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Concern about Child Weight among Parents of Children At-Risk for Obesity

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Abstract

Objectives: This study investigated the relationship between parental concern about child weight and weight-related child behaviors, parenting practices, and household characteristics.

Methods: Parent-child dyads (N=421) enrolled in a randomized, controlled obesity prevention trial were evaluated at baseline.

Results: Parental concern regarding child weight was associated with greater use of restrictive and monitoring feeding practices and lower total child energy intake.

Conclusions: Parents expressing greater concern about child weight were more likely to report engaging in strategies to regulate their child's dietary intake, some of which may inadvertently have negative consequences. Intervention strategies that activate parental concern about child weight should include guidance and support for engaging in feeding practices that support healthful child eating patterns and growth.

Keywords

childhood obesity; weight concerns; feeding practices

Childhood obesity in the United States is a significant public health concern. Prevalence estimates from 2009-2010 indicate that approximately 17% of U.S. children ages 2-19 are obese and 15% are overweight.¹ Obesity is associated with multiple health comorbidities in childhood and adolescence, including type 2 diabetes,^{2,3} hypertension,²⁻⁴ and weight-related

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Human Subjects Approval Statement

Parent informed consent and child assent were obtained from all parent-child dyads, and study protocol and procedures were approved by the HealthPartners Institute for Education and Research Institutional Review Board (A08-132).

stigma.⁵ The negative health effects of obesity extend beyond childhood; children who are overweight or obese are at a greater risk for obesity and its health consequences in adulthood.⁶ The health risks associated with obesity and its high prevalence among U.S. children highlight the need for obesity prevention efforts.

Parents are key partners in efforts to prevent childhood obesity, given their influence on multiple risk factors for overweight and obesity in children. Parent-level factors, such as encouraging child physical activity (PA),⁷ and setting rules about child TV use,⁸ and modeling of healthy eating behaviors^{9,10} are among the determinants of child PA level, media use, and dietary intake, all of which affect a child's risk of obesity. Parental recognition of and concern about child weight status are other factors that may influence children's weight status. Interestingly, there is a lack of concordance between the actual weight status of the child and parent perceptions of child weight. It is well documented that many parents do not recognize when their child is overweight or obese¹¹⁻¹⁴ and many report low levels of concern about their child's weight.¹⁵⁻¹⁷ Additionally, a recent study found that many parents of overweight or obese children did not recognize that their child's weight posed a health risk, even among parents who accurately perceived their child as overweight.¹⁸

Parental misperception of child weight status, coupled with low levels of parental concern about child weight and its health consequences, are potential barriers to obesity prevention efforts.^{14,18} Perception of health risk is often viewed as a key component of behavior change,^{19,20} and several studies have recommended intervention strategies and clinical care practices targeting components of risk perception, including parental awareness and concerns about child weight.^{15,17,18,21} It is important that these strategies activate parent's recognition of child weight-related health risks in a way that facilitates practices promoting healthy child growth, rather than contributing to anxiety and unhealthy weight control strategies. However, prior research in this area does not provide clear or consistent evidence indicating how parental beliefs regarding child weight are associated with weight-related parenting practices, parent engagement in child obesity prevention and/or treatment interventions, or child weight outcomes.

In this study, we focus on parental concern regarding child weight. Few studies have examined the relationship between parental concern about child weight and weight-related parenting practices, and those that have reach varying conclusions about whether parental concern is associated with healthy parental behaviors. A recent study of average weight and overweight children and adolescents found parents who were concerned about child weight, compared to those who were unconcerned, reported greater use of several strategies to promote healthy child weight, including limiting child screen time, decreasing restaurant use, and decreasing soda intake.²¹ Similarly, an Australian study of average weight and overweight children ages 5-6 and 10-12 years found parental concern about a child's future weight was associated with parental action to prevent child overweight.¹⁶ Conversely, maternal concern about child weight has been associated with potentially negative weight-related parenting practices, such as greater use of restrictive feeding practices among mothers of preschoolers,²² elementary school children,²³ and early adolescents²⁴ across the

