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Complete List of Authors:	Eli, Karin; University of Oxford, Institute of Social and Cultural Anthropology Howell, Kyndal; University of Oregon, Department of Psychology Fisher, Philip; University of Oregon, Department of Psychology Nowicka, Paulina; Karolinska Institutet, Clinical Science, Intervention and Technology; University of Oxford, Institute of Social and Cultural Biology
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When Does Obesity Become a Problem? A Qualitative Analysis of Parents' and Grandparents' Perceptions of Preschoolers' Body Weights

Karin Eli [1], PhD, Kyndal Howell [2], BS, Philip A. Fisher, PhD [2], Paulina Nowicka, PhD [1,3]

Affiliations: [1] Unit for Biocultural Variation and Obesity, Institute of Social and Cultural Anthropology, University of Oxford, Oxford, UK; [2] Department of Psychology, University of Oregon, Eugene, USA; [3] Unit of Pediatrics, Department of Clinical Sciences, Intervention and Technology, Karolinska Institute, Stockholm, Sweden

Address correspondence to:
Paulina Nowicka, Division of Pediatrics, Department of Clinical Science, Intervention and Technology (CLINTEC), Karolinska Institutet, 141 86 Stockholm, Sweden, Tel: +46 46 70 454 88 33, Email: paulina.nowicka@ki.se

Abstract

OBJECTIVES: Parents' difficulties in perceiving children's weight status accurately pose a barrier for family-based obesity interventions; however, the factors underlying weight misinterpretation still need to be identified. This study's objective was to examine mothers', fathers', and grandparents' perceptions of preschoolers' body sizes. Interview questions emphasized perceptions of overweight and obesity from a life course perspective, parental responsibility, and appropriate contexts in which to discuss preschoolers' weights.

DESIGN: Semi-structured interviews, which were videotaped, transcribed, and analyzed qualitatively.

SETTING: Eugene and the Springfield metropolitan area, Oregon, USA

PARTICIPANTS: Families of children aged 3-5 years were recruited in February – May 2011 through advertisements about the study, published in the job seekers' sections of Craigslist and local newspapers. 49 participants (22 parents and 27 grandparents, 70% women, 60% with overweight/obesity) from sixteen low-income families of children aged 3-5 years (50% girls, 56% with overweight/obesity) were interviewed.

RESULTS: There are important gaps between clinical and lay perceptions of childhood obesity. While parents and grandparents were aware of their preschoolers' growth chart percentiles, these measures did not translate into recognition of children's overweight or obesity. The participants spoke of obesity as a problem that may affect the children in the future, but not at present. Participants identified childhood obesity as being transmitted from one generation to the next, and stigmatized it as resulting from 'lazy' parenting. Parents and grandparents avoided discussing the children's weights with each other and with the children themselves.

CONCLUSIONS: The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

Strengths and limitations of this study

- This study's sample is the largest ever reported in a qualitative investigation of family members' perceptions of preschoolers' body weights.
- While most previous studies focused only on mothers' perceptions of their preschoolers' body weights, this study included mothers, fathers, grandmothers, and grandfathers, recognizing that various adult family members influence young children's body image, eating, and exercise habits.
- Although low-income participants tend to be difficult to reach, the study successfully recruited a predominantly low-income sample.
- The sample primarily consisted of families of Caucasian origin, and thus did not allow for an investigation of the influence of cultural background on perceptions of children's body sizes.
- As several participants were single mothers, the number of fathers was not high enough to enable an assessment of potential differences between fathers' and mothers' perceptions.

INTRODUCTION

While there is growing evidence of the superior effectiveness of lifestyle interventions initiated early in childhood[1-3], one of the main barriers in conducting such interventions is parents' lack of recognition of, or concern about, obesity in children. Parents' difficulties in perceiving children's body sizes accurately have been demonstrated since the early 2000s, across many countries, cultures and child ages[4-6]. A recent study of over 16,000 children aged 2-9 years from eight European countries has shown that, among parents of overweight children, 63% perceived their children's weights as 'proper', independent of educational level[7]. Moreover, a meta-analysis of 69 studies on parental perceptions of children's body weights showed that half of the parents underestimated their children's weights.[8]

Most studies have applied a quantitative approach to describe parents' miscategorization of children's weight status; however, the underlying factors have not been identified conclusively[6]. To date, only two studies[9 10] have used in-depth interviews to examine how parents make sense of children's body weights and their health implications. In their study of low income mothers, Jain et al have shown that most mothers did not worry about their children's body weights if the children were active and socially accepted; the mothers, however, distrusted pediatric growth charts[9]. Misinterpretation of growth charts was also highlighted by Rich et al, who found that 80% of parents perceived their child as healthy although the child's weight was at the 95th percentile. These parents, notably, were aware of obesity related health risks[10]. More recently, focus groups revealed that, in assessing their children's body sizes, parents tend not to rely on clinical measurements; rather, they often compare their children visually to other children whose body sizes can be defined as extreme, thus skewing their perceptions of what a healthy body size is[11].

So far, existing research on parental perceptions of children's body weights has focused almost exclusively on mothers, not acknowledging the critical influence of other family members, such as fathers and grandparents [12]. Because family-based interventions have been proposed as the most effective approach to treating child obesity[13 14], knowledge about how other adult caretakers perceive and discuss young children's body weights will contribute to understanding familial barriers to treatment. To examine caretakers' perceptions of young children's body weights from a broader familial perspective, we designed this study to include family sets of mothers, fathers, and grandparents actively involved in taking care of preschool age children. As childhood obesity remains high among families with low socioeconomic status[15-17], and as it is more difficult to recruit and retain these families in intervention programs [18 19], we chose to target a low income population.

METHODS

Families of children aged 3-5 years from the Pacific Northwest (Eugene and Springfield metropolitan area, Oregon) were recruited in February – May 2011 through advertisements about the study, published in the job seekers' sections of Craigslist and local newspapers. The study's main research aim was to evaluate the role of grandparents in the development of preschoolers' lifestyles early in life, such that the active involvement of grandparents in family life (defined as spending time with the grandchild at least twice a month) was the primary criterion for inclusion in the study. Consequently, only families in which at least one parent and one grandparent were willing to be interviewed were included in the study. The other inclusion criteria specified that the child's age must be between 3-5 years, and that the child should have no underlying medical condition or disability which would affect his/her

weight. The study was approved by the Internal Review Board of the Oregon Social Learning Center.

In total, 49 family members (70% female) from sixteen families were interviewed. Participants' characteristics are summarized in Table 1. Due to the targeted recruitment process (ads in job advertisement sections) the sample displayed low levels of education and income; as many as 50% of parents were unemployed. Moreover, more than half of parents and two thirds of grandparents had overweight or obesity, according to WHO criteria[20]. Of the children, 56% were either overweight or obese (overweight: 85th percentile $\leq$ BMI < 95th percentile; obesity: BMI $\geq$ 95th percentile)[21-23]; those five who were categorized as obese were in the 95th, 96th, 98th (two children) and 99th percentiles for their BMI. The majority of children, parents and grandparents were Caucasian, reflecting the ethnicity profile of this region of the Pacific Northwest.

Insert Table 1 here.

Parents and grandparents were interviewed separately at the Oregon Social Learning Center. Free child care was provided on site, and the children were not present during the interviews. Each interviewed participant received compensation of $50 for participating in the study. Prior to the interview, parents and grandparents completed a comprehensive sociodemographic questionnaire. All the interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. The interviews, which were conducted by a single researcher (either the second or the last author), lasted 1.5-2.5 hours

and explored the different roles of family members in shaping a child's lifestyle. Before coding, all participant names were changed to ensure confidentiality.

This paper focuses on the parents' and grandparents' perceptions of young children's body weights, with particular emphasis on overweight and obesity from a life course perspective, parental responsibility, and contexts in which parents and grandparents discuss preschoolers' body weights. The main questions were: (1) Do you think that how much a child weighs matters? If yes, why? If not, why? (2) How much do you think that a child's weight is possible to control/controllable? If yes, what lifestyle choices do you think are the most important? How/when do you think they can be promoted, and who do you think can do that? And who in the family plays the most important role when it comes to influencing the child's weight? If no, what makes you think that way? (3) What do you think about your child's (or grandchild's) weight? As compared to his/her siblings, cousins, other children, to the child's parents. Are you concerned/not concerned? (4) What do you think that the parents of your grandchild think about your grandchild's weight (or grandparents of your child about your child's weight)? Examine: If there are two parents (grandparents) in the house, do they have the same opinion? (5) Do you talk about your child (grandchild's) weight with his/her grandparents (parents)? If yes, why, how? If not, why? Examine: If there are two parents in the house, which of them do you talk the most with and why? (6) Do you know if your child (grandchild) thinks about his/her weight? Probe: Does he/she ever comment on it? Did that happen in your presence? If yes, what did you say? If your child doesn't think about his/her weight, is it good or bad?

It should be noted that while all participants were asked the same main questions, the interview process allowed for fluidity, and follow-up questions were adapted according to

each participant's responses. Additionally, while the majority of data directly refer to the main questions listed, the present analysis includes pertinent comments the participants made throughout the interviews. The interviews were videotaped and transcribed in full. For this paper, transcript sections that related to the main questions were extracted and collated. The transcripts were then coded independently by the first and the last author, using a thematic discourse analysis approach. Discourse analysis is concerned with people's use of language to describe and make sense of their realities, and is an appropriate approach for qualitative studies that examine people's definitions of and spoken attitudes towards health issues[24]. Over several in-person meetings and email correspondence, the two coders compared and discussed their codes, to examine and resolve potential disagreements, and reach consensus on the clustering of codes into themes and on the grouping of themes under thematic categories.

RESULTS

The analysis yielded twelve major themes, clustered under four thematic categories: Perceptions of young children's body sizes, perceptions of the timeline of obesity, perceptions of parental responsibility and blame for childhood obesity, and perceptions of appropriate contexts for speaking about preschoolers' body weights. Examples of participant quotes from each of the thematic categories and their constituent themes are presented in table format (Tables 2-5). The complete sets of pertinent participant quotes are provided as supplemental material.

