Disordered eating behaviors and food insecurity: A qualitative study about children with obesity in low-income households

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1. INTRODUCTION

Food insecurity has traditionally been considered to be a condition of inadequate food, with or without hunger, and historically characterized by underweight. However, in the fifteen years since an initial provocative case report suggested a link between food insecurity and obesity[1] it has become increasingly apparent that food-insecurity and obesity coexist in American children.[2] This seeming paradox is not a surprise when one considers the economics of food pricing, where energy-dense foods that are high in fats and refined carbohydrates are cheaper than foods with higher nutritional value.[3] With inadequate resources, food insecure families disproportionately rely on feeding their children these low-cost foods.[4]

Compounding the economics of food pricing is the observation that the experience of food-insecurity is typically associated with a cycle of fluctuating availability, where individuals eat decreasing amounts of food as resources dwindle, and then compensate by overeating palatable and energy-dense foods when food is more available.[5] The reliance on highly palatable, inexpensive, processed foods when resources are more available followed by a restriction of caloric intake mimics dietary restraint, which is associated with binge eating and weight gain. Research has shown that food-insecure adults report having higher levels of binge eating episodes,[4, 6] and it has been shown that as many as a third of children and adolescents with obesity have binge eating episodes.[7]

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There is information in the literature describing the disproportionate consumption of fats, fast foods, and added sugars among food-insecure youth.[8–10] However, eating behaviors among food-insecure children with obesity (compared to their food-secure peers) are less well described. In this study, focus groups were conducted with caregivers in order to explore potential challenges to clinical intervention/management unique to children with obesity who have the dual burden of living in a food-insecure household. To more fully frame the inquiry process, groups were conducted with family members from food-insecure households as well as from low-income, food-secure households as a comparison.

2. SUBJECTS, MATERIALS, AND METHODS

2.1. Participants

2.1.1. Source population (index children)—Participants were recruited for the focus groups if they were caregivers of a child ("index child") who was being seen in the pediatric weight management clinical program called Healthy Hearts, at Children's Hospital & Research Center Oakland. In this ongoing clinical program, patients between the ages of 2 and 18 years old are referred by their primary care pediatrician when they have overweight (body mass index, or BMI >85th percentile) or obesity (BMI >95th percentile) and prior efforts made by the primary care doctor have not led to improvement in weight status. At the time of the intake visit in the Healthy Hearts program, caregivers are asked to complete a series of survey questions that are completed either on a computer or on a paper form.

This intake process includes questions about self-reported household income, whether the household currently (or in the past) has used federal benefits such as the Supplemental Nutrition Assistance Program (SNAP, also known as "food stamps"), and questions regarding household food security. The gold-standard measurement of food security status is the US Core Food Security Module (CFSM), which is an 18-item questionnaire in English[11] and in Spanish[12] developed by the USDA to measure household food security over the past 12 months. A subset of 6 items from the full questionnaire (Short Form of the Household Food Insecurity Scale) has been shown to be a reliable substitute for the full 18-item questionnaire when time is more limited.[11, 13] Computer-based intake questionnaires use the CFSM, and paper-based intakes use the Short Form.

2.1.2. Focus group participants—Caregivers of children with a recent clinic appointment (typically within 2 months of the focus group) were recruited by telephone invitation to participate. Only caregivers who had reported an annual household income below $45,000 a year were recruited, in order to maximize the comparability between food-insecure and food-secure groups. Participants were assembled into either food-insecure or food-secure discussion groups in the interest of facilitating within-group cohesion during discussion. Participants were not told that they had been identified as being "food-insecure" or "food-secure", but rather that they were all being invited to discuss the topic of "Healthy Eating on a Budget."

Subjects could participate as a primary participant regardless of gender or family role (e.g. parent or grandparent) as long as the index child spent at least 50% of their time with this caregiver/family member and as long as this adult was an individual responsible for

shopping and meal preparation when the child was in their care. An alternative activity (dance class) was offered for the children during the focus groups, but additional family members and patients themselves were allowed to participate in the focus group as secondary participants if they preferred being a part of this discussion rather than the alternative activity.