BMI spectrum, as well as with pressure to eat feeding strategies among mothers of early adolescents.²⁴

These studies suggest parental concern about child weight may be associated with weight-related parenting practices, but additional research is needed to more fully examine these relationships given the small number of studies in this area, differences in study populations, and mixed findings. In the present study, we describe parental perception of child weight and concern about child weight among parents of young children between the ages of 5 and 10, who are overweight (BMI percentiles 85-95th) or are at-risk for becoming overweight (BMI percentiles 70-84th). We then investigate the relationship between parental concern about child weight and child-, household-, and parent-level factors in 3 domains: diet, PA, and media use. In doing so, we sought to: 1) assess accuracy of parental perceptions of child weight status and describe parental concerns about child weight; 2) assess demographic correlates of accuracy of parental perceptions of child weight status and parental concern about child weight; and 3) examine the relationship between parental concern about child weight and weight-related dietary, PA, and media factors at the child, household, and parent levels.

METHODS

Study Design and Participants

This cross-sectional analysis utilized baseline data from the Healthy Homes/Healthy Kids (HHHK 5-10) study, an ongoing randomized controlled trial evaluating the efficacy of an obesity prevention program. Four hundred twenty-one parent-child dyads were recruited from 20 primary care clinics in the Minneapolis-St. Paul metropolitan area. Eligible children ranged in age from 5 to 10 years and were at-risk for obesity, defined as BMI between the 70-95th percentiles for age and sex. Eligible parents were English-speaking and willing to take part in study measurements and intervention. At baseline, participants completed a series of measures assessing parent and child health behaviors, parent and child height and weight, child PA level, and child dietary intake. Study design and full eligibility criteria are described elsewhere.²⁵

Measures

Demographic characteristics—Parents reported child, their own, and sociodemographic characteristics, such as ethnicity, race, and free or reduced price school lunch eligibility. Child age and sex were retrieved from the child's Electronic Medical Record.

Child BMI percentile and primary parent/guardian BMI—Child body mass index (BMI) percentile was calculated using the CDC 2000 Growth Charts, and parent BMI was calculated as kg/m². Study staff measured child and primary study parent/guardian weight and height in the family home using a Seca 876 flat scale and Seca 217 stadiometer (Seca Corp., Hanover, MD). Weight and height were measured twice. If the first two measurements differed by more than 0.2 kg for weight or more than 1.0 cm for height, the process was repeated a third time. Data for the multiple assessments were averaged. Child

BMI percentile was used to classify children into two weight groups: at-risk for overweight (BMI 70-84th percentile) and overweight (BMI 85-95th percentile). While children with a BMI between the 70th and 84th percentile were within the normal-weight category, we considered these children at-risk for overweight because they fell at the upper end of the normal-weight category.

Parent classification of child weight and concern regarding child weight—One item from the perceived child weight subscale of the Child Feeding Questionnaire (CFQ)²⁶ was used to determine the accuracy of parent perceived child weight. Parents classified their child's weight at 5 age periods on a 5-point scale, with the response options: "markedly underweight," "underweight," "average," "overweight," and "markedly overweight." Item responses "markedly underweight" and "underweight" were combined and "overweight" and "markedly overweight" were combined to create 3 response categories: "underweight," "average," and "overweight." The item corresponding to the child's current age was compared to the child's measured BMI group (70-84th BMI percentile vs. 85-95th BMI percentile). Among overweight children, parents who classified their child as overweight or markedly overweight were considered to have an accurate perception of their child's weight, while those who rated their child as average, underweight, or markedly underweight were classified as underestimating their child's weight. Because item response options did not include an "at-risk for overweight" weight category, parents of children between the 70-84th BMI percentile who classified their child as average weight were considered to have an accurate perception of their child's weight. Parents who chose the underweight or overweight response options were classified as inaccurately perceiving their child's weight.