Insert Tables 2-5 here.

Perceptions of young children's body sizes (Table 2)

None of the participants used the words 'obese' or 'overweight' to describe the preschoolers whom the growth charts defined as such. The participants used a range of words to describe the body sizes of these preschoolers, including 'pudgy', 'chunky', 'solid', 'stout', 'chubby', 'stocky', 'big boned', and 'robust'. Several participants described the preschoolers as 'tall' and/or 'big for their age'. Notably, even the father of the heaviest child in the sample (99th percentile) described his child as 'a little on the heavy side'. Across the sample, including the parents and grandparents of normal weight children, the participants spoke of 'baby fat' as cute and healthy, and even as something to encourage. A few participants also spoke of children's higher percentiles on the growth charts (>90th percentile) in positive terms. The parents and grandparents of the overweight or obese preschoolers said their body weight was not worrisome because children go through 'growth spurts' and 'stretch out', such that their current excess weight will eventually convert into height.

Perceptions of the timeline of obesity (Table 3)

The participants spoke of obesity as a problem that may affect the preschoolers in the future, but not at present. Several participants indicated that a high body weight becomes problematic when the child reaches school age, particularly due to the risk of teasing, social exclusion, and bullying. Participants also said that a high body weight becomes problematic when it negatively affects the child's health, activities, behaviors, or mood. However, only one participant, whose child was in the 99th percentile for weight, said that she could notice the detrimental effects of the child's body weight at present. Thus, even when speaking of obesity in terms of impact on activity and health, the participants placed it outside the remit of the preschoolers' current experience. Participants also spoke of obesity as problematic due to its manifestations in adulthood, expressing that children's body weights and their eating and

exercise habits are important because they translate into ‘long lasting effects’ and ‘hav[ing] more trouble as an adult’.

Perceptions of parental responsibility and blame for childhood obesity (Table 4)

The participants identified parents as bearing primary responsibility for their children’s eating and exercise habits and for their body weights. Even those participants who spoke of body size as being affected by genetics asserted that parents can still influence their children’s body weights. Likewise, participants who mentioned that children may be overweight or obese due to a health condition (e.g. glandular dysfunction) said that parents are responsible for making sure the child’s medical problem is identified and resolved. The participants argued that parents are responsible for children’s body weights because they can control what their children eat, provide a healthy food environment at home, encourage their children to play outside and be active, and model healthy behaviors themselves.

The participants’ concepts of parental responsibility linked with their attitudes towards parental blame for childhood obesity. Several participants said they ‘judged’ parents whose children were obese; some even said that the parents of obese children were guilty of child neglect or abuse. Participants identified childhood obesity as being transmitted from one generation to the next, and as the result of ‘lazy’ parenting. Having an obese child was an outward sign of ‘failing’ as a parent, and one mother whose child was obese spoke of feeling blamed by clinicians for the child’s unexplained weight gain.

Perceptions of appropriate contexts for speaking about preschoolers' body weights (Table 5)

The participants described discussions of preschoolers' body weights as sensitive, often unnecessary, and potentially dangerous. The decision to engage in discussion about children's body weights was context dependent. Participants said they discussed their children's or grandchildren's body weights with them only if the children themselves raised the topic. Those participants whose preschoolers did not mention body weight said they had never discussed the issue with them. Several participants said that children of preschool age do not have body image concepts related to weight, and some cited their preschoolers' 'comfortable' behaviors as signaling a lack of concern with body image. A number of participants also said they avoided discussions of their preschoolers' body weights because these discussions could be harmful to the children's self-esteem and emotional wellbeing.

Notably, parents avoided discussing their children's body weights not only with the children themselves, but also with the children's grandparents; likewise, grandparents avoided discussing their grandchildren's body weights with the parents. Participants described these discussions as unnecessary when body weight was 'not an issue'. It was only when a child's body weight was perceived as problematic (in the case of the largest child in the sample) that parents and grandparents said they openly discussed it with each other. However, while most participants said they did not discuss body weights, they identified comments on children's 'healthy' appearance, growth, or muscle definition as appropriate and positive. Thus, although participants were reluctant to discuss the preschoolers' body weights, they did discuss the preschoolers' body sizes, with attention to how 'big' or 'strong' they were.

DISCUSSION

This study's findings suggest that the parents and grandparents of preschool age children face difficulties in identifying and discussing their preschoolers' overweight and obesity. Previous research has found that low income mothers are not concerned about preschoolers' overweight because they attribute body weight to genetic heredity[9]. However, in this study, the participants strongly endorsed the idea that parents bear primary responsibility for their children's eating and exercise habits and body weights. Nevertheless, the participants did not speak of their own children or grandchildren as overweight or obese. Notably, the participants' responses were consistent across the sample, and no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes.

Although the participants recognized obesity in general as a problem, they normalized their own children's and grandchildren's excess body weight as 'toddler pudge' or 'cute baby fat'. Like Jain et al [9], the authors of the present study suggest that the participants used these words not as euphemisms. The participants' consistent descriptions of children's higher body weights in positive terms – as 'cute' or 'healthy' – underscore the invisibility of preschoolers' obesity among lay persons. While participants said that preschoolers' body weights would be problematic if the child became 'visibly overweight', it was unclear how a 'visibly overweight' preschooler might look. As noted by Jones et al[11], when participants described obesity, it was through extreme cases of morbid obesity in later childhood or adulthood, such as older children who were 'miniatures of their parents' and contestants on *The Biggest Loser* who weighed 400 lbs.

Just as the participants visualized obesity through images of older children or adults, they also spoke of obesity as a problem that might affect children later in life, but not in preschool age. Participants spoke of suffering from teasing as a school age child, or from poor health as an adult, as the consequences that marked obesity as a problem. While participants did say that they would recognize a body weight problem if their preschoolers showed negative changes in behavior, activity, and mood, they did not name immediate health risks. The participants' depictions of obesity revealed a disconnect between knowledge and perception, previously shown by Rich et al[10]. Although they were aware of their preschoolers' growth chart percentiles, most participants did not link these percentiles with the categories of 'overweight' and 'obesity'. Likewise, although participants were aware of the health risks associated with obesity, they did not link their preschoolers' body weights with potential problems in the present tense.

While the participants did not associate obesity with early childhood, they did take responsibility for their preschoolers' body weights, and endorsed healthy eating and exercise practices. Along similar lines, however, the participants – including some whose children were classified as obese –blamed parents for childhood obesity. The participants' expressions of judgment toward the parents of obese children were aligned with broader social stigma attached to obesity[25 26]. Given the participants' stigmatizing attitudes, it is not surprising that they did not discuss their preschoolers' body weights with other family members. Although parents and grandparents did discuss children's body sizes through comments on how 'big', 'strong', 'healthy', or 'muscular' they were, most participants whose preschoolers were classified as overweight or obese did not discuss their body weights with family members, except when there was a perceived health problem. It is possible that, for the participants, discussion of body weight threatened to expose both themselves and their children to the risk

of blame, reduced self-esteem, and stigma attached to obesity. At the same time, it is important to note that, in deciding not to discuss body weight with their preschoolers (unless the children themselves raised the topic), the participants protected the children's body image and self-esteem. Moreover, like the parents described by Andreassen et al [27], those parents who recognized their children needed to lose weight attempted to enact weight loss strategies without explicitly mentioning weight. As previous studies have shown, parental comments about body weight are associated with body dissatisfaction and reduced self-esteem in children[28-30], such that the participants' stance on avoiding 'weight talk' with children was positive and should be encouraged.

The results of this study suggest that there are important gaps between clinical and lay perceptions of childhood obesity. While parents and grandparents are aware of their preschoolers' growth chart percentiles, these measures do not translate into recognition of young children's overweight or obesity. Without visual examples of how a preschool age child with overweight or obesity might look, such as sketched silhouettes or photographs at different weight categories[31-33], parents and grandparents continue to speak of children's excess weight as 'cute' or 'healthy', and perceive obesity as problematic only in later childhood or adulthood. Moreover, as parents and grandparents find it difficult to discuss young children's body weights with the children and with one another, this might affect the success of clinical interventions for childhood obesity, in which children's caretakers are forced into a new and uncomfortable discussion.

The clinical implications of this study include several components. In discussions with parents and grandparents of preschool age children, clinicians should clarify how children's fat distribution and body sizes typically change with age. Clinicians should also speak with

children's caretakers about the meaning of growth chart percentiles, and provide visual examples of how children might look in each of the percentile categories. Moreover, clinicians should emphasize the immediate problems associated with obesity in early childhood, such as hypertension (present at more than 50% of children with obesity), dyslipidemia, motor skill development and orthopedic complications[34-36].

The results also suggest that the countering of stigma should be an important part of the clinical management of childhood obesity. Given the social stigma and blame attached to parents of children with obesity, parents might contest a child's obesity diagnosis and be reluctant to take part in interventions to manage their child's condition[37]. It is therefore crucial that clinicians directly address stigma when they speak to parents, emphasizing that childhood obesity is not the parents' fault, and that managing this condition together is a positive step. Similarly, clinicians should avoid addressing parents of children with obesity in ways that might make them feel guilty or judged. Finally, it is important that clinicians frame discussions of children's body weights sensitively, and encourage parents and grandparents to address children's eating and physical activity practices through positive words and actions, without emphasizing body weight to the children themselves.

This study had some limitations. While the sample was the largest ever reported in a qualitative investigation of parents' and grandparents' perceptions and attitudes concerning preschoolers' body weights, the children themselves were not interviewed. Moreover, the sample primarily consisted of families of Caucasian origin, representing the ethnic distribution of the population in Eugene and Springfield, Oregon. Thus, the influence of cultural background on perceptions of children's body sizes, which several studies have identified as important[5 16 26], could not be investigated. Additionally, as several participants

were single mothers, the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes. Finally, while a number of families had a full or nearly-full set of grandparents participating, some had only one or two grandparents participating, due to circumstances such as the other grandparents' living outside the area.

