar dessert). For this analysis, we focused only on maternal behavior occurring when the dyad was offered a serving of green beans, because it was hypothesized that this food would be most likely to elicit pressure to eat from the mother. Instances of maternal prompts to eat, defined as verbal and/or physical encouragements[26] were counted.

Statistical Analysis

Univariate statistics were used to describe the sample. We performed multivariable logistic regression to determine correlates of maternal concern for undereating, including child sex, child age, child BMIz; maternal BMI, maternal education (high school or less vs more than high school), maternal race/ethnicity (Hispanic or nonwhite vs non-Hispanic white), child CEBQ Food Fussiness subscale, and Child Food Neophobia Scale score. To determine if maternal concern for undereating is associated with maternal feeding practices, we used linear (for CFQ Pressure subscale), logistic (for observed bribery or pressure in dinnertime meals at home), or Poisson regression (for observed prompts to eat green beans), adjusted for child BMIz, sex, and age; maternal BMI, education, and race/ethnicity; and household food insecurity. All P values were on the basis of 2-tailed tests and compared with a significance level of .05. All statistical analysis was performed using SAS version 9.3 (SAS Institute Inc, Cary, NC).

Results

Characteristics of the study sample (n = 286) are shown in Table 1. In the semistructured interview, more than a third of mothers (n = 105; 36.5%) expressed that they were concerned about child undereating; illustrative quotes are shown in Table 2. The presence of concern for undereating was defined as the mother expressing any worries or concern about her child not eating enough quantity of food. Some mothers expressed concerns for their children

Table 1. Participant Characteristics

Variable	Total n (%) or Mean (SD)
Child male sex	147 (51.4%)
Child age in months	70.8 (8.4)
Child BMIz	0.8 (1.0)
Child weight status	
Underweight	3 (1.1%)
Healthy weight	163 (57.0%)
Overweight	59 (20.6%)
Obese	61 (21.3%)
Maternal BMI	33.2 (9.4)
Maternal race/ethnicity	
White, non-Hispanic	197 (68.9%)
Black, non-Hispanic	44 (15.4%)
Hispanic, any race	23 (8.0%)
Other	22 (7.7%)
Maternal education > high school	148 (51.8%)
Maternal weight status (n, %)	
Underweight	3 (1.1%)
Healthy weight	61 (21.3%)
Overweight	53 (18.5%)
Obese	169 (59.1%)
CEBQ Food Fussiness Subscale score	2.7 (0.8)
CFNS score	36.5 (13.2)
CFQ Pressure to Eat Subscale score	2.7 (1.1)
Bribes child to eat during home mealtime observation	129 (49.2%)
High pressure to eat during home mealtime observation	83 (31.7%)
Prompts to eat green beans in structured eating interaction	3.0 (4.1)

BMIz indicates body mass index z-score; BMI, body mass index; CEBQ, Child Eating Behavior Questionnaire; CFNS, Child Food Neophobia Scale; and CFQ, Child Feeding Questionnaire.

Table 2. Illustrative Quotes of the Theme of Maternal Concern That Her Child Does or Might Not Eat Enough

"Yeah. There's a lot of times I worry about [my child not eating enough] just because of his size. But, whenever he goes to the doctor they don't seem to be worried, so if the doctor's not worried I shouldn't be. But I still do. I still worry about him 'cause, he is so little and when I see his backbones and his ribs it scares me."
"She'll pick at a meal but won't eat the whole thing… she's just picking and picking… that worries me, like dang, she's not really eating. So maybe she's not getting all the nutrients that she needs."
"You know I try to push, like I said, the protein is the biggest thing you know and then the fruits and vegetables whether it's a banana or grapes or an apple, you know, I try to make him eat something!"
"Yes [I worry he doesn't eat enough] because, like I said, if I'm not there to-to give him the rest of his dinner, he won't eat finish it. He'll run away and start playing. I'm like oh no, you gotta come back here, you gotta finish that! So, that's pretty much it. I think if I'm not there to monitor or make sure that he finishes his meal he won't."
"He's very, very picky about the fruits that he eats and even more about the vegetables that he eats. So I worry about him not gettin' those. That stuff. I mean he loves milk, so I'm not worried about calcium, but yeah, I do worry about [him not eating enough]."
"I have a concern about school. It just seems like, yeah, they're hungry all the time. But when they're at home when they eat breakfast and lunch he'll want a snack later. But like when they go to school, it seems like they come home like they're starving—they haven't ate all day. I don't know if it's not enough food or he's just not eating. So that's my only concern."