Parental concern about child weight was assessed using the 3-item CFQ concern about child weight subscale.²⁶ Parents reported their level of concern about the child eating too much when the parent is not around, the child needing to diet to maintain a healthy weight, and the child becoming overweight. Items were rated on a 5-point scale, with the response options: "unconcerned," "slightly unconcerned," "neutral," "slightly concerned," and "concerned." Items were averaged to compute the subscale score, and Cronbach's alpha in our sample was 0.84.

Diet-related variables—Child dietary intake was assessed using a multi-pass 24-hour recall administered by study staff trained and certified to use the Nutrition Data System for Research software versions 2009, 2010, and 2011 (NDSR, Nutrition Coordinating Center, NCC, University of Minnesota, Minneapolis, MN). Children seven years old or older served as the primary respondent. For children younger than seven, the parent was primary respondent. Parents reported whether the child ate a typical amount on the day of the recall, and recalls in which the parent or child could not remember one or more meal were flagged as unreliable by the interviewer. Only "typical" and "reliable" diet recalls were included in analyses of child dietary intake (N=396). Recalls were analyzed using NDSR version 2011 software. Total energy intake, percent calories from fat, and servings of fruit, vegetables, sweet and salty snack foods, and sugar sweetened beverages were reported. The fruit category included the following NDSR food codes: citrus fruit; fruit excluding citrus fruit; and avocado and similar. The vegetable category included: dark green vegetables; deep

yellow vegetables; tomato; other starchy vegetables; and other vegetables. The sweet and salty snack food category included: cakes, cookies, pies, pastries, Danish, doughnuts, and cobblers—all; snack bars—all; snack chips—all; flavored popcorn; chocolate and non-chocolate candy; frozen dairy and non-dairy desserts; and pudding and other dairy desserts. The sugar sweetened beverage category included: ready-to-drink flavored milk—all; sweetened flavored milk beverage powder—all; sweetened soft drinks; sweetened fruit drinks; sweetened water; sweetened meal replacement; and sweetened tea, coffee, and coffee substitute.

Household food availability was assessed for 5 food and beverage categories: fruits, vegetables, salty snacks, sweet snacks, and beverages. Categories were developed from the Food Frequency Questionnaire.^{27,28} Participants were presented with a list of items for each category, and they selected the items available in their home within the last week. A count variable was created for each food and beverage category to indicate the number of items from that category available in the home. Fruit and vegetable availability was combined and reported together, and salty and sweet snack availability was combined.

Child fast food intake was assessed with one item, modified from Boutelle (2007).²⁹ Parents reported the number of times during the past week that their child ate something from a fast food restaurants, such as McDonald's, Burger King, and Taco Bell, using the response options: "Never," "1-2 times," "3-4 times," "5-6 times," and "7+ times." Responses were dichotomized to compare any fast food intake to none ("ate out 1+ times during the past week" vs. "never ate out").

Three subscales from the CFQ²⁶ measured parent use of monitoring, restriction, and pressured feeding strategies. Items were rated on a 1- 5 scale, with the response options: "never," "rarely," "sometimes," "mostly," and "always." Items were averaged to compute subscale scores. In our sample, Cronbach's alpha coefficients for the monitoring, restriction, and pressure to eat subscales were 0.93, 0.78, and 0.69, respectively.

Physical activity-related variables—Child PA was measured using ActiGraph GT1M accelerometers (ActiGraph LLC, Pensacola, FL). Children were asked to wear the accelerometers for seven full days during waking hours, except during water activities. Children were included in analyses using PA data if they recorded at least 4 valid monitoring days, defined as 10 or more hours of wear time (N=322). Non-wear time was defined as a string of 60 minutes or more of zero-counts, allowing for a two-minute interruption interval of 100 counts or less. To estimate minutes spent in moderate-to-vigorous physical activity (MVPA), data were aggregated into one-minute epochs; cut points were defined using the Evenson et al.³⁰ equations.