CONCLUSION

This study was the first to focus on both parents' and grandparents' perceptions of preschoolers' body weights, and is the largest qualitative study to date to include a mixed familial sample of adult caretakers of preschool age children. The study's results demonstrate that while parents and grandparents recognize childhood obesity as problematic, endorse healthy eating and exercise habits, and take responsibility for children's body weights, they find it difficult to recognize and discuss young children's overweight and obesity. The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

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CONTRIBUTORSHIP STATEMENT

Karin Eli: Dr Eli coded the interviews and analyzed them together with Dr Nowicka, wrote the manuscript, and approved the final manuscript as submitted.

Kyndal Howell: Ms Howell coordinated the data collection, critically reviewed the manuscript, and approved the final manuscript as submitted.

Philip A. Fisher: Professor Fisher contributed to the design of the study, critically reviewed the manuscript and approved the final manuscript as submitted.

Paulina Nowicka: Dr Nowicka conceptualized and designed the study, coordinated and supervised data collection and analysis, coded the interviews and analyzed them together with Dr Eli, critically reviewed the manuscript and approved the final manuscript as submitted.

COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

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DATA SHARING

Online supplementary table S6-9 containing complete sets of pertinent participant quotes. No additional data available.

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Table 1. Descriptive statistics of the sample

	Child (n=16)	Parent (n=22)	Grandparent (n=27)
Age (mean in years, range)	4.6 (3.1-5.7)	32. 2 (22.7-49.5)	56.9 (43.0-77.9)
Gender:			
Female	8 (50%)	14 (64%)	21 (78%)
Male	8 (50%)	8 (36%)	6 (22%)
Racial background:			
Euro-American/Caucasian	11 (68%)	21 (95%)	23 (84%)
Native American	0	1 (5%)	0
Asian	0	0	1 (4%)
African-American	0	0	1 (4%)
Mixed	5 (32%)	0	2 (8%)
BMI (mean, range)	17.7 (14.3-21.5)	26.8 (16.1-39.1)	29.1 (16.1-49.4)
Weight status:			
Underweight	0	2 (9%)	1 (3%)
Normalweight	7 (44%)	8 (36%)	8 (30%)
Overweight	4 (25%)	6 (27%)	10 (37%)
Obese	5 (31%)	6 (27%)	8 (30%)
Highest school grade completed	n/a		
High school		8 (82%)	20 (74%)
College/University		4 (18%)	7 (26%)
Working situation	n/a		
Full time		7 (32%)	8 (30%)
Part time		4 (18%)	4 (15%)

Not employed*		11 (50%)	15 (55%)
Annual household income	n/a		
Less than 14,999 USD		8 (36%)	7 (26%)
15,000-24,999 USD		6 (27%)	6 (22 %)
25,000 – 39,999 USD		4 (18%)	6 (22 %)
More than 40, 000 USD		4 (18%)	8 (30 %)

* Main reasons for unemployment among parents were child care, education and not finding work; among grandparents, unemployment was due to not finding work, going on retirement, or retiring due to personal health issues.

Table 2. Perceptions of young children's body sizes. Examples of participant quotes from each of the thematic categories and their constituent themes. The complete sets of pertinent participant quotes are provided as supplemental material.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age.
1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight.
1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts.
1.8 Gp01P1 (Mother) ***: she's also getting really tall, but I have a concern that she's getting a little pudgier (…) She's pudgy, she is a little overweight and we're working on it.
1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never been concerned about her weight.
1.16 Gp11P1 (Mother) ***: she has always been at the 90 or 100 percentile with her age group but in weight and always under in height. She has always been kind of short and stocky.
Theme 2: 'Baby fat' is cute and healthy
2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know.
2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut.
2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles.
2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby.
2.13 Gp07G1 (Mother's mother) *: [My daughter] was the only one, like I said that [she] was in the 95th percentile. She was the only one I ever wondered about, but she was cute chubby, that I didn't.
Theme 3: Children go through 'growth spurts' and 'stretching out'
3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then they just, you know they start doing this (makes expanding outward hand movements) and

then they just grow like a tree, then they lean up.

3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it.

3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height.

3.9 Gp11G1 (Mother's mother) ***: we've never been concerned when she goes through those eating phases because we know it's her growth spurt and it's not like she's gaining weight this way (out) growing this way (up).

Table 3. Perceptions of the timeline of obesity, examples of participant quotes from each of the thematic categories and their constituent themes. The complete sets of pertinent participant quotes are provided as supplemental material.

Theme 4: A high body weight becomes problematic later in childhood
4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy. 4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care. 4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating." 4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.
Theme 5: Children's body weight becomes problematic when it affects their activities or health
5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that. 5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine. 5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern.
Theme 6: Obesity becomes problematic in adulthood
6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age. 6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole life. 6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Table 4. Perceptions of parental responsibility and blame for childhood obesity. Examples of participant quotes from each of the thematic categories and their constituent themes. The complete sets of pertinent participant quotes are provided as supplemental material.

Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control.
7.4 Gp02G1 (Father's mother) *: I think that if you buy a lot of junk food and that's what you have: soda, chips and things like that… and that's what your child is mostly eating, and they're getting overweight from that, then yes, you have a lot of control.
7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem.
7.11 Gp04G2 (Mother's father) *: I see a lot of kids just go and play their computer games and TVs sitting down eating chips, and that's not the kid's fault.
7.13 Gp12G3 (Father's mother) ***: If you are active, the kids will be active. If you are into nutrition, the kids will be into nutrition.
7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.
Theme 8: The parents of obese children are blamed by themselves and by others
8.1 Gp042 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me.
8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents.
8.4 Gp13P1 (Mother) ***: If I had a fat kid, it would be looking at me every day, "I'm a failure. I'm doing something wrong."
8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent.
8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.

Table 5. Perceptions of appropriate contexts for speaking about preschoolers' body weights. Examples of participant quotes from each of the thematic categories and their constituent themes. The complete sets of pertinent participant quotes are provided as supplemental material.

Theme 9: Parents and grandparents do not discuss preschoolers' body weights with them, unless the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat". 9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level. 9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old".
Theme 10: It's acceptable to discuss how big or strong preschoolers are.
10.1 Gp12G2 (Father's father) ***: I can't say that it's [the child's weight] ever come up. Other than to say that "he's sure getting heavy", in growing up. 10.2 Gp12G3 (Father's mother) ***: We talk about how fit he is. He's a very fit child. 10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, "Yeah, look at his muscles". 10.4 Gp11G1 (Mother's mother) ***: we talk about her weight and her height a lot because she's a big girl, but not that we're concerned. 10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.
Theme 11: Discussing preschoolers' body weights can affect their self-esteem negatively
11.1 Gp03P1 (Mother) ***: So when he [the child] asks me stuff like that [about his weight] we talk about being strong versus being big and not strong. So it's all about trying to be strong and healthy so, that's what we talk about. 11.2 Gp03P2 (Father) ***: By far I don't think that parents should focus on it [weight] because then it will become a focal point for the child. 11.3 Gp01G1 (Father's mother) ***: I wouldn't sit with an iron fist and say, "You can't have that because it will make you fat." Because that effects their mental (wellbeing). 11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything. 11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too

much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.
Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem
12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her. 12.5 Gp12G2 (Father's father) ***: I don't think about what his parents think about his weight. I know [his father] is certainly concerned with nutrition 12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet. 12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it. 12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.

Table 6. Perceptions of young children's body sizes; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age.
1.2 Gp07G1 (Mother's mother) *: There are going to be kids, that are just by their DNA and genetics, that are a chunkier body build, stuff like that.
1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight.
1.4 Gp13G1 (Mother's mother) ***: [My daughter] was a larger child, she was never 'obese' or fat or whatever, she was never teased or anything like that.
1.5 Gp14P1 (Mother) **: I think [my daughter] has got a big frame, she has big bones.
1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts.
1.7 GP10G4 (Father's stepmother) **: But if a child is just built bigger, then you need to let that go and just realize that's how a child is made.
1.8 Gp01P1 (Mother) ***: she's also getting really tall, but I have a concern that she's getting a little pudgier (…) She's pudgy, she is a little overweight and we're working on it.
1.9 Gp03G01 (Mother's mother) ***: [My grandson] has a little bit of a weight issue.
1.10 Gp10G4 (Father's stepmother) **: I think he is a short little toddler. He is a little bit round.
1.11 Gp10G1 (Father's mother) **: Our middle son, when he was in 4th or 5th grade, he was a little chunky (…) He was 10.6 [lbs] when he was born and just a super stout, robust baby the minute he was born.
1.12 Gp13G2 (Mother's father) ***: He's not overweight at all, he's almost skinny, but he's tall, he's a tall kid. He's always been big and tall for his age.
1.13 Gp16P1 (Father) **: I think it's just, he's a big boy, yeah they are big for their age.
1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never

been concerned about her weight. 1.15 Gp10P1 (Mother) **: I think he has a good amount of weight on his bones. And he is normally big for his age. 1.16 Gp11P1 (Mother) ***: she has always been at the 90 or 100 percentile with her age group but in weight and always under in height. She has always been kind of short and stocky. 1.17 Gp03G1 (Mother's mother) ***: he's very big for his age. He's tall. People think he's six, he's only five.
Theme 2: 'Baby fat' is cute and healthy
2.1 Gp02P1 (Father) *: she's got some cute baby fat but it's nothing to be worried about. 2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know. 2.3 Gp05P3 (Mother's mother) *: You know, she's got that little girl pudge on her, that's so cute. Actually, I think a couple times this past year, I thought she might be a little underweight, because she didn't seem to have that little toddler pudge. 2.4 Gp06P1 (Mother) **: I don't worry about his weight right now, it's really hard at this age because I mean all of them are kinda pudgy. 2.5 Gp07P1 (Mother) *: She's well within range, she's got that cute little extended abdomen of a toddler, you know. 2.6 Gp10G1 (Father's mother) **: our kids were always in the 95th percentile… robust kids. I think he seems very healthy. 2.7 Gp13G1 (Mother's mother) ***: I think he's in the 50th percentile for weight and over a 100th for height. 2.8 Gp14P1 (Mother) **: I think she is fine, she does have a little belly, but it's not anything I would worry about or say anything. (…) I think she is healthy, I think she is just a big strong girl. 2.9 Gp10P1 (Mother) **: when he got chubby when he was younger, they [grandparents] just thought it was the cutest thing. You know… they are like… they just want to pinch his cheeks. 2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut. 2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles. 2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby. 2.13 Gp07G1 (Mother's mother) *: [My daughter] was the only one, like I said that [she] was in the 95th percentile. She was the only one I ever wondered about, but she was cute chubby, that I