being "too skinny" or underweight, which they often attributed to undereating. Mothers often described their children as "picky eaters" with limited palates or restricted preferences for foods. This was problematic for many mothers who further described concerns that their children were not getting sufficient vitamins and nutrients in their diet. Many mothers wished their children would specifically eat more protein, fruits, and vegetables. Some mothers described that they were frustrated with their children "picking at their plates" and not finishing food which was served to them, which resulted in wasting that food. To encourage their children to eat more, some mothers described making family meal choices on the basis of foods that would be palatable to their children, and others described making a separate meal for their child at dinnertime. Many mothers mentioned questioning whether or not their children had eaten enough when they said they were "full," because they believed that their children were using this as an excuse not to eat less palatable foods, such as vegetables. Some mothers believed that they could judge what quantity of food was enough for their children to eat, and seemed to trust that instinct more than their children's assessment of their own satiety. Other mothers described being torn between not wanting to pressure children to eat if they are truly not hungry and wanting children to have eaten enough. Strategies that mothers mentioned they used to encourage their children to eat more included monitoring their children at the table to make sure they finished their meal, using pressure or bribery to encourage children to eat more, offering additional snacks throughout the day, making meals more palatable or making food more easily accessible to the child (eg, keeping snacks in lower cupboards where the child can reach). Mothers mentioned concerns for consequences of not eating enough including being hungry, malnourished, and having poor growth.

Bivariate analysis examining the relationship between maternal and child characteristics and maternal concern for undereating showed that children of mothers who expressed concern for their children undereating had a lower mean BMIz (0.48 ± 0.95 vs 1.05 ± 1.01; $P < .001$). Children of mothers who reported concern for their child undereating tended to be pickier eaters (have higher mean food fussiness subscale scores; 3.0 vs 2.6) and have a higher food neophobia scale score (41 vs 34). There was no association between concern versus no concern for undereating with child age (70.4 vs 71.0 months), child sex (52% vs 51% male), maternal age (32 vs 31 years), maternal BMI (32 vs 34; $P = .12$), maternal obesity (53% vs 62% obese; $P = .17$), maternal race/ethnicity (70% vs 68% non-Hispanic white), maternal education (50% vs 47% high school or less), or household food insecurity (32% vs 31% food insecure), with all P values $> .2$ except as noted.

The multivariate model evaluating associations of maternal and child characteristics with maternal concern for child undereating is shown in Table 3. Each 1 unit increase in child BMIz was associated with 0.58 times the odds of maternal concern for undereating (95% confidence interval [CI], 0.43–0.77). Each 1 point increase in the CEBQ Food Fussiness subscale score was associated with an odds ratio [OR] = 2.41 (95% CI, 1.26–4.59) for maternal concern for undereating. No other characteristics of the child or mother were associated with maternal concern for undereating.

In adjusted models examining feeding practices, maternal concern for undereating was associated with higher CFQ Pressure to Eat (RR = 1.97; 95% CI, 1.55–2.50), greater observed bribery (OR = 2.63; 95% CI, 1.50–4.60), and high observed pressure (OR = 1.90; 95% CI, 1.08–3.36) during home dinnertime meals, and more prompts to eat green beans during the structured task (relative risk = 3.12; 95% CI, 1.02–9.53).

Table 3. Logistic Regression Model Results Reporting aORs of Maternal Concern for Child Undereating

Variable	aOR (95% CI)
Child sex (female vs male)	1.29 (0.75–2.21)
Child age in months	1.00 (0.97–1.03)
Child BMIz	0.58 (0.43–0.77)**
Maternal BMI	1.00 (0.97–1.03)
Maternal education (HS or less vs > HS)	1.03 (0.60–1.75)
Maternal race/ethnicity (Hispanic or nonwhite vs non-Hispanic white)	0.94 (0.53–1.69)
Food insecurity	1.05 (0.60–1.86)
CEBQ Food Fussiness score	2.41 (1.27–4.61)**
Child Food Neophobia Scale score	1.00 (0.97–1.04)

aOR indicates adjusted odds ratio; BMIz, body mass index z-score; BMI, body mass index; HS, high school; and CEBQ, Child Eating Behavior Questionnaire.

**$P < .01$.

DISCUSSION

Results of this study support previous studies that showed that mothers are concerned that their children do not eat enough,[1–3] and also makes several new contributions to the literature that might guide providers in responding to maternal concerns about child undereating. The first key finding was that approximately one-third of mothers of low-income 4- to 8-year old children expressed concern that their child does not or might not eat enough. Qualitative analysis of mothers' elaboration of this concern showed a focus on inadequate quantity of intake, but with links made to the child being "too skinny," "picky," consuming insufficient vitamins, protein, fruits, and vegetables, or wasting food. In addition, mothers invested significant emotional and cognitive energy in interpreting and managing this behavior because of concerns about future malnutrition and growth. Overall, mothers' concerns about child undereating were rooted in a strong focus on ensuring healthy nutrition and adequate growth in their children, and revealed detailed reasoning and investment in how to appropriately respond to and interpret their child's behaviors to optimize the child's health.