Parental support for child PA was assessed with 8 items adapted from Trost et al.³¹ Parents rated the frequency during the past week that they had supported their child's engagement in PA, such as providing transportation to a place where the child could engage in PA or watching the child participate in PA or sports. Items were rated twice, once with respect to the parent in the study and once with respect to other adult members of the household. Ratings were made on a 0-4 Likert scale, with the response options: "none," "once,"

“sometimes,” “almost daily” and “daily.” All 4 items were averaged across both family members, to create an 8-item composite variable, and Cronbach’s alpha was 0.88 in the present sample.

Parents reported household availability of play and media equipment using a 47-item inventory, modified from Sherwood et al.³² Play equipment was classified into 2 categories: 1) active play equipment, such as soccer ball, playhouse, and gym shoes; and 2) media equipment, such as active video game, computer, and digital TV recorder. A count variable was created for each category of play equipment to indicate the household availability of items from each category.

Media-related variables—Four items separately assessed child computer and video game use and child TV use on an average weekday and weekend day.³³ Response options for the items were: “0 hours (coded as 0),” “< 1 hour (.5),” “1 hour (1),” “2 hours (2),” “3 hours (3),” “4 hours (4),” and “5+ hours (5).” We calculated separate estimates of time spent per day watching TV and time spent per day using a computer and video games as the sum of the weekday estimate multiplied by 5 and the weekend day estimate multiplied by 2, divided by 7. These estimates were combined to create a composite variable of the child’s total media use, and responses were dichotomized to classify children as meeting or exceeding the American Academy of Pediatrics’ recommendation of 2 or fewer hours of media time each day.³⁴

Two items assessed whether parents had rules about how much time the child can spend playing computer or video games and watching TV.³³ Parents were also asked to report the number of days during the past week that the child had eaten dinner with the TV turned on. Responses were dichotomized to “0 days” and “1+ day.”

Statistical Analysis

Statistical analyses were conducted using SAS software, Version 9.2 (SAS Institute, Cary, NC). Descriptive statistics were calculated to describe sample composition. A Fisher’s exact test assessed the accuracy of parent perceived child weight, and a t-test assessed the difference in parental concern about child weight between the at-risk and overweight group. Demographic correlates of accuracy of perceived child weight and parental concern about child weight were assessed using t-tests, Spearman rank-order correlations, or Fisher’s exact tests, as appropriate. Bivariate relationships between parental concern about child weight and behavioral measures were quantified by estimating linear and logistic regression models in which a continuous or dichotomous outcome was predicted from parental concern about child weight. In subsequent multivariate linear and logistic models, the following key demographic and weight variables were included as covariates: parent BMI and child age, sex, and BMI. In models predicting child dietary intake, total child dietary intake (total kcals) was included as a covariate. Dependent variables were the following: 1) diet-related variables (child dietary intake, household food availability, family fast food intake, and parent feeding practices); 2) PA-related variables (child MVPA, parental support for child PA, and household play equipment availability); and 3) media (child media use, parent rules about media use, and dinner while watching TV). The predictor in each model was the

continuous parental concern about child weight variable. The modal score for this composite was 1.0, with increasingly fewer respondents with higher composite scores. As such, the lowest response option (1=unconcerned) was the referent value in the regression models. All other continuous predictors were mean centered. Predicted values were calculated for each continuous outcome (means) and each dichotomous outcome (percentages) for 3 levels of parental concern (1=unconcerned, 3=neutral, 5=concerned). Because results of simple linear and logistic regression models did not differ substantially from multivariate regression models, only results from multivariate analyses are presented.

RESULTS

Sample Characteristics

Characteristics of the parent-child dyads (N=421) and outcome variables are presented in Table 1. Among children, sex and weight status were evenly distributed, about two-thirds were non-Hispanic White, and the mean age was 6.6 years (SD=1.7). Parents were predominantly women (93%), non-Hispanic White (79%), and had a college degree or higher (72%). Mean parent age was 37.5 years (SD=6.5) and mean BMI was 28.6 kg/m² (SD=6.3).

