

Family Mealtime Interactions and Overweight Children with Asthma: Potential for Compounded Risks?

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Objective Exploratory study aimed to examine differences in family interaction patterns during a routine mealtime between overweight, at-risk for overweight, and average weight children with asthma. **Methods** Eighty families of children with asthma, aged 5–12 years, were videotaped during a mealtime in their homes. The videotapes were rated using the McMaster Mealtime Family Interaction Coding System (MICS). Structural aspects of the meal such as presence of sugary drinks and whether the television was on were also coded. **Results** Significant differences were found on the MICS with families of children with asthma who were overweight scoring lower on task accomplishment, affect management, interpersonal involvement, and roles. Families of overweight children with asthma also displayed an increased presence of sugary beverages, shorter meal length, and fewer adults at the table. **Conclusions** Preliminary findings suggest that families with children with asthma who are overweight may have a more difficult time managing mealtimes and feel overwhelmed by this family routine.

Key words childhood overweight; family interaction; pediatric asthma.

The rate of overweight conditions for children in the United States has increased sharply in the past decade, with approximately 16% of children and adolescents being considered overweight (Centers for Disease Control, 2002). Children who are overweight frequently experience other chronic health conditions such as diabetes and asthma. There have been increasing concerns about the relatively high co-occurrence of being overweight and pediatric asthma leading to speculation about contributing factors such as the role of the physical environment (Brisbon, Plumb, Brawer, & Paxman, 2005), increased airway hyperresponsiveness (Shore & Fredberg, 2005), and tendency to overdiagnosis of asthma in overweight children (Bibi et al., 2004). The emotional climate of the family has long been identified as a moderator of symptom expression in children with asthma (Kaugers, Klinnert, & Bender, 2004). Furthermore, the management of daily routines, such as mealtime, has also been found to be related to overall quality of life in families with a child with asthma (Fiese, Wamboldt, & Anbar, 2005). In this exploratory study, we aimed to

examine whether mealtime interaction patterns would differ in families who had a child with asthma who was of average weight or was overweight.

The family is the primary socializing unit for children and responsible for establishing healthy eating habits and modeling beneficent food choices (Kinston, Loader, & Miller, 1987). Survey studies suggest that families with overweight children structure their eating times in different ways, allowing more television viewing and accordingly the child's responsibility to make dietary decisions independent of parental guidance when compared to families with children of average weight (Gable & Lutz, 2000). Direct observations of mother-child interactions during mealtimes have found a relation between maternal prompts and child caloric intake (Drucker, Hammer, Agras, & Bryson, 1999), suggesting an association between family dynamics and food consumption. Although the literature is somewhat sparse, we were interested in examining the relation between family interaction patterns and the likelihood that a child with asthma would also be overweight. In this

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brief report, we set out to explore two primary questions. First, would families with an overweight child with asthma interact during mealtime in ways that differed from families whose child with asthma was of average weight? Second, would the structure of the meal (e.g., television on and presence of sugary drinks) distinguish families who had a child with asthma who was overweight?

Method

Participants

As part of an ongoing study of family life and asthma, 80 families with children between 5 and 12 years of age ($M = 7.8$, $SD = 1.96$), with mild-to-moderately severe asthma served as the basis of this analysis (21% mild, 20% mild persistent, 44% moderate persistent, and 15% severe persistent). The children were 32% African-American, 56% Caucasian, 3% Hispanic, and 9% of mixed race. Sixty-five percent were boys.

Procedure

The IRB approved the study, recruited families through four pediatric clinics (ambulatory clinic in teaching hospital, pediatric pulmonology clinic, and two suburban private practices). Eligible families receive letters describing the project, and once they indicate an interest in the project are contacted by project staff. Parents and child are first seen in a laboratory setting to complete questionnaires and interviews about family life and asthma. Within 1 week of the laboratory visit, study staff arrange a home visit to drop off the video camera, instruct the family in its use, and return to pick up the camera once the meal taping is complete. All families participated in the laboratory and mealtime portions of the study.

Measures

Body Mass Index

Children's body mass index (BMI) percentile for age was calculated using z-BMI scores (Baylor College of Medicine, 2004). BMI scores were categorized at the 85th–94th percentile range as at-risk for overweight and >95th percentile as overweight (Kuczmarski et al., 2000). The validity of the BMI as a measure of obesity has been demonstrated in numerous studies (Pietrobelli et al., 1998).