didn't.
Theme 3: Children go through 'growth spurts' and 'stretching out'
3.1 Gp10P1 (Mother) **: I really liked how chubby he was. It was really nice to cuddle. And I didn't worry about that. Because I figure when he would grow, that weight would just stretch out. 3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then they just, you know they start doing this (makes expanding outward hand movements) and then they just grow like a tree, then they lean up. 3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it. 3.4 Gp11P1 (Mother) ***: When she starts getting kind of chunky I start waiting for that growth spurt because if it doesn't hit soon I get worried and start watching what she's eating. 3.5 Gp12P2 (Father) ***: When they're growing, they grow up and they grow out. 3.6 Gp14G1 (Mother's mother) **: I know sometimes kids pudge and then they stretch out. 3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height. 3.8 Gp01P1 (Mother) ***: kids go through different phases and right now is a pudgy stage**.** 3.9 Gp11G1 (Mother's mother) ***: we've never been concerned when she goes through those eating phases because we know it's her growth spurt and it's not like she's gaining weight this way (out) growing this way (up). 3.10 Gp14G1 (Mother's mother) **: I know when [my daughter] was in 5th grade, she got heavier, and then she stretched out in high school. 3.11 Gp06G1 (Mother's mother) **: We can tell when he's about to go through a growth-spurt he gets that little teeny tummy.

Table 7. Perceptions of the timeline of obesity; the complete sets of pertinent participant quotes.

Theme 4: A high body weight becomes problematic later in childhood
4.1 Gp02G1 (Father's mother) *: I think that when you see kids that are very overweight at 5, 7 and on up, that there's something going on with their eating. I think that when you have small children, like babies, who are plump, healthy babies, that's a whole different story. But I think that when they're older there's something to it. 4.2 Gp10G2 (Father's father) **: Someone with a child [my grandson's] age… he is just 3… I

don't know what data shows. Is there any issue with childhood obesity at that age? I don't know. When they talk about childhood obesity, later on, because humans go through all these different growth spurts

4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy.

4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care.

4.5 Gp01G1 (Mother's mother) ***: when they [obese children] get to school they're going to be teased (…) they're going to be the last ones picked for teams in school.

4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating."

4.7 Gp15G1 (Mother's mother) *: as he starts to enter the schooling system that [weight] isn't an additional emotional piece of baggage that he has to carry… being ostracized in the area or personally feeling like different.

4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.

Theme 5: Children's body weight becomes problematic when it affects their activities or health

5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that.

5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine.

5.3 Gp05P1 (Mother) *: if the weight is causing problems and issues in their body and … then that's a problem.

5.4 Gp08P1 (Mother) *: If she starts getting like, even more heavier, where I'm noticing maybe that she's depressed, or gaining weight more, or where if I see it affecting the way she looks at herself or her behavior with other kids, her activities, then I would be concerned.

5.5 Gp10P2 (Father) **: If a kid is too fat to do much then it is not going to be healthy.

5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern.

5.7 Gp14P1 (Mother) **: As long as they are healthy [weight is not an issue]; if you can visibly see that a child is overweight, and not getting enough activity, then that would matter.
Theme 6: Obesity becomes problematic in adulthood
6.1 Gp01P1 (Mother) ***: I do think that a child's weight matters. Just because you don't want them to develop unhealthy habits early because it's going to follow them for the rest of their life. 6.2 Gp01G2 (Father's mother) ***: I don't like seeing a child that age to start out being obese. It carries on with them so… I worry about healthy eating with them a little bit because of that. 6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.4 Gp06P1 (Mother) **: what motivated me is looking at my child and what I want him – who I want him to be in 25 years as a young man. 6.5 Gp10G2 (Father's stepfather) **: If a child is not getting proper nutrition, especially during certain critical stages, you can have all kinds of long lasting effects, and yes that does speak to weight, certainly. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age. 6.7 Gp14G2 (Father's mother) **: I think [weight matters] because what they learn as a child can carry on through their life. What they learn to eat. 6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole life. 6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Table 8. Perceptions of parental responsibility and blame for childhood obesity; the complete sets of pertinent participant quotes.

Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control. 7.2 Gp01P1 (Father) ***: the parents and grandparents have control of what the children eat. 7.3 Gp02P1 (Father) *: I think with proper feeding and keeping the proper foods in the house you can control the weight. If you have a bunch of snack foods and junk food all throughout the

house and people sit around and watch TV and eat food, you're controlling the weight there and not in a good way – you're going to get heavier.

7.4 Gp02G1 (Father's mother) *: I think that if you buy a lot of junk food and that's what you have: soda, chips and things like that… and that's what your child is mostly eating, and they're getting overweight from that, then yes, you have a lot of control.

7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem.

7.6 Gp06G1 (Mother's mother) **: Just make them [fast foods] a treat, a special treat. Not because you are tired and don't want to cook, because then that becomes too easy for them.

7.7 Gp09G1 (Mother's mother) *: I think if you sit down and eat as a family, you're not sitting in front of the TV feeding your face, so you're going to limit the amount… you're talking so you're not eating as much.

7.8 Gp13G1 (Mother's mother) ***: Yeah, a child's weight is easy to control, if you control what goes in and out of their mouth.

7.9 Gp14P1 (Mother) **: She does like to eat, you could hand her a bag of cookies and put her in front of the TV, and she might sit there all day. Or she might not, I don't know, I've never done that. I could see if some parents were lazy, that might be an easy option. I think parents have a lot of influence on the weight of the child.

7.10 Gp13P1 (Mother) ***: They (parents) need to monitor what their child's eating and make sure they're being active.

7.11 Gp04G2 (Mother's father) *: I see a lot of kids just go and play their computer games and TVs sitting down eating chips, and that's not the kid's fault.

7.12 Gp09P1 (Mother) *: three year-olds should be running around, they should be active and they shouldn't be sitting on the couch eating Cheetos all day. So that's not a very healthy lifestyle and to each their own with parenting but in my personal opinion, I think it can be controlled.

7.13 Gp12G3 (Father's mother) ***: If you are active, the kids will be active. If you are into nutrition, the kids will be into nutrition.

7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.

7.15 Gp15P1 (mother) *: some kids will be more susceptible to gaining weight than others (…) but I think it's totally controllable what you're going to feed them.

Theme 8: The parents of obese children are blamed by themselves and by others

8.1 Gp04P2 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me.
8.2 Gp05G3 (Mother's mother) *: Sometimes I see heavy parents who don't seem to exercise, and don't seem to eat right. And I see their children, and I say, "Oh my gosh, they are passing that down to the next generation."
8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents.
8.4 Gp13P1 (Mother) ***: If I had a fat kid, it would be looking at me every day, "I'm a failure. I'm doing something wrong."
8.5 Gp04P2 (Mother) *: I think most adults who are overweight can probably attribute it to their parents.
8.6 Gp11P1 (Mother) ***: I hate those parents who are like, "Well, she'll only eat at McDonald's." "No! She won't. You let her only eat at McDonald's. Or you let her only eat fruit snacks."
8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent.
8.8 Gp13G2 (Mother's father) ***: to me, seeing an overweight six year old, it's like what is going on here? I think it's the adults, the parents, guardians, are the ones who have the most effect on that.
8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.
8.10 Gp03P1 (Mother) ***: They [medical staff] kept asking me what I was feeding him because he was getting so chubby (…) I kept thinking, "What am I doing wrong?"

Table 9. Perceptions of appropriate contexts for speaking about preschoolers' body weights; the complete sets of pertinent participant quotes.

Theme 9: Parents and grandparents do not discuss preschoolers' body weights with them, unless the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat".
9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he

saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level.

9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old".

9.4 Gp09P1 (Mother) *: I don't like this but she does have a fascination with my scale—she doesn't know what the numbers mean but she likes to get on there and I'll be like, "Oh my God, you gained a pound!" and she'll get excited (…) but I think she's still too young to know what (body) image is.

9.5 Gp01G1 (Father's mother) ***: I think she is totally oblivious to it [weight] which is good in a way.

9.6 Gp02P1 (Father) *: I don't think she's noticed any difference between the her and her sister… she's not really conscious of it yet, she is just her.

9.7 Gp10P1 (Mother) **: I don't think he thinks about his weight. We never talk about it. It is almost like nonexistent, especially at his age

9.8 Gp05P3 (Mother's mother) *: She's very comfortable with her body. (…) I think she's aware that she has a body, and that it functions. (…) But I don't think she's really aware of, "oh, I'm too skinny, I'm too fat."

9.9 Gp14P1 (Mother) **: I don't think she thinks anything of it. She is comfortable walking around the house with no clothes on. I don't think she thinks anything of it, she has never said anything.

Theme 10: It's acceptable to discuss how big or strong preschoolers are

10.1 Gp12G2 (Father's father) ***: I can't say that it's [the child's weight] ever come up. Other than to say that "he's sure getting heavy", in growing up.

10.2 Gp12G3 (Father's mother) ***: We talk about how fit he is. He's a very fit child.

10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, "Yeah, look at his muscles".

10.4 Gp11G1 (Mother's mother) ***: we talk about her weight and her height a lot because she's a big girl, but not that we're concerned.

10.5 Gp10G1 (Father's mother) **: We might have in passing commented to how healthy he seems. I mean, just something sort of innocuous and nothing really of concern.

10.6 Gp04P1 (Father) *: We talk about how he's growing and how he weighed and checked up.

10.7 Gp04P2 (Mother) *: He [the child] just thinks it's a cool number. He gets excited to get weighed, "am I getting bigger?"