Parent Perceived Child Weight and Concern about Child Weight

Overall, most parents classified their child as average weight (91%), with only a small minority classifying their child as overweight (7%) or underweight (2%). The mean score on the concern about child weight subscale was 2.4 (SD=1.2), on a 1-5 scale. Table 2 displays parent perceived child weight and concern about child weight by measured child weight group. Parent perceived child weight differed by the child's current measured weight status (Fisher's exact test, $p < .001$). Among overweight children, 89% of parents underestimated their child's weight, while approximately 12% correctly classified their child as overweight. Almost all (96%) of parents of children at-risk for overweight classified their child as average weight. Concern about child weight was also significantly associated with the child's measured weight status; concern was higher among parents of overweight children compared to parents of children at-risk for overweight ($M=2.7[SD=1.2]$ vs. $M=2.1[SD=1.1]$, $p < .001$).

Among parents of overweight children, concern about child weight was also significantly associated with accuracy of parent-perceived child weight. Parents who accurately perceived their child as overweight reported higher concerns about their child's weight, compared to those parents who underestimated their child's weight ($M=3.8[SD=1.0]$ vs. $M=2.5[SD=1.2]$, $p < .001$). Due to small sample size, the comparison between accuracy of perceived child weight and concern about child weight was not feasible among parents of children at-risk for overweight.

Demographic Correlates of Accuracy of Parent Perceived Child Weight and Concern about Child Weight

Among parents of overweight children, accuracy of parental perception of their child's weight status was associated with child age. Parents who accurately classified their child as

overweight had older children, compared to those who underestimated their child's weight ($M=8.1$ [$SD=1.6$] vs. $M=6.4$ [$SD=1.6$], $p < .001$). There was no association between accuracy of perceived child weight and child sex, child or parent race and ethnicity, child eligibility for free or reduced price lunch, parent BMI, or parent education. These same comparisons were not made among parents of children at-risk for overweight because of small sample size.

Concern about child weight was positively correlated with child age ($r = .23$, $p < .001$), and parents of girls reported greater concern about their child's weight, compared to parents of boys ($M=2.6$ [$SD=1.2$] vs. $M=2.1$ [$SD=1.2$], $p < .001$). Parental concern about child weight was not related to child or parent race and ethnicity, child eligibility for free or reduced price lunch, parent BMI, or parent education.

Concern about Child Weight: Relationship with Diet-, PA-, and Media-Related Variables

The role of parental concern in diet-, PA-, and media-related child behaviors, household characteristics, and parenting practices is presented in Table 3. We found a significant association between parental concern about child weight and 3 diet-related variables of interest. Parental concern about child weight was negatively associated with total child daily energy intake ($b = -76.6$, $p < .01$). As the level of parental concern increased, the predicted value for total child energy intake decreased. Parental concern was positively associated with two parent feeding practices, restriction ($b = .34$, $p < .001$) and monitoring ($b = .12$, $p < .05$). Use of these feeding practices increased with level of parental concern about child weight. No significant relationships between parental concern about child weight and PA- or media-related variables of interest were observed.

DISCUSSION

This study first described parent perceived child weight and concern about child weight and examined their demographic correlates. Consistent with prior research in this area,¹¹⁻¹⁴ we found that parents overwhelmingly perceived their children as average weight. There are likely multiple factors that contribute to parents' tendency to describe children as average weight, including unfamiliarity with BMI percentile cut points for overweight,¹⁴ differences in cultural beliefs or values regarding weight,³⁵ and comparisons to peers^{14,36} in a society where approximately one third of children are overweight or obese.¹ Not surprisingly, parental classification of child weight differed by the child's actual weight status, with a greater proportion of parents of overweight children classifying their child as overweight than parents of children at-risk for overweight. We observed overall low levels of parental concern regarding child weight, though concern was greater among parents of girls, older children, and overweight children. Notably, within the subset of parents of overweight children, parents who accurately perceived their child as overweight expressed greater concern about their child's weight than parents who underestimated their child's weight status. These findings are similar to several studies that have found a relationship between parental concern about child weight and child measured weight status,^{16,21} parent perceptions of child weight status,^{15,21} child sex,²¹ and child age.^{15,16}