2.2 Focus groups

Between April 2012 and December 2013, a total of 7 focus groups were conducted. Based on recruitment from 37 index patients, the focus groups were attended by a total of 47 participants (42 caregivers, 2 siblings, and 3 patients). There were four food-insecure groups and three food-secure groups. The moderator for all groups was a physician in the clinic from which subjects were recruited. Focus groups were on average 73 minutes long (standard deviation 6 minutes). One food-secure and one food-insecure group were conducted in Spanish. All focus groups were digitally recorded with the permission of the participants and were then transcribed verbatim, in English and Spanish. In most cases, the transcriber had been present in the room during the discussion.

2.3 Data collection

At the start of each session, the moderator shared with participants the two main topics of interest for the overall larger study: shopping habits (with probing to ask specifically about participation in federal assistance programs) and meal preparation. Though disordered eating was not an a priori research interest at the start of the project, comments about children hiding food emerged spontaneously in the first focus group. These comments arose during discussion about shopping patterns, when participants were sharing their frustration with the rapid disappearance of newly-made food purchases. This first group was a food-insecure group, and this report of food hiding triggered further interest in the topic. In the subsequent focus groups, the moderator probed specifically for the presence or absence of food hiding in the index children (or other children in the household) with prompts such as "Some families say that they discover their child is eating in secret, or hiding food in their room. Have you ever noticed this?" As described later, binge eating and night-time eating emerged in analysis of transcripts described below, but these topics were not probed for specifically during data collection.

2.4.1 Qualitative Data analysis—During the focus group data collection period, food hiding emerged as an unexpected theme, and generated the motivation for this analysis. For this analysis, all transcripts were scanned for any comments referring to eating behavior (as opposed to the other topics such as shopping and mealtime preparation) and organized in table format. Quotations from Spanish-language groups were coded in Spanish for the purposes of analysis, and specific quotes were translated to English only for the purposes of this manuscript.

In order to contextualize this finding of what appeared to be an abnormal, or disordered eating behavior, we relied on the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) to provide a deductive framework (theory-driven approach) to complement inductive codes generated for the overall study. In an iterative process that

considered both the comments made by respondents as well as DSM-V criteria for Binge Eating Disorder (BED) and Other Specified Feeding and Eating Disorders (OSFED),[14] three codes were created: 1) Binge-type eating behavior, 2) Secretive eating/hiding behavior and 3) Night-time eating. Binge eating episodes are formally defined in the DSM-V by consumption of a large amount of food in a discrete amount of time (under 2 hours) that is a larger quantity than most people would eat under similar circumstances, where there is a "loss of control" during these eating episodes. [14] In this analysis, to be coded as binge-type eating behavior, an episode had to be plausibly time-limited to no more than a few hours in the description given. There is a constellation of additional behavioral criteria that are required for a formal diagnosis of BED. One of these additional criteria is that the episodes are associated with "Eating alone because of feeling embarrassed by how much one is eating." [14] A quotation was coded as representing "Secretive eating/hiding behavior" if there seemed to be some effort made such that the act of eating or evidence of having eaten was hidden from others. (However, because responses were from the point of view of the caregivers, the dimension of whether or not the child was eating alone "because of" embarrassment could not be directly assessed.) Nighttime eating syndrome (NES) is characterized by episodes of night eating, as manifested by eating after awakening from sleep ("nocturnal ingestions") or by excessive food consumption (over 25% of daily calories) after the evening meal ("evening hyperphagia"). [14] A response was coded as representing night-time eating when a reference was made to food that was consumed either after the evening meal or at night when the subject would have been thought by others to be sleeping, with the caveat that it would not be possible to estimate the proportion of daily calories consumed in any reported episode.

For the overall study, based on the questions in the focus group guide and some a priori understanding about the experience of food insecurity, the first and second author had independently coded transcripts to evaluate fit with these deductive codes, identified new codes through an open coding process, and refined codes through an iterative process with in-person discussion until coders had 80% agreement. The final set included three codes that were related to eating behaviors that were not otherwise included with the deductive codes derived from the DSM-V.