10.8 Gp04G3 (Mother's mother) *: it's been awhile since we've talked about it. We used to talk

about it every time he came back from the doctor. The percentile he was in and such.

10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.

10.10 Gp07G1 (Mother's mother) *: She's [the child's mother] never, that I can think has ever expressed any concern about her weight. She makes comments, like "Boy, I can tell [the child] must be going through a growth spurt."

10.11 Gp09P1 (Mother) *: They [grandparents] always joke and say that she looks just like Daddy because Daddy's kind of tall and lean.

Theme 11: Discussing preschoolers' body weights can affect their self-esteem negatively

11.1 Gp03P1 (Mother) ***: So when he [the child] asks me stuff like that [about his weight] we talk about being strong versus being big and not strong. So it's all about trying to be strong and healthy so, that's what we talk about.

11.2 Gp03P2 (Father) ***: By far I don't think that parents should focus on it [weight] because then it will become a focal point for the child.

11.3 Gp01G1 (Father's mother) ***: I wouldn't sit with an iron fist and say, "You can't have that because it will make you fat." Because that effects their mental (wellbeing).

11.4 Gp01P1 (Mother) ***: I have a concern that she's getting a little pudgier so I'm like, "If you're going to do milk, please go down to the skim or 1%, lay off the juice or dilute it", to start doing the things that she won't notice.

11.5 Gp14G2 (Father's mother) **: I don't think a parent should badger them about their eating habits, I think there are ways to slowly and gradually make changes to lose weight rather than pointing it out.

11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything.

11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.

Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem

12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her.

12.2 GP10G4 (Stepmother of the father) **: I never talk about his [the child's] weight.

12.3 Gp06P1 (Mother) **: No, I don't think she [grandmother] thinks he's at an unhealthy

weight. (…) She's never said anything to me.

12.4 Gp12G3 (Father's mother) ***: I think they [the parents] should be very pleased with it [the child's weight], but I don't know.

12.5 Gp12G2 (Father's father) ***: I don't think about what his parents think about his weight. I know [his father] is certainly concerned with nutrition

12.6 Gp07P1 (Mother) *: I think that my mom probably would think it [the child's weight] doesn't matter. (…) [I]t's never something we discuss.

12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet.

12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it.

12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.

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"A little on the heavy side": A Qualitative Analysis of Parents' and Grandparents' Perceptions of Preschoolers' Body Weights

Karin Eli [1], DPhil, Kyndal Howell [2], BS, Philip A. Fisher, PhD [2], Paulina Nowicka, PhD [1,3]

Affiliations: [1] Unit for Biocultural Variation and Obesity, Institute of Social and Cultural Anthropology, University of Oxford, Oxford, UK; [2] Department of Psychology, University of Oregon, Eugene, USA; [3] Unit of Pediatrics, Department of Clinical Sciences, Intervention and Technology, Karolinska Institute, Stockholm, Sweden

Address correspondence to:
Paulina Nowicka, Division of Pediatrics, Department of Clinical Science, Intervention and Technology (CLINTEC), Karolinska Institutet, 141 86 Stockholm, Sweden, Tel: +46 46 70 454 88 33, Email: paulina.nowicka@ki.se

Abstract

OBJECTIVES: Parents' difficulties in perceiving children's weight status accurately pose a barrier for family-based obesity interventions; however, the factors underlying weight misinterpretation still need to be identified. This study's objective was to examine parents and grandparents' perceptions of preschoolers' body sizes. Interview questions also explored perceptions of parental responsibility for childhood obesity and appropriate contexts in which to discuss preschoolers' weights.

DESIGN: Semi-structured interviews, which were videotaped, transcribed, and analyzed qualitatively.

SETTING: Eugene and the Springfield metropolitan area, Oregon, USA

PARTICIPANTS: Families of children aged 3-5 years were recruited in February – May 2011 through advertisements about the study, published in the job seekers' sections of Craigslist and local newspapers. 49 participants (22 parents and 27 grandparents, 70% women, 60% with overweight/obesity) from sixteen low-income families of children aged 3-5 years (50% girls, 56% with overweight/obesity) were interviewed.

RESULTS: There are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents were aware of their preschoolers' growth chart percentiles, these measures did not translate into recognition of children's overweight or obesity. The participants spoke of obesity as a problem that may affect the children in the future, but not at present. Participants identified childhood obesity as being transmitted from one generation to the next, and stigmatized it as resulting from 'lazy' parenting. Parents and grandparents avoided discussing the children's weights with each other and with the children themselves.

CONCLUSIONS: The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

Strengths and limitations of this study

- This study's sample is the largest ever reported in a qualitative investigation of family members' perceptions of preschoolers' body weights.
- While most previous studies focused only on mothers' perceptions of their preschoolers' body weights, this study included mothers, fathers, grandmothers, and grandfathers, recognizing that various adult family members influence young children's body image, eating, and exercise habits.
- Although low-income participants tend to be difficult to reach, the study successfully recruited a predominantly low-income sample.
- The sample primarily consisted of families of Caucasian origin, and thus did not allow for an investigation of the influence of cultural background on perceptions of children's body sizes.
- As several participants were single mothers, the number of fathers was not high enough to enable an assessment of potential differences between fathers' and mothers' perceptions.

INTRODUCTION

While there is growing evidence of the superior effectiveness of lifestyle interventions initiated early in childhood[1-3], one of the main barriers in conducting such interventions is parents' lack of recognition of, or concern about, obesity in children. Parents' difficulties in perceiving children's body sizes accurately have been demonstrated since the early 2000s, across many countries, cultures and child ages[4-6]. A recent study of over 16,000 children aged 2-9 years from eight European countries has shown that, among parents of overweight children, 63% perceived their children's weights as 'proper', independent of educational level[7]. Moreover, a meta-analysis of 69 studies on parental perceptions of children's body weights showed that half of the parents underestimated their children's weight.[8]

Most studies have applied a quantitative approach to describe parents' miscategorization of children's weight status; however, the underlying factors have not been identified conclusively[6]. To date, only two studies[9 10] have used in-depth interviews to examine how parents make sense of children's body weights and their health implications. In their study of low income mothers, Jain et al have shown that most mothers did not worry about their children's body weights if the children were active and socially accepted; the mothers, moreover, distrusted pediatric growth charts, and attributed childhood obesity to genetics, rather than to factors modifiable in the home environment [9]. Misinterpretation of growth charts was also highlighted by Rich et al, who found that 80% of parents perceived their child as healthy although the child's weight was at the 95th percentile. These parents, notably, were aware of obesity related health risks[10]. More recently, focus groups revealed that, in assessing their children's body sizes, parents tend not to rely on clinical measurements; rather, they

often compare their children visually to other children whose body sizes can be defined as extreme, thus skewing their perceptions of what a healthy body size is[11].

So far, existing research on parental perceptions of children's body weights has focused almost exclusively on mothers, and has not examined the critical influence of other family members, such as fathers and grandparents [12]. Because family-based interventions have been proposed as the most effective approach to treating child obesity[13 14], knowledge about how other adult caretakers perceive and discuss young children's body weights will contribute to understanding familial barriers to treatment. Moreover, the fostering of sensitive and non-judgmental communication about children's eating practices and body sizes is important for the prevention of body dissatisfaction and disordered eating in childhood and adolescence[15 16]. To examine caretakers' perceptions of young children's body weights from a broader familial perspective, we designed this study to include family sets of parents and grandparents actively involved in taking care of preschool age children. This study was part of a larger research project, whose overall aim was to evaluate the role of grandparents in the development of preschoolers' lifestyle early in life. The larger research project yielded rich material on the participants' perceptions of young children's body weights, and we found this topic merited dedicated discussion apart from the larger study.

As childhood obesity remains high among families with low socioeconomic status[17-19], and as it is more difficult to recruit and retain these families in intervention programs [20 21], we chose to target a low income population.

METHODS

Families of children aged 3-5 years from the Pacific Northwest (Eugene and Springfield metropolitan area, Oregon) were recruited in February – May 2011 through advertisements about the study, published in a local newspaper and the volunteers' and job seekers' sections of Craigslist (the most widely used classified advertisement website in the United States). The active involvement of grandparents in family life (defined as spending time with the grandchild at least twice a month) was the primary criterion for inclusion in the study. Consequently, only families in which at least one parent and one grandparent were willing to be interviewed were included in the study. The other inclusion criteria specified that the child's age must be between 3-5 years, and that the child should have no underlying medical condition or disability which would affect his/her weight. All families who contacted the study coordinator and were found to fulfill the inclusion criteria were recruited to the study. The study was approved by the Internal Review Board of the Oregon Social Learning Center. When the participants first met with the researchers, and before the interviews took place, the researchers verbally explained the informed consent forms to each participant, and answered any questions participants had . If the parents/grandparents agreed to participate, they were asked to read and sign the written project description and project consent forms. The families received a copy of the written study description and informed consent forms.

Parents and grandparents were interviewed separately at the Oregon Social Learning Center. Free child care was provided on site, and the children were not present during the interviews. Each interviewed participant received compensation of $50 for participating in the study. Prior to the interview, parents and grandparents completed a comprehensive sociodemographic questionnaire routinely used in research projects involving families at the Oregon Social Learning Center; the questionnaire included items concerning family composition, parental education, employment status, and living conditions. All the

interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. The weight status using height and weight was not calculated prior the interview, thus the interviewer and the family members were not informed about the child's or family members' weight status. The interviews, which were conducted by a single researcher (either the second or the last author), lasted 1.5-2.5 hours and explored the different roles of family members in shaping a child's lifestyle. Before coding, all participant names were changed to ensure confidentiality.