This study then examined the relationship between parental concern about child weight and weight-related child behaviors, parenting practices, and household characteristics in the following 3 domains: diet, PA, and media. Our findings provide support for the association between parental concern about child weight and parent feeding practices,^{21-24,37} and provide preliminary evidence for a relationship between parental concern and child dietary intake. However, parents who expressed greater concern about their child's weight were not more engaged in other weight-related parenting-practices of interest, such as support for child PA or rules about child media use. Additionally, household food and play equipment availability was not associated with parental concern about child weight.

With the exception of the association between parent concerns about child weight and parent use of restrictive feeding practices,^{21-24,37} our findings differ from prior research. Others studies have reported that parents who were concerned about their child's weight, compared to unconcerned or only slightly concerned parents, were more likely to engage in behaviors to promote healthy child weight,^{14,16,21} while we found that higher concern was not associated with greater parental engagement in behaviors promoting healthy child weight. Parents may not have the tools or knowledge to increase their or their child's engagement in diet, PA, or media behaviors that promote healthy child weight. These results suggest it may be appropriate to provide parents with information and behavioral guidance to help support them in enacting effective strategies to prevent their child from becoming overweight. Because these are cross-sectional data, results may also support the conclusion that parental engagement in these behaviors informed the level of concern parents expressed about their child's weight. In other words, parents who are already engaging in behaviors to support healthy child weight may not believe that there is a reason to be concerned about their child's weight.

Results of this study are relevant to efforts to prevent childhood obesity. Our findings indicate that the high level of parental misclassification of child weight and low level of concern about child weight observed in prior studies persists, even among parents of children at-risk for obesity. Multiple studies have suggested that parents' low perception of obesity risk impedes efforts to engage these parents in behaviors that promote healthy child weight,^{14,18} and they have emphasized the importance of strategies to raise parents' awareness of their child's obesity risk as a first step to promoting parental behavior changes to support healthy child weight. While approaches to heighten parents' perceptions of their child's obesity risk are warranted, our study demonstrates the necessity of going beyond simply raising awareness and concern, to helping parents effectively use and develop skills to promote healthy child growth at home and reduce unproductive parenting behaviors that may contribute to unhealthy child growth. In our study, higher concern about child weight was not related to several key parent and child behaviors and household characteristics that influence child weight.

Furthermore, we found that parents with higher concern about their child's weight reported greater monitoring of their child's intake of high fat and sweet foods, as well as greater restriction of these foods. Parental use of restrictive feeding practices has been associated with several negative outcomes, including child overweight,³⁷ child preference for restricted foods,³⁹ increased snack intake,³⁷⁻³⁹ and decreased eating self-regulation³⁷ among girls³⁷⁻³⁹

and boys.^{38,39} The impact of monitoring feeding practices on child eating behaviors and weight status is less clear, with some studies reporting an association between these practices and healthy eating behaviors, such as healthier snacking among boys and girls,⁴⁰ others linking monitoring to unhealthy child behaviors, such as impaired eating self-control among girls.³⁷ While multiple studies have found associations between controlling feeding practices and unhealthy child eating behaviors and higher weight status, others report controlling feeding practices are related to lower child weight status⁴¹ and more nutritious snacking.⁴² A possible explanation for divergent findings in the literature is that the way in which parents exert control over their child's dietary intake may influence the impact of feeding practices.⁴⁰ It seems that covert or overt methods of influencing a child's diet have differential effects on child eating behaviors, with the helpfulness of obvious or subtle feeding strategies varying based on the specific feeding practice.⁴⁰ Monitoring and restrictive feeding practices measured by the CFQ²⁶ are generally conceptualized as more overt feeding strategies; however, it is possible for parents to implement these practices in a way that is perceivable to children or that is not.⁴⁰ Overall, this literature suggests a complex relationship between parental feeding practices and child eating behaviors and weight status, and further research is needed to understand which practices, delivered in what way, contribute to adaptive child eating behaviors and healthy child weight outcomes. Additionally, there is an opportunity for interventions to first activate parental concern about child weight to encourage management of child dietary intake, and then support parents in developing effective strategies to encourage healthy child dietary intake and develop adaptive child eating behaviors.