2.4.2 Quantitative descriptive analysis—In order to compare food-secure to food-insecure index patients, two-sided t-tests of means were used to evaluate basic characteristics for index patients (age, gender proportions) and for their caregivers who participated in the focus groups (gender proportion).

The study was approved by the Children's Hospital and Research Center Oakland Institutional Review Board (IRB).

3. RESULTS

3.1.1. Demographics of source population (index children)—There were 37 children (22 food-insecure and 15 food-secure) from the clinic population who were represented by these focus group participants. (see Table) These children did not differ by age (mean age was 12.0 years for food-insecure and 11.5 years for food-secure), though they

did vary by gender (68% male among food-insecure, and 33% male among food-secure, p=0.04).

The average number of prior Healthy Hearts clinic appointments attended at the time of participation in this study was 4.1 visits, with fewer visits (3.2 visits) for food-insecure children than for their food-secure peers (5.5 visits, p=0.02). The moderator was one of 4 different physicians in the clinical team, and a total of 28 of the 37 index patients had seen the moderator at least once as a physician provider in the multidisciplinary clinic. The average number of appointments that had been attended with the moderator as the physician of record was 1.5 visits, with no statistically significant difference between food-insecure children (1.2 visits) compared to food-secure children (1.9 visits).

3.1.2. Demographics of focus group participants—There were 4 food-insecure groups (30 participants) and 3 food-secure groups (17 participants). Food-insecure focus group participants were 70% female, and food-secure participants were 88% female, though this difference was not statistically significant. Three food-insecure adolescents declined the dance class and attended the focus group instead, with two in Group 1, one in Group 3. Though any comments that these adolescents made during the focus groups were transcribed and eligible for analysis, they contributed few comments overall, and none were included in this analysis.

3.2. Food intake habits: Common undesirable eating behaviors

Participants were asked to describe food intake habits in the household, and both food-insecure and food-secure caregivers described a range of negative or undesirable eating behaviors of the index child with obesity and/or other household members. A total of 3 codes for "common undesirable eating behaviors" emerged: 1) Overeating (not including binge episode); 2) Rejecting nutritious foods; 3) Having a preference for foods with high energy density.

Participants from all food-insecure households and the latter two of the three food-secure households had anecdotes about their children overeating because of frequent snacking. For example, two parents in one food-secure focus group engaged in a dialogue about how they needed to stop buying peanut butter, because their children will "keep returning to the kitchen to spoon out peanut butter," finishing off the jar in a few days. A majority of participants had anecdotes about picky eating habits and how their children refused to eat vegetables. Caregivers lamented their children's preference for high-calorie junk foods.

3.3.1. Disordered eating behaviors: Binge eating episodes in the children—In addition, however, respondents spoke about eating behaviors that fell out of the range of classification of "normal" eating behaviors, and were more reminiscent of disordered eating patterns or behaviors. Overeating arose in the first food-insecure group, but there were no specific examples of what might be considered a "binge" in a discrete time period. However, in all subsequent food-insecure focus groups, where specific probing about food hiding spurred more conversation about disordered eating behaviors in general, spontaneous descriptions of distressing binge-type episodes emerged. For example:

Group 3, Respondent 1, Food-Insecure: That's why I don't like chips in my home. Oh about a month ago I see in Mi Pueblo two bags of chips for five bucks. I buy it, and I wrapped it up, put it high, high, high. I was looking for the chips, "Where are the chips?" "I don't eat chips." "Where are the chips?"… "I ate it when my dad came." I said, "How much? Where's the other bag?" "I eat the two bags." (**R5** What?!) Two big bags, oh my god. I turned around, I don't say nothing, oh my god.

Group 5, Respondent 4, Food-insecure: Yeah or it could be like a Saturday when I'm gone walking or gone shopping and he doesn't want to go and we leave him at home. One time I left him. I bought a whole bucket of ice cream. I came home that whole sh*t was gone.

Some parents reflected that perhaps this was learned behavior on the part of their children.

Group 3, Respondent 4, Food-insecure I know that there are times when he's not hungry, and we just got through eating and five minutes later he already wants to eat something else. And I know he's not hungry. I don't know if it rubbed off on him, you know, watching me eat uncontrollably.