This paper focuses on the parents' and grandparents' perceptions of young children's body weights, with particular emphasis on overweight and obesity, parental responsibility for childhood obesity, and contexts in which parents and grandparents discuss preschoolers' body weights. The main questions were: (1) Do you think that how much a child weighs matters? If yes, why? If not, why? (2) How much do you think that a child's weight is possible to control/controllable? If yes, what lifestyle choices do you think are the most important? How/when do you think they can be promoted, and who do you think can do that? And who in the family plays the most important role when it comes to influencing the child's weight? If no, what makes you think that way? (3) What do you think about your child's (or grandchild's) weight? As compared to his/her siblings, cousins, other children, to the child's parents. Are you concerned/not concerned? (4) What do you think that the parents of your grandchild think about your grandchild's weight (or grandparents of your child about your child's weight)? Examine: If there are two parents (grandparents) in the house, do they have the same opinion? (5) Do you talk about your child (grandchild's) weight with his/her grandparents (parents)? If yes, why, how? If not, why? Examine: If there are two parents in the house, which of them do you talk the most with and why? (6) Do you know if your child

(grandchild) thinks about his/her weight? Probe: Does he/she ever comment on it? Did that happen in your presence? If yes, what did you say? If your child doesn't think about his/her weight, is it good or bad?

It should be noted that while all participants were asked the same main questions, the interview process allowed for fluidity, and follow-up questions were adapted according to each participant's responses. Additionally, while the majority of data directly refer to the main questions listed, the present analysis includes pertinent comments the participants made throughout the interviews. The interviews were videotaped and transcribed in full; videotaping allowed for the inclusion of non-verbal expressions in the transcriptions. For this paper, transcript sections that related to the main questions were extracted and collated. The transcripts were then coded independently by the first and the last author, using a thematic discourse analysis approach. Discourse analysis is concerned with people's use of language to describe and make sense of their realities, and is an appropriate approach for qualitative studies that examine people's definitions of and spoken attitudes towards health issues[22]. Thematic analysis facilitates the identification of patterns in qualitative data, and therefore allowed the researchers to delineate themes across the data set[23]. Over several in-person meetings and email correspondence, the two coders compared and discussed their codes, to examine and resolve potential disagreements, and reach consensus on the clustering of codes into themes and on the grouping of themes under thematic categories.

RESULTS

In total, 49 family members (70% female) from sixteen families were interviewed. The sample included 22 parents and 27 grandparents – subsample sizes suitable for data saturation [24]. Seven families consisted of single parent with sole responsibility for the child (five single

mothers and two single fathers). In ten families, only one grandparent was interviewed; in two families, two grandparents were interviewed; in three families, three grandparents were interviewed; and in one family, four grandparents were interviewed. In five of the families, all grandparents who had contact with the grandchild were interviewed. The most common reason for not being able to include full sets were the other grandparents' residing outside the study area.

Participants' characteristics are summarized in Table 1. All data refer to parents and grandparents who were interviewed as part of the study. Due to the targeted recruitment process (ads in job advertisement sections) the sample displayed low levels of education and income; as many as 50% of parents were unemployed. The majority of children, parents and grandparents were Caucasian, reflecting the ethnicity profile of this region of the Pacific Northwest.

All the interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. These measurements were taken in order to contextualize the participants' stated perceptions of and attitudes toward childhood overweight/obesity and associated lifestyle factors. The participants' and the children's BMI statuses were not calculated prior to the interviews, so as not to bias the interview process. Thus, the interviewers and the participants were not informed about the child's or any of the adult family members' weight status. More than half of parents and two thirds of grandparents had overweight or obesity, according to World Health Organization criteria[25]. Of the children, 56% were either overweight or obese (overweight: 85th percentile < Body Mass Index (BMI)

< 95th percentile; obesity: BMI ≥ 95th percentile) [26-28]; those five who were categorized as obese were in the 95th, 96th, 98th (two children) and 99th percentiles for their BMI.

Insert Table 1 here.

The analysis yielded twelve major themes, clustered under four thematic categories: Perceptions of young children's body sizes, perceptions of the timeline of obesity, perceptions of parental responsibility and blame for childhood obesity, and perceptions of appropriate contexts for speaking about preschoolers' body weights. While the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes, it is possible to say that the participants' responses were consistent across the sample, and no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes. Examples of participant quotes from each of the thematic categories and their constituent themes are presented in table format (Tables 2-5). The complete sets of pertinent participant quotes are provided as supplemental material (Supplementary Tables 1-4).

Insert Tables 2-5 here.

Perceptions of young children's body sizes (Table 2)

None of the participants used the words 'obese' or 'overweight' to describe the preschoolers whom the growth charts defined as such. The participants used a range of words to describe the body sizes of these preschoolers, including 'pudgy', 'chunky', 'solid', 'stout', 'chubby', 'stocky', 'big boned', and 'robust'. Several participants described the preschoolers as 'tall'

and/or 'big for their age'. Notably, even the father of the heaviest child in the sample (99th percentile) described his child as 'a little on the heavy side'. Across the sample, including the parents and grandparents of normal weight children, the participants spoke of 'baby fat' as cute and healthy, and even as something to encourage. A few participants also spoke of children's higher percentiles on the growth charts (>90th percentile) in positive terms. The parents and grandparents of the overweight or obese preschoolers said their body weight was not worrisome because children go through 'growth spurts' and 'stretch out', such that their current excess weight will eventually convert into height.

Perceptions of the timeline of obesity (Table 3)

The participants spoke of obesity as a problem that may affect the preschoolers in the future, but not at present. Several participants indicated that a high body weight becomes problematic when the child reaches school age, particularly due to the risk of teasing, social exclusion, and bullying. Participants also said that a high body weight becomes problematic when it negatively affects the child's health, activities, behaviors, or mood. However, only one participant, whose child was in the 99th percentile for weight, said that she could notice the detrimental effects of the child's body weight at present. Thus, even when speaking of obesity in terms of impact on activity and health, the participants placed it outside the remit of the preschoolers' current experience. Participants also spoke of obesity as problematic due to its manifestations in adulthood, expressing that children's body weights and their eating and exercise habits are important because they translate into 'long lasting effects' and 'hav[ing] more trouble as an adult'.

Perceptions of parental responsibility and blame for childhood obesity (Table 4)

The participants identified parents as bearing primary responsibility for their children's eating and exercise habits and for their body weights. Even those participants who spoke of body size as being affected by genetics asserted that parents can still influence their children's body weights. Likewise, participants who mentioned that children may be overweight or obese due to a health condition (e.g. glandular dysfunction) said that parents are responsible for making sure the child's medical problem is identified and resolved. The participants argued that parents are responsible for children's body weights because they can control what their children eat, provide a healthy food environment at home, encourage their children to play outside and be active, and model healthy behaviors themselves.

The participants' concepts of parental responsibility linked with their attitudes towards parental blame for childhood obesity. Several participants said they 'judged' parents whose children were obese; some even said that the parents of obese children were guilty of child neglect or abuse. Participants identified childhood obesity as being transmitted from one generation to the next, and as the result of 'lazy' parenting. Having an obese child was an outward sign of 'failing' as a parent, and one mother whose child was obese spoke of feeling blamed by clinicians for the child's weight gain, which, as she said, neither she nor the child's clinicians could explain.

Perceptions of appropriate contexts for speaking about preschoolers' body weights (Table 5)

The participants described discussions of preschoolers' body weights as sensitive, often unnecessary, and potentially dangerous. The decision to engage in discussion about children's body weights was context dependent. Participants said they discussed their children's or

grandchildren's body weights with them only if the children themselves raised the topic. Those participants whose preschoolers did not mention body weight said they had never discussed the issue with them. Several participants said that children of preschool age do not have body image concepts related to weight. Some participants cited their preschoolers' 'apparent 'comfort' with – or lack of self-consciousness about – their bodies as signaling a lack of concern with body image. A number of participants also said they avoided discussions of their preschoolers' body weights because these discussions could be harmful to the children's self-esteem and emotional wellbeing.

Notably, excepting the parents of the two children with the height weight statuses, all parents avoided discussing their children's body weights not only with the children themselves, but also with the children's grandparents; likewise, excepting one grandmother, all grandparents avoided discussing their grandchildren's body weights with the parents. Participants described these discussions as unnecessary when body weight was 'not an issue'. It was only when a child's body weight was perceived as problematic (in the case of the largest child in the sample) that parents and grandparents said they openly discussed it with each other. However, while most participants said they did not discuss body weights, they identified comments on children's 'healthy' appearance, growth, or muscle definition as appropriate and positive. Thus, although participants were reluctant to discuss the preschoolers' body weights, they did discuss the preschoolers' body sizes, with attention to how 'big' or 'strong' they were.

DISCUSSION

This study's findings suggest that the parents and grandparents of preschool age children face difficulties in identifying and discussing their preschoolers' overweight and obesity. Previous research has found that low income mothers are not concerned about preschoolers' overweight because they attribute body weight to genetic heredity[9]. However, in this study, the participants strongly endorsed the idea that parents bear primary responsibility for their children's eating and exercise habits and body weights. Nevertheless, the participants did not speak of their own children or grandchildren as overweight or obese. Notably, the participants' responses were consistent across the sample, and no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes.

Although the participants recognized obesity in general as a problem, they normalized their own children's and grandchildren's excess body weight as 'toddler pudge' or 'cute baby fat'. Like Jain et al [9], the authors of the present study suggest that most participants used these words not as euphemisms, as underscored by the participants' consistent descriptions of children's higher body weights in positive terms – as 'cute' or 'healthy'. While participants said that preschoolers' body weights would be problematic if the child became 'visibly overweight', it was less clear how a 'visibly overweight' preschooler might look. The participants' discussions focused, instead, on signs that might negate 'visible overweight' in a preschooler, including tallness, muscularity, and physical strength. As noted by Jones et al[11], when participants described obesity, it was through extreme cases of morbid obesity in later childhood or adulthood, with some citing examples of older children who were 'miniatures of their parents' and contestants on *The Biggest Loser* who weighed 400 lbs. Future research should explore how a 'visibly overweight' preschooler might look to parents and grandparents.