This study has several limitations and strengths that should be considered when interpreting our findings. Study limitations include the restricted range of child weight in our sample. The sample was comprised of children toward the upper end of the BMI spectrum, but who were not yet obese (70-95th BMI percentile), so we were not able to assess the relationship between parental concern about child weight and weight-related behaviors of interest among parents of children who were obese. In addition, we did not examine the relationship between parental perceptions of child weight status and parent and child weight-related behaviors because of statistical and conceptual concerns; there was limited variability in parent perceived child weight (i.e., the large majority of parents classified their child as average weight), and the measure used to assess parent perceived child weight did not include a response option to classify a child as at-risk for overweight. This is a limitation, as parental perceptions of child weight status are likely to be related to parental concern about child weight, further influencing parent behaviors supporting child diet, PA, and media usage.

Another limitation is that dietary recalls were based largely on parent report, and parents may under- or overestimate their child's dietary intake. Parents with greater concern about their child's weight might be sensitive about their child's dietary intake and underreport child dietary intake to the interviewer. Conversely, concerned parents may believe their child overeats and thus overestimate their child's dietary intake. Additionally, a single 24-hour diet recall was used to estimate child dietary intake; therefore, it is possible that dietary intake variables do not represent the child's usual diet. Parents were asked whether their child ate a typical amount on the day of the recall, and dietary data were included in

analyses if parents reported their child ate a typical amount of food on the recalled day. Another limitation is that constructs measuring parenting practices related to family restaurant use and media use are comprised of one item, which may not fully capture these parenting dimensions. Lastly, our analyses were cross-sectional, and as such we cannot make causal inferences about the relationships between parental concern about child weight and the variables of interest.

Limitations aside, our consideration of weight-related variables across three domains is an important strength; baseline HHHK data allowed us to examine the relationship between parental concern about child weight and child-, parent-, and household-level factors related to child diet, PA, and media use, all of which may influence child weight. Second, child and parent height and weight were measured by trained study staff, and child minutes of MVPA were measured using the gold standard method of assessing PA, accelerometer. Future analyses using HHHK 5-10 follow-up data will provide an opportunity to investigate these relationships prospectively in an obesity prevention intervention targeting young children at risk for overweight and obesity.

IMPLICATIONS FOR HEALTH BEHAVIOR OR POLICY

As professionals across multiple fields work to curb the childhood obesity epidemic, it is important to understand how parental concern about child weight affects parents' and children's behaviors, parents' involvement in obesity prevention interventions and, ultimately, children's weight outcomes. Our findings highlight the need for obesity interventions that consider parental concern about children's obesity risk, while supporting parental engagement in behaviors and practices that encourage healthy child weight. Without providing parents support and strategies to effectively manage child weight, parental concern about child weight may contribute to unproductive parenting practices.

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Table 1

Sample Characteristics and Outcome Variables (N=421)