Though there were references to overeating in the food-secure groups, there were no comments regarding binge episodes that arose spontaneously in the food-secure groups.

3.3.2. Diso rdered eating behaviors: Secretive eating/food hiding in the children—The topic of children eating secretively arose in the first food-insecure focus group, and was probed for in subsequent groups. It emerged as a salient issue in each of the food-insecure groups, and with probing, only one food-secure respondent gave a light-hearted anecdote about how her granddaughter finished off the ice cream over the course of a few days without her knowledge. Among the food-insecure groups, there were numerous references to discoveries that their children were hiding food and eating it. One mom (**Group 4, Respondent 2, Food-insecure, Spanish**) described how her daughter, from the age of 5 or 6, would sneak food – often unappetizing items such as fast food tacos that had already gone cold- and the mom would find them hidden in bags stashed in the living room, in her daughter's room, and sometimes even hidden in bureau drawers. One mother explained an incident and included her reflections:

Group 1, Respondent 1, Food-insecure: I see my son hiding food under the bed. Yesterday he got a bottle of water and he hid it and I thought it was something else and I went after him and he was sitting on it and I was like why did you hide? And then I went and find out it was water and was like why did you hide the bottle of water? Sometimes when you get anxiety and you can't get access to food and you know you have it, you go and take it and you hide and eat. You know the anxiety, the anxiety makes eating nonstop.

And another noted:

Group 3, Respondent 5, Food-insecure. At first my nieces were getting' on him, I was getting on him. I don't think he really…he kind of cut it out, out of our sight. I

think he like went into his room and brought them secretly and, yeah, I don't think it really ever stopped.

Respondents in three out of the four food-insecure groups referred specifically to finding candy and other wrappers hidden in either their child's bedroom or all around the house.

> **Group 1, Respondent 5, Food-insecure:** And one [100 calorie snack bar] is not bad, but eight? And I'll find them stashed all over the house.

And another:

> **Group 4, Respondent 4, Food-insecure, translated from Spanish**: He hides candy from me, and I find it because he doesn't empty the trash. I find it in the trash can, or in his bed…

This mom continues on to describe how he protests, and always insists that it wasn't him who ate the candies. Upon hearing this, another caregiver responds with the resignation that her daughter has the same behaviors.

> **Group 4 Respondent 9, Food-insecure:** My daughter is the same way. She also hides those wrappers from yellow cheese, and then says 'It wasn't me. It wasn't me. There are other kids [in the house].' [Respondent pauses.] But I know that it is her. She tries to say 'No, no'. But it's her.

3.3.3. Disordered eating behaviors: Food hiding among food-insecure caregivers—What was perhaps also striking, however, was that food-insecure parents were also often hiding food as well.

> **Group 5, Respondent 4, Food-insecure**: So and they're good and they come in different flavors. And I buy them and when they get to be too much I just take them. He says, "Where are you going?" I says, " I'm putting these in my closet."

> **Respondent 2**: And it's a shame that you have to hide some things so they won't eat it all. I have to do that.

Another parent noted that sometimes, food she had hidden had gone bad:

> **Group 3 Respondent 3, Food-insecure**: They want a lot of junk food, I know. I try not to buy it. I mean, I do buy it, I'm not going to lie. I do buy it. But I do hide it, and then sometimes, like, I'll find it and it's already [gone] bad, because I hid it.

Though this was described as something that they "had to do" to prevent their children from eating too much food, they also described examples of how they did this to make sure that they could have their fair share, too.

> **Group 3, Respondent 5, Food-insecure:** I was craving the Doritos…I think I might have had a nice portion like this with some sour cream, I never seen the bag again, ever. Like ever.

> **Respondent 1:** That's why no more chips in my home, no more.

> **Respondent 5:** Okay, that was a big giant bag. I'm just gunna buy the personal, next time, for myself. The personals are great.

3.3.4. No endorsement of food hiding in the food-secure caregivers—The topic of food hiding did not arise spontaneously in the first of the three food-secure groups. This theme was probed in the second and third food-secure groups, as it had been identified as an area of interest. While two participants tried to offer helpful examples of what they considered problematic eating behavior, they ultimately had no examples to tell about food hiding.