Maternal concern for undereating was strongly associated with child picky eating and lower child BMIz. The differential findings for child food neophobia compared with picky eating are worth noting. Specifically, children being reluctant to try a new food did not appear to trigger maternal concern for undereating, and the child being generally picky about what is served at meals (ie, refusing to eat familiar foods) triggered more concern. Of note, the reluctance to sample new foods (food neophobia) is believed to be a genetic trait linked to an anxious phenotype[27] whereas picky eating is believed to be related to environmental context and parenting.[28,29] Mothers seemed comfortable accepting their child's reluctance to try new foods in that reluctance was not associated with concern about undereating. Yet, picky eating and a thinner body type were associated with maternal concern about undereating. This maternal concern about undereating in turn was associated with more pressuring feeding practices believed to be maladaptive.[4,5]

Maternal concern about child undereating was not associated with child sex, child age, child food neophobia, maternal race/ethnicity, maternal education, maternal BMI, or household food insecurity. Our finding that maternal BMI is not associated with concern for undereating is consistent with previous work that reported that maternal obesity is not associated with pressure to eat.[30,31] We posit that the mechanism by which maternal obesity is linked with child obesity is via other pathways, and not through maternal feeding behaviors. Additionally, although food insecurity was not associated with maternal concern for undereating, many children living in poverty participate in supplemental nutrition programs through the schools, which might have reduced maternal concern. This topic should be explored in future work.

The results of this study have several implications for practice. First, mothers were deeply emotionally and cognitively invested in ensuring their children consumed adequate food for optimal nutrition and growth. Because a common challenge in pediatric care is eliciting adequate parental concern to motivate behavior change,[32,33] the strong motivation among mothers of thinner (but healthy weight) children to ensure healthy nutrition and growth might be a strength upon which to build. The fact that this concern appears to be associated with the child being thinner and a pickier eater, but no other maternal or child characteristics, might guide the pediatric provider in which mother–child dyads to target for a more in-depth exploration of this concern, as well as how to address it.

Results also provide some guidance regarding how to address concerns about undereating with mothers. First, because the concern was more common among mothers of thinner (but healthy weight) children than of heavier children, spending time during the pediatric visit reviewing the child's healthy growth and expected trajectory might be reassuring. Second, in discussing the child's eating behavior, the results suggest that focusing on picky eating, but not food neophobia, might be most relevant to reducing maternal concern. In other words, providing the mother strategies for how to get the child to try new foods is unlikely to reduce her concerns about her child undereating. Rather, providing the mother strategies for how to increase her child's intake of a healthy variety of familiar foods, with a focus on fruits and vegetables, might be most effective in reducing her concern about undereating. It is notable that mothers face competing recommendations: they are advised to ensure that their child consumes a diet with a wide variety of fruits and vegetables and essential nutrients,[34] however, mothers are also cautioned against putting too much pressure on their children to eat certain foods.[35] The most useful guidance a pediatric provider might be able to provide to mothers with concerns about undereating is how to manage her thin child's picky eating behavior to ensure a healthy diet that meets nutrition recommendations, while avoiding maladaptive feeding practices, such as excessive pressure and control. Education about healthy portion size for children might also reduce demands on children's intake and reassure parents about the lack of poor growth or "undereating."

There are several limitations to this study. Participants were a convenience sample of low-income English-speaking mothers who were recruited from a single geographical area, therefore findings might not be generalizable to other cultures and populations. Although interviewers received training to give nonjudgemental responses, participants' responses might have been influenced by social desirability bias. Additionally, although the videotaped home mealtime observations occurred on 3 separate days, it is possible that families behave differently when being videotaped while eating as opposed to when they eat without observation. The Food Fussiness subscale of the CEBQ included questions related to food neophobia as well as picky eating, and disentangling these 2 concepts in future work will be an important next step.

In summary, mothers in this study were often concerned about undereating in their young children and its potential

associated consequences of poor nutrition and growth. These mothers were invested in understanding and appropriately managing their child's picky eating behaviors to optimize the child's nutrition and growth. Providing mothers guidance in how to appropriately and effectively facilitate children's intake of a diverse range of familiar, healthy foods at meals and providing reassurance about healthy growth trajectories might be effective strategies for reducing maternal concern about undereating and the associated maladaptive pressuring feeding practices.

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