	N(%) or M(SD)
Child Characteristics	
Girls	208 (49.4%)
Age	6.6 (1.7)
Non-Hispanic White	289 (69.1%)
Eligible FRPL	82 (19.7%)
BMI percentile	84.9 (6.9)
At risk/BMI 70—84 th percentile	206 (48.9%)
Overweight/BMI 85—95 th percentile	215 (51.1%)
Parent Characteristics	
Women	391 (92.9%)
Age	37.5 (6.5)
Non-Hispanic White	330 (79.0%)
College degree or higher	299 (71.5%)
Full or part-time employment for pay	350 (83.7%)
BMI in kg/m ²	28.6 (6.3)
Outcome Variables	
Child dietary intake	
Total energy intake in kcal	1768.9 (555.7)
Percent energy from fat	29.9 (6.9)
Servings of fruit	1.6 (1.8)
Servings of vegetables	1.3 (1.5)
Servings of salty and sweet snacks	1.9 (1.7)
Servings of sugar sweetened beverages	0.8 (1.1)
Household food availability	
Count of fruits and vegetables	13.6 (3.9)
Count of salty snacks and sweets	7.9 (3.5)
Count of sugar sweetened beverages	1.5 (1.2)
Eat at fast-food restaurant 1+times/week	278 (66.4%)
Parent feeding practices	
Restriction	3.2 (0.8)
Monitoring	3.7 (1.0)
Pressure to eat	2.2 (0.9)
Child MVPA in minutes/day	53.6 (30.9)
Count of active play equipment available	19.5 (6.2)
Parental support for physical activity	2.5 (0.9)
Meet AAP screen time guidelines	191 (45.7%)
Dinner while watching TV 1+day/week	205 (48.9%)
Rules about time spent watching TV	330 (79.1%)

	N(%) or M(SD)
Rules about time spent playing computer/video games	336 (82.0%)

Note.

BMI = Body mass index

FRPL = Free or reduced price school lunch

MVPA = Moderate to vigorous physical activity

AAP = American Academy of Pediatrics

Table 2

Parent Perceived Child Weight and Concern Regarding Child Weight

	Child BMI Group	
	At-risk for Overweight (N=206) N(%) or M(SD)	Overweight (N=215) N(%) or M(SD)
Perceived child weight status (N=408)		
Underweight	6 (3.0%)	2 (1.0%)
Average weight	190 (95.5%)	183 (87.6%)
Overweight	3 (1.5%)	24 (11.5%)
Concern about child weight (N=416)	2.1 (1.1)	2.7 (1.2)

Note.

Totals may not add to 421 due to missing data

Table 3

Model-predicted Means and Percentages for Participant Diet-, Physical Activity-, and Media-Related Characteristics as a Function of Parental Concern about Child Weight

	Concern about Child Weight		
	Unconcerned (1)	Neutral (3)	Concerned (5)
Diet-related factors			
Child dietary intake (N=367)			
Energy intake in kcal *	1969.9	1816.7	1663.4
Percent energy from fat	29.6	29.4	29.3
Servings of fruit	1.6	1.7	1.8
Servings of vegetables	1.3	1.3	1.2
Servings of salty and sweet snacks	1.6	1.7	1.8
Servings of sugar sweetened beverages	0.8	0.8	0.9
Household food availability (N=392)			
Count of fruits and vegetables	13.5	14.0	14.5
Count of salty and sweet snacks	8.2	8.4	8.5
Count of sugar sweetened beverages	1.5	1.4	1.4
Eat at fast-food restaurant 1+times/week (N=391)	66.8%	65.3%	63.7%
Parent feeding practices			
Restriction ** (N=389)	2.8	3.5	4.1
Monitoring * (N=391)	3.5	3.8	4.0
Pressure to eat (N=390)	2.2	2.3	2.4
Physical activity-related factors			
Child MVPA in minutes/day (N=306)	62.6	59.2	55.8
Count of active play equipment available (N=392)	20.3	19.8	19.2
Parental support for physical activity (N=381)	2.5	2.5	2.5
Media-related factors			
Meet AAP screen time guidelines (N=390)	44.8%	39.6%	34.7%
Dinner while watching TV 1+day/week (N=391)	50.3%	53.0%	55.6%
Rules time spent watching TV (N=389)	74.9%	77.4%	79.7%
Rules time spent playing computer/video games (N=383)	83.7%	82.7%	81.6%

Note.

MVPA = Moderate to vigorous physical activity

AAP = American Academy of Pediatrics

*
p < .01,

**
p < .001