> **Group 7**, **Food Secure, Spanish (translated for manuscript)** (Moderator probing)….Sometimes people say that they find that their children are hiding food in their rooms, or…

> **Respondents** (multiple, all speaking at once): No **Moderator:** No one has had that experience?

> (R multiple speakers, shaking heads)

> **Respondent 7**: Well, I haven't had the experience where my son hides food in his room. But-what happens sometimes is that I will be in my room, and he is in the living room, and he is just going in circles back and forth to the refrigerator…

When probed a second time about whether their children ever hid food, another mom offered an anecdote about how her daughter brought home packaged snack food, asking her mom if she could eat it right away. When mom said that she couldn't, because they had just eaten, the child "negotiated" that she wanted to put the snack food away for safe-keeping for the next day, so that no one else would eat it.

3.3.5. Disordered eating behaviors: Night-time eating in the children—Night-time eating was not specifically probed for during the focus groups, but it arose in two of the food-insecure groups and none of the food-secure groups. In the exchange below, parents discuss their frustration with knowing that their children have this behavior:

> **Group 3 Respondent 4, Food insecure:** My son sleeps downstairs, near the kitchen. And, uh, yeah, when we're upstairs…

> **(Respondent 5, spouse of R4, interjects:** We can hear the cabinets…

> **Respondent 4 (continues) ..**.we can hear the cabinets closing. And then in the morning, what we had for leftovers the night before you know are just gone now. So I know he's eating at night.

> **Respondent 1, responding to Respondents 4&5:** It's really frustrating. I want to put a lock on my fridge. So they don't take anything from there or everything. Any place there is food.

Later during the same group, a different parent described the same concern about night-time consumption.

> **Group 3 Respondent 1, Food-insecure:** But when its time to go to bed I start to notice he eats when everybody is sleeping. So I said, "Oh my gosh." And I said, "What am I going to do?"

A parent from a different food-insecure group commented:

Group 5 Respondent 4, Food-insecure: When I put something up thinking we're going to have it for tomorrow by the time I wake up it's gone. It's gone.

4. DISCUSSION

This paper described the commonalities in eating behaviors between the food-insecure and food-secure groups as well as highlighted the emergent theme of disordered eating that arose in the food-insecure groups. All of the focus groups described and endorsed the observation of their children's overeating and excessive snacking. The study further found that families of these children with obesity had a wide range of undesirable eating behaviors that may vary by food security status. Previously, the experience of food insecurity in the context of childhood obesity has not been well described. This study's findings suggest that a different constellation of behaviors might exist for children with obesity who are also living in a food-insecure household.

Secretive eating, night-time eating, and binge-type eating behaviors may make the task of weight normalization more challenging in children with obesity who are food-insecure. Determining whether a child has aberrant eating behaviors requires even more sensitive probing on the part of a clinician. Though resource constraints make formal assessment of food security (whether using the 18-item staged questionnaire or even the 6-item Short Form) challenging in the context of primary care, clinicians can nonetheless use modified versions of the USDA food sufficiency screener question, "Which of these statements best describes the food eaten in your household in the last 12 months: —enough of the kinds of food we want to eat; —enough, but not always the kinds of food we want; —sometimes not enough to eat; or, —often not enough to eat?"[11] Increasingly, food insecurity and food insufficiency are entities recognized by physicians who are concerned that families in their practice are hungry and needing more access to resources.[15] Potentially, it could be valuable for clinicians to probe more specifically for disordered eating in their patients with concurrent obesity and hunger.

Binge-type eating and night-time eating are a concern in these children with obesity because they represent children with even higher health risks than from their obesity alone. Research in children 5 to 12 years has shown that binge eating predicts development of metabolic syndrome, worsened triglycerides, and elevated visceral adipose tissue,[16] which is consistent with similar research in adults.[17] Night-time eating is well-known in the literature as being associated with obesity and making weight management more difficult, [18] and among individuals with obesity its presence suggests more severe psychological distress and depression.[19]

It was particularly notable that disordered eating behaviors were not limited to the children, and that many parents described having these behaviors as well. Caregivers spontaneously mentioned their own food hiding and binge eating behaviors, though did not specifically volunteer whether they had nighttime eating themselves. Qualitative research with adult women living in food-insecure environments has similarly shown that with women having excess weight, compared to their peers with normal weight status, frequently discussed emotional eating, overeating, and stashing food.[20] The disordered eating behaviors

described in this sample may represent behaviors that are salient at the intersection of hunger and obesity for both children and adults, alike.