Mealtime Interaction Coding System

The Mealtime Interaction Coding System (MICS) (Dickstein, Hayden, Schiller, Seifer, & San Antonio, 1994) is adapted from the McMaster Model of Family Functioning (Epstein, Baldwin, & Bishop, 1983). The

MICS consists of 7 subscales (See Table 1) rated on a 7-point scale. The MICS has been used to reliably distinguish patterns of interaction in children with chronic illnesses from healthy controls (Janicke, Mitchell, & Stark, 2005; Speith et al., 2001). Intraclass correlations were calculated for interrater reliability and were found to be acceptable: task accomplishment, 0.84; communication, 0.84; affect management, 0.82; interpersonal involvement, 0.85; behavior control, 0.82; roles, 0.72; and overall functioning, 0.84.

Hollingshead Four-Factor Index of Social Status

Socioeconomic status (SES) (Hollingshead, 1975) was formulated using the Hollingshead four-factor index of social status completed by parents. All socioeconomic classes were represented in the sample with a range of 11–66 on the Hollingshead ($M = 38.9$ $SD = 16.3$).

Mealtime Observation Form

This exploratory measure (Benson & Munoz, 2004) was developed for this study to reflect the presence or absence of structural characteristics of the mealtime environment. Ten categories were examined; length of meal, number of adults at meal, number of children at meal, how the meal is served, television, radio, and/or music on/off, is target child given second helpings, beverage of target child, is nutrition discussed, is dessert served, and how many times target child leaves table. Overall interrater reliability for all 10 categories was 90%, as measured by percentage of agreement.

Functional Severity of Asthma

The Functional Severity of Asthma scale (FSS) (Rosier et al., 1994) is a 6-item scale (e.g., wheezing, night wakening, and activity limitations) completed by parents. The scale has proven to be reliable, with an internal consistency estimate of 0.89.

Results

The mean BMI score was 18.7 ($SD = 5.1$, range 13–34.8) and the mean BMI percentile was 64.3 ($SD = 33.1$, range 1–99%). On the basis of BMI percentile scores, 57% ($n = 46$) were classified as average weight, 17.5% ($n = 14$) as at-risk for being overweight, and 25% ($n = 20$) classified as overweight. There were no significant differences between BMI groups on SES. There was a significant difference in SES according to recruiting site with those families recruited from the teaching hospital being of lower socioeconomic background [$F(3,76) = 17.47$, $P < 0.0001$]. There were no significant differences between recruitment sites and likelihood of being classified in the average,

Table I. McMaster Mealtime Interaction Coding Scales

	Description	Low score	High score
Task accomplishment	Structure of meal. Is a Routine followed? Are all members satisfied by the food?	Chaotic. Disruptions are not acknowledged or addressed	Flexible, smooth transitions, efficient planning, and noticeable routine
Communication	Exchange of information	Ineffective communication; silence or irrelevant talking	Clear and direct. Messages are acknowledged
Affect management	Appropriateness and relevance of emotional expression. Both production and response are considered	Difficulty with affective production and response. May include severe restriction of emotion, emotional lability	Affect enhances family interaction. The range, intensity of emotional expression is appropriate, valued, and encouraged
Interpersonal involvement	How family members value the activities and concerns of others	Lack of involvement, lack of privacy, unclear boundaries, and few independent decisions made	Empathic involvement in members' activities and concerns, genuine interest in the activities of others
Behavior control	The manner in which families express and maintain behavioral standards	Unpredictable or chaotic behavior control. Both parents and children exhibit problems which often results in conflict	Flexible style, standards are clear and predictable, reflecting respect for others. Constructive elaboration on appropriate behavior
Roles	How members fulfill functions. Are dinnertime activities fairly distributed, age-appropriate, and explicitly assigned?	Lack of or inappropriate task assignment, lack of responsibility for tasks	Family assigns and takes responsibility for tasks smoothly and efficiently
Overall family functioning	Overall level of family functioning. Rater's general clinical impression, taking into account strengths and weaknesses of the family	Generally unpleasant and challenging to view, characterized by chaos	High quality of interactions and a sense that all have enjoyed the mealtime and each other's company

at-risk, or overweight BMI group [$X^2(79) = 3.84, Ns$]. There was a nonsignificant trend in terms of functional severity of asthma, with a greater proportion of the overweight group being classified as moderately persistent [$X^2(79) = 11.01, P < 0.09$].