Just as the participants visualized obesity through images of older children or adults, they also spoke of obesity as a problem that might affect children later in life, but not in preschool age. Participants spoke of suffering from teasing as a school age child, or from poor health as an adult, as the consequences that marked obesity as a problem. While participants did say that they would recognize a body weight problem if their preschoolers showed negative changes in behavior, activity, and mood, they did not name immediate health risks. The participants' depictions of obesity revealed a disconnect between knowledge and perception, previously shown by Rich et al[10]. Although they were aware of their preschoolers' growth chart percentiles, most participants did not link these percentiles with the categories of 'overweight' and 'obesity'. Likewise, although participants were aware of the health risks associated with obesity in adulthood, they did not link their preschoolers' body weights with potential problems in the present tense.

While the participants did not associate obesity with early childhood, they did take responsibility for their preschoolers' body weights, and endorsed healthy eating and exercise practices. Along similar lines, however, the participants – including some whose children were classified as obese –blamed parents for childhood obesity. The participants' expressions of judgment toward the parents of obese children were aligned with broader social stigma attached to obesity[29 30]. Given the participants' stigmatizing attitudes, it is not surprising that they did not discuss their preschoolers' body weights with other family members. Although parents and grandparents did discuss children's body sizes through comments on how 'big', 'strong', 'healthy', or 'muscular' they were, most participants whose preschoolers were classified as overweight or obese did not discuss their body weights with family members, except when there was a perceived health problem. It is possible that, for the participants,

discussion of body weight threatened to expose both themselves and their children to the risk of blame, reduced self-esteem, and stigma attached to obesity. At the same time, it is important to note that, in deciding not to discuss body weight with their preschoolers (unless the children themselves raised the topic), the participants protected the children's body image and self-esteem. Moreover, like the parents described by Andreassen et al [31], those parents who recognized their children needed to lose weight attempted to enact weight loss strategies without explicitly mentioning weight. As previous studies have shown, parental comments about body weight are associated with body dissatisfaction and reduced self-esteem in children[15 32 33], such that the participants' stance on avoiding 'weight talk' with children was positive and should be encouraged. A recent study has proposed a set of guidelines to help parents discuss body image and eating with preschool aged children in a supportive way that is protective of children's self-esteem[16].

The results of this study suggest that there are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents are aware of their preschoolers' growth chart percentiles, these measures do not translate into recognition of young children's overweight or obesity. Without visual examples of how a preschool age child with overweight or obesity might look, such as sketched silhouettes or photographs at different weight categories[34-36], parents and grandparents continue to speak of children's excess weight as 'cute' or 'healthy', and perceive obesity as problematic only in later childhood or adulthood. Moreover, as parents and grandparents find it difficult to discuss young children's body weights with the children and with one another, this might affect the success of clinical interventions for childhood obesity, in which children's caretakers are forced into a new and uncomfortable discussion.

The clinical implications of this study include several components. In discussions with parents and grandparents of preschool age children, clinicians should clarify how children's fat distribution and body sizes typically change with age. Clinicians should also speak with children's caretakers about the meaning of growth chart percentiles, and provide visual examples of how children might look in each of the percentile categories. Moreover, clinicians should emphasize the immediate problems associated with obesity in early childhood, such as hypertension (present in more than 50% of children with obesity), dyslipidemia, motor skill development and orthopedic complications[37-39].

The results also suggest that the countering of stigma should be an important part of the clinical management of childhood obesity. Given the social stigma and blame attached to parents of children with obesity, parents might contest a child's obesity diagnosis and be reluctant to take part in interventions to manage their child's condition[40]. It is therefore crucial that clinicians directly address stigma when they speak to parents, emphasizing that childhood obesity is not the parents' fault, and that managing this condition together is a positive step. Similarly, clinicians should avoid addressing parents of children with obesity in ways that might make them feel guilty or judged. Finally, it is important that clinicians frame discussions of children's body weights sensitively, and encourage parents and grandparents to address children's eating and physical activity practices through positive words and actions, without emphasizing body weight to the children themselves.

This study had some limitations. While the sample was the largest ever reported in a qualitative investigation of parents' and grandparents' perceptions and attitudes concerning preschoolers' body weights, the families were mainly of Caucasian origin, representing the ethnic distribution of the population in Eugene and Springfield, Oregon. Thus, the influence

of cultural background on perceptions of children's body sizes, which several studies have identified as important[5 18 30], could not be investigated. As the study targeted families of low socioeconomic status, further research is needed to determine whether the results can be generalized to other populations. Additionally, as several participants were single mothers, the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes. Finally, while a number of families had a full or nearly-full set of grandparents participating, some had only one or two grandparents participating, due to circumstances such as the other grandparents' living outside the area.

CONCLUSION

This study was the first to focus on both parents' and grandparents' perceptions of preschoolers' body weights, and is the largest qualitative study to date to include a mixed familial sample of adult caretakers of preschool age children. The study's results demonstrate that while parents and grandparents recognize childhood obesity as problematic, endorse healthy eating and exercise habits, and take responsibility for children's body weights, they find it difficult to recognize and discuss young children's overweight and obesity. The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

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CONTRIBUTORSHIP STATEMENT

Karin Eli: Dr Eli coded the interviews and analyzed them together with Dr Nowicka, wrote the manuscript, and approved the final manuscript as submitted.

Kyndal Howell: Ms Howell coordinated the data collection, critically reviewed the manuscript, and approved the final manuscript as submitted.

Philip A. Fisher: Professor Fisher contributed to the design of the study, critically reviewed the manuscript and approved the final manuscript as submitted.

Paulina Nowicka: Dr Nowicka conceptualized and designed the study, coordinated and supervised data collection and analysis, coded the interviews and analyzed them together with Dr Eli, critically reviewed the manuscript and approved the final manuscript as submitted.

COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

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DATA SHARING

Online supplementary table S1-4 containing complete sets of pertinent participant quotes. No additional data available.

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570 Table 1. Descriptive statistics of the sample

	Child (n=16)	Parent (n=22)	Grandparent (n=27)
Age (mean in years, range)	4.6 (3.1-5.7)	32. 2 (22.7-49.5)	56.9 (43.0-77.9)
Gender:			
Female	8 (50%)	14 (64%)	21 (78%)
Male	8 (50%)	8 (36%)	6 (22%)
Racial background:			
Euro-American/Caucasian	11 (68%)	21 (95%)	23 (84%)
Native American	0	1 (5%)	0
Asian	0	0	1 (4%)
African-American	0	0	1 (4%)
Mixed	5 (32%)	0	2 (8%)
BMI (mean, range)	17.7 (14.3-21.5)	26.8 (16.1-39.1)	29.1 (16.1-49.4)
Weight status:			
Underweight	0	2 (9%)	1 (3%)
Normalweight	7 (44%)	8 (36%)	8 (30%)
Overweight	4 (25%)	6 (27%)	10 (37%)
Obese	5 (31%)	6 (27%)	8 (30%)
Highest school grade completed	n/a		
High school		8 (82%)	20 (74%)
College/University		4 (18%)	7 (26%)
Working situation	n/a		
Full time		7 (32%)	8 (30%)
Part time		4 (18%)	4 (15%)

Not employed*		11 (50%)	15 (55%)
Annual household income	n/a		
Less than 14,999 USD		8 (36%)	7 (26%)
15,000-24,999 USD		6 (27%)	6 (22 %)
25,000 – 39,999 USD		4 (18%)	6 (22 %)
More than 40, 000 USD		4 (18%)	8 (30 %)

* The main reasons for unemployment among parents were child care, pursuing higher education, and not finding work; among grandparents, unemployment was due to not finding work, reaching retirement age,, or retiring due to health issues.

Table 2. Examples of participants' quotes on perceptions of young children's body sizes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age. 1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight. 1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts. 1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never been concerned about her weight.
Theme 2: 'Baby fat' is cute and healthy
2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know. 2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut. 2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles. 2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby.
Theme 3: Children go through 'growth spurts' and 'stretching out'
3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then they just, you know they start doing this (makes expanding outward hand movements) and then they just grow like a tree, then they lean up. 3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it. 3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height.

Table 3. Examples of participants' quotes on perceptions of the timeline of obesity.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 4: A high body weight becomes problematic later in childhood
4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy. 4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care. 4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating." 4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.
Theme 5: Children's body weight becomes problematic when it affects their activities or health
5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that. 5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine. 5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern.
Theme 6: Obesity becomes problematic in adulthood
6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age. 6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole

life. 6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Table 4. Examples of participants' quotes on perceptions of parental responsibility and blame for childhood obesity.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control. 7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem. 7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.
Theme 8: The parents of obese children are blamed by themselves and by others
8.1 Gp042 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me. 8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents. 8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent. 8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.

Table 5. Examples of participants' quotes on perceptions of appropriate contexts for speaking about preschoolers' body weights.

Table Legends: Gp# - family group number; P - parent; G – grandparent.

602 * = parent/grandparent of child with normal weight
603 ** = parent/grandparent of child with overweight
604 *** = parent/grandparent of child with obesity
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Theme 9: Parents and grandparents discuss preschoolers' body weights with them only when the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat". 9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level. 9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old".
Theme 10: It's acceptable to discuss how big or strong preschoolers are.
10.2 Gp12G3 (Father's mother) ***: We talk about how fit he is. He's a very fit child. 10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, "Yeah, look at his muscles". 10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.
Theme 11: Discussing preschoolers' body weights can affect their self-esteem negatively
11.2 Gp03P2 (Father) ***: By far I don't think that parents should focus on it [weight] because then it will become a focal point for the child. 11.3 Gp01G1 (Father's mother) ***: I wouldn't sit with an iron fist and say, "You can't have that because it will make you fat." Because that effects their mental (wellbeing). 11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything. 11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.
Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem

12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her.

12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet.

12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it.

12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.