While unfavorable eating behaviors such as excessive snacking were common among these children regardless of food access in the household, the descriptions and detailed accounts of eating binges, food hiding, and night eating may be a manifestation of the additional pressure of worry about food. Fram et. al[21] conducted interviews with adults and children (9 to 16 years old) in families at risk for food insecurity, and found that children were aware of dwindling food supplies and took responsibility towards generating resources in a way that parents often did not realize. Furthermore, they found "instances where a parent felt that their child was protected from hunger and worries about food, but the child reported substantial worry and/or cutting back on food." In this context, the disordered eating behaviors disclosed by caregivers-particularly the food hiding and secretive eating-may be an internalization of the lived experience of household food insecurity among these children with obesity.

There was a gender difference in the index children, and the food-secure group was comprised of more caregivers for female children, and the food-insecure group was comprised of caregivers for males. Alternatively, it is possible that the behaviors described here, such as food hiding, are more common in males than in females, making gender a confounder in these findings.

There are potential limitations to generalizability of the data because they are from a focus group setting. First and foremost, it is not possible to determine with certainty whether any of the children represented by the focus group participants would meet formal criteria for a clinical diagnosis of either binge eating disorder or night eating syndrome. Specific information is missing about frequency and duration of episodes, and these responses reflect only the behaviors known to the parents, lacking the important characterization of the level of distress that is caused for the children themselves. It is also quite possible that some respondents were reluctant to disclose socially undesirable eating behaviors in a group setting, and that individual interviews would have revealed even more socially undesirable eating behaviors. An additional important limitation was the fact that the moderator was a physician in the obesity program from which subjects were recruited. Though this was felt to be a strength because of the moderator's experience with sensitive discussion about children's weight status and eating behaviors with family members, this could have introduced a level of desirability bias and a reluctance to talk about undesirable eating habits. Additionally, a potential power differential between a physician and patient's family could influence responses. In general, prior contact with the moderator before the focus group session was not extensive, and as noted, there were no differences in prior exposure to the moderator between food-secure and food-insecure groups. Furthermore, it is also possible that the presence of children – in particular, the index children from which the focus groups were recruited-might have influenced respondent willingness to discuss difficult topics. However, in these groups, index patients were only present in two of the food-insecure groups, where disordered eating emerged as a topic, and in none of the food-secure groups, where disordered eating was not salient despite probing from the moderator.

In conclusion, consideration of a child's food security status may be helpful in the context of obesity. These findings suggest that future research regarding food insecurity in children at risk of obesity would be strengthened by consideration of food hiding and binge eating behaviors. This study provides early work suggesting that individuals such as clinicians who have direct contact with children and adults living with food insecurity may improve service to these at-risk populations by considering the potential role of disordered eating behaviors, though this needs to be supported with further investigation.

Acknowledgments

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TABLE

Description of focus group participants and of their children who were patients in the pediatric weight management program ("index patients").

	Total	Food-Secure	Food-Insecure	p value[*]
INDEX PATIENT CHARACTERISTICS				
Total number of index patients	37	15	22	n/a
Age of index patients (years)	11.8	11.5	12.0	0.64
Percent female	46%	67%	32%	0.04
Prior number of clinic visits	4.1	5.5	3.2	0.02
Prior # of clinic visits (with moderator)	1.5	1.9	1.2	0.13
FOCUS GROUP PARTICIPANTS				
Total number of groups	7	3	4	n/a
Total number of participants	47	17	30	n/a
Number of participants who were index patients	3	0	3	n/a
Percent female	77%	88%	70%	0.16

[*] P values denote significance testing for 2-sided t-tests of means