We examined differences between the three BMI groups on the mealtime interaction coding scales. Significant differences were found between groups on 6 of 7 of the scales (See Table II). Follow-up mean comparisons using the Tukey–Kramer HSD method revealed that

families with an overweight child with asthma were observed to accomplish the task of the meal less efficiently, have difficulty managing affect, be less interpersonally involved, and assign fewer roles than families with a child with asthma who was of average weight. Because there was the possibility that asthma severity could affect our findings, we reran the analyses using asthma severity as a grouping variable and found no significant differences across the mealtime interaction codes based on severity.

Table II. Mealtime Interaction Codes across Body Mass Index Groups

MICS Scale	Average [<i>M</i> (<i>SD</i>)]	At-risk [<i>M</i> (<i>SD</i>)]	Overweight [<i>M</i> (<i>SD</i>)]	<i>F</i> (<i>Df</i>) [<i>M</i> (<i>SD</i>)]	<i>P</i>
Task accomplishment	5.02 (1.18) ^a	5.42 (0.94) ^{a,b}	4.30 (1.55) ^b	3.76 (2.77)	<0.03
Communication	4.69 (1.47)	4.71 (1.26)	3.94 (1.54)	1.92 (2.76)	Not significant
Affect management	4.84 (1.17) ^a	5.00 (0.96) ^a	3.80 (1.51) ^b	5.86 (2.77)	<0.004
Interpersonal involvement	4.67 (1.67) ^a	5.28 (1.38) ^{a,b}	3.84 (1.83) ^b	3.18 (2.76)	<0.05
Behavior control	4.83 (1.35) ^a	5.07 (1.07) ^a	3.95 (1.79) ^a	3.33 (2.77)	<0.04
Roles	5.10 (1.15) ^a	5.28 (0.91) ^a	4.30 (1.08) ^b	4.60 (2.77)	<0.01
Overall functioning	4.86 (1.43) ^a	5.14 (1.09) ^a	3.94 (1.81) ^a	3.36 (2.76)	<0.04

Levels not connected by same letter are significantly different using Tukey–Kramer HSD.

We did not find any differences in terms of how the meal was served (i.e., family style, in the kitchen, and buffet), whether the TV/radio was on or not, dessert served, or if nutrition was discussed. We did find that the families with an overweight child with asthma were more likely to be served a sweetened drink [$X^2(60) = 5.45$, $P < 0.06$], had fewer adults at the table [$F(2,77) = 3.59$, $P < 0.03$], and had shorter meals [$F(2,77) = 4.20$, $P < 0.02$; overweight M (expressed in minutes) = 16.35, $SD = 6.68$, at-risk $M = 18.27$, $SD = 6.03$, average $M = 22.42$, $SD = 9.58$].

Discussion

In this exploratory study, we set out to examine the interaction styles of families with a child with asthma who were either overweight or of average weight. Despite the increasing concerns about comorbidity of asthma and overweight conditions in childhood, the role that family climate may play in sustaining such conditions is relatively uncharted. In this exploratory study, we found several aspects of family dynamics that distinguished the group of children with asthma who were overweight from those who were not. In general, families whose child was overweight had a more difficult time managing the meal, assigning roles, and responding to emotions. Taken together, mealtimes appear to be a time of being overwhelmed rather than equal distribution of responsibilities as detected on the roles and affect management subscales. Previous reports have suggested that being overwhelmed or burdened by daily routines is associated with poorer quality of life for children with asthma (Fiese et al., 2005). In this regard, the meal in and of itself may be but one more strain on an already stressed system. We also noted that the families with an overweight child spent less time at the table, suggesting a rushed pace to the meal.

There are several limitations to this study including the lack of a control group. We would recommend, however, that a control group include not only healthy children of average weight but also children who are overweight without asthma. Our sample was also restricted in that we relied on volunteers recruited from clinics, and thus, our sample is a sample of convenience. Concerns about the validity of mealtimes observations are frequently raised. Although these concerns should be taken seriously, over 99% of the families reported that the meals we videotaped were typical of most of their meals. Future efforts are warranted to observe families over several mealtimes to assure adequate sampling. Furthermore, our interest is on whole family functioning,

and yet, we have focused on only one child as the index of being overweight. In future analyses, with a larger sample, we aim to address some of these limitations.

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