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su~~When Does Obesity Become a Problem?~~"A little on the heavy side": A Qualitative Analysis of Parents' and Grandparents' Perceptions of Preschoolers' Body Weights

Karin Eli [1], ~~PhD~~DPhil, Kyndal Howell [2], BS, Philip A. Fisher, PhD [2], Paulina Nowicka, PhD [1,3]

Affiliations: [1] Unit for Biocultural Variation and Obesity, Institute of Social and Cultural Anthropology, University of Oxford, Oxford, UK; [2] Department of Psychology, University of Oregon, Eugene, USA; [3] Unit of Pediatrics, Department of Clinical Sciences, Intervention and Technology, Karolinska Institute, Stockholm, Sweden

Address correspondence to:
Paulina Nowicka, Division of Pediatrics, Department of Clinical Science, Intervention and Technology (CLINTEC), Karolinska Institutet, 141 86 Stockholm, Sweden, Tel: +46 46 70 454 88 33, Email: paulina.nowicka@ki.se

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Abstract

OBJECTIVES: Parents' difficulties in perceiving children's weight status accurately pose a barrier for family-based obesity interventions; however, the factors underlying weight misinterpretation still need to be identified. This study's objective was to examine ~~mothers',~~ ~~fathers',~~parents and grandparents' perceptions of preschoolers' body sizes. Interview questions ~~emphasized~~also explored perceptions of ~~overweight and obesity from a life course perspective,~~ parental responsibility~~,~~ for childhood obesity and appropriate contexts in which to discuss preschoolers' weights.

DESIGN: Semi-structured interviews, which were videotaped, transcribed, and analyzed qualitatively.

SETTING: Eugene and the Springfield metropolitan area, Oregon, USA

PARTICIPANTS: Families of children aged 3-5 years were recruited in February – May 2011 through advertisements about the study, published in the job seekers' sections of Craigslist and local newspapers. 49 participants (22 parents and 27 grandparents, 70% women, 60% with overweight/obesity) from sixteen low-income families of children aged 3-5 years (50% girls, 56% with overweight/obesity) were interviewed.

RESULTS: There are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents were aware of their preschoolers' growth chart percentiles, these measures did not translate into recognition of children's overweight or obesity. The participants spoke of obesity as a problem that may affect the children in the future, but not at present. Participants identified childhood obesity as being transmitted from one generation to the next, and stigmatized it as resulting from 'lazy' parenting. Parents and grandparents avoided discussing the children's weights with each other and with the children themselves.

CONCLUSIONS: The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

Strengths and limitations of this study

- This study's sample is the largest ever reported in a qualitative investigation of family members' perceptions of preschoolers' body weights.
- While most previous studies focused only on mothers' perceptions of their preschoolers' body weights, this study included mothers, fathers, grandmothers, and grandfathers, recognizing that various adult family members influence young children's body image, eating, and exercise habits.
- Although low-income participants tend to be difficult to reach, the study successfully recruited a predominantly low-income sample.
- The sample primarily consisted of families of Caucasian origin, and thus did not allow for an investigation of the influence of cultural background on perceptions of children's body sizes.
- As several participants were single mothers, the number of fathers was not high enough to enable an assessment of potential differences between fathers' and mothers' perceptions.

INTRODUCTION

While there is growing evidence of the superior effectiveness of lifestyle interventions initiated early in childhood[1-3], one of the main barriers in conducting such interventions is parents' lack of recognition of, or concern about, obesity in children. Parents' difficulties in perceiving children's body sizes accurately have been demonstrated since the early 2000s, across many countries, cultures and child ages[4-6]. A recent study of over 16,000 children aged 2-9 years from eight European countries has shown that, among parents of overweight children, 63% perceived their children's weights as 'proper', independent of educational level[7]. Moreover, a meta-analysis of 69 studies on parental perceptions of children's body weights showed that half of the parents underestimated their children's ~~weights~~weight.[8]

Most studies have applied a quantitative approach to describe parents' miscategorization of children's weight status; however, the underlying factors have not been identified conclusively[6]. To date, only two studies[9 10] have used in-depth interviews to examine how parents make sense of children's body weights and their health implications. In their study of low income mothers, Jain et al have shown that most mothers did not worry about their children's body weights if the children were active and socially accepted; the mothers, ~~however~~moreover, distrusted pediatric growth charts, and attributed childhood obesity to genetics, rather than to factors modifiable in the home environment [9]. Misinterpretation of growth charts was also highlighted by Rich et al, who found that 80% of parents perceived their child as healthy although the child's weight was at the 95th percentile. These parents, notably, were aware of obesity related health risks[10]. More recently, focus groups revealed that, in assessing their children's body sizes, parents tend not to rely on clinical measurements; rather, they often compare their children visually to other children whose body

sizes can be defined as extreme, thus skewing their perceptions of what a healthy body size is[11].

So far, existing research on parental perceptions of children's body weights has focused almost exclusively on mothers, and has not ~~acknowledging~~examined the critical influence of other family members, such as fathers and grandparents [12]. Because family-based interventions have been proposed as the most effective approach to treating child obesity[13 14], knowledge about how other adult caretakers perceive and discuss young children's body weights will contribute to understanding familial barriers to treatment. Moreover, the fostering of sensitive and non-judgmental communication about children's eating practices and body sizes is important for the prevention of body dissatisfaction and disordered eating in childhood and adolescence[15 16]. To examine caretakers' perceptions of young children's body weights from a broader familial perspective, we designed this study to include family sets of ~~mothers, fathers,~~parents and grandparents actively involved in taking care of preschool age children. This study was part of a larger research project, whose overall aim was to evaluate the role of grandparents in the development of preschoolers' lifestyle early in life. The larger research project yielded rich material on the participants' perceptions of young children's body weights, and we found this topic merited dedicated discussion apart from the larger study.

As childhood obesity remains high among families with low socioeconomic status[~~15-17~~17-19], and as it is more difficult to recruit and retain these families in intervention programs [~~18-19~~20 21], we chose to target a low income population.

METHODS

Families of children aged 3-5 years from the Pacific Northwest (Eugene and Springfield metropolitan area, Oregon) were recruited in February – May 2011 through advertisements about the study, published in a local newspaper and the volunteers' and job seekers' sections of Craigslist ~~and local newspapers. The study's main research aim was to evaluate (~~the ~~role of grandparents~~most widely used classified advertisement website in the ~~development of preschoolers' lifestyles early in life, such that the~~United States). The active involvement of grandparents in family life (defined as spending time with the grandchild at least twice a month) was the primary criterion for inclusion in the study. Consequently, only families in which at least one parent and one grandparent were willing to be interviewed were included in the study. The other inclusion criteria specified that the child's age must be between 3-5 years, and that the child should have no underlying medical condition or disability which would affect his/her weight. ~~The study was approved by the Internal Review Board of the Oregon Social Learning Center~~All families who contacted the study coordinator and were found to fulfill the inclusion criteria were recruited to the study. The study was approved by the Internal Review Board of the Oregon Social Learning Center. When the participants first met with the researchers, and before the interviews took place, the researchers verbally explained the informed consent forms to each participant, and answered any questions participants had . If the parents/grandparents agreed to participate, they were asked to read and sign the written project description and project consent forms. The families received a copy of the written study description and informed consent forms.

~~In total, 49 family members (70% female) from sixteen families were interviewed. Participants' characteristics are summarized in Table 1. Due to the targeted recruitment process (ads in job advertisement sections) the sample displayed low levels of education and income; as many as 50% of parents were unemployed. Moreover, more than half of parents~~

~~and two thirds of grandparents had overweight or obesity, according to WHO criteria[20]. Of the children, 56% were either overweight or obese (overweight: 85th percentile ≤ BMI < 95th percentile; obesity: BMI ≥ 95th percentile)[21-23]; those five who were categorized as obese were in the 95th, 96th, 98th (two children) and 99th percentiles for their BMI. The majority of children, parents and grandparents were Caucasian, reflecting the ethnicity profile of this region of the Pacific Northwest.~~

~~*Insert Table 1 here.*~~

Parents and grandparents were interviewed separately at the Oregon Social Learning Center. Free child care was provided on site, and the children were not present during the interviews. Each interviewed participant received compensation of $50 for participating in the study. Prior to the interview, parents and grandparents completed a comprehensive sociodemographic questionnaire~~.~~ routinely used in research projects involving families at the Oregon Social Learning Center; the questionnaire included items concerning family composition, parental education, employment status, and living conditions. All the interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. The weight status using height and weight was not calculated prior the interview, thus the interviewer and the family members were not informed about the child's or family members' weight status. The interviews, which were conducted by a single researcher (either the second or the last author), lasted 1.5-2.5 hours and explored the different roles of family members in shaping a child's lifestyle. Before coding, all participant names were changed to ensure confidentiality.

This paper focuses on the parents' and grandparents' perceptions of young children's body weights, with particular emphasis on overweight and obesity ~~from a life course perspective~~, parental responsibility for childhood obesity, and contexts in which parents and grandparents discuss preschoolers' body weights. The main questions were: (1) Do you think that how much a child weighs matters? If yes, why? If not, why? (2) How much do you think that a child's weight is possible to control/controllable? If yes, what lifestyle choices do you think are the most important? How/when do you think they can be promoted, and who do you think can do that? And who in the family plays the most important role when it comes to influencing the child's weight? If no, what makes you think that way? (3) What do you think about your child's (or grandchild's) weight? As compared to his/her siblings, cousins, other children, to the child's parents. Are you concerned/not concerned? (4) What do you think that the parents of your grandchild think about your grandchild's weight (or grandparents of your child about your child's weight)? Examine: If there are two parents (grandparents) in the house, do they have the same opinion? (5) Do you talk about your child (grandchild's) weight with his/her grandparents (parents)? If yes, why, how? If not, why? Examine: If there are two parents in the house, which of them do you talk the most with and why? (6) Do you know if your child (grandchild) thinks about his/her weight? Probe: Does he/she ever comment on it? Did that happen in your presence? If yes, what did you say? If your child doesn't think about his/her weight, is it good or bad?

It should be noted that while all participants were asked the same main questions, the interview process allowed for fluidity, and follow-up questions were adapted according to each participant's responses. Additionally, while the majority of data directly refer to the main questions listed, the present analysis includes pertinent comments the participants made throughout the interviews. The interviews were videotaped and transcribed in full;

videotaping allowed for the inclusion of non-verbal expressions in the transcriptions. For this paper, transcript sections that related to the main questions were extracted and collated. The transcripts were then coded independently by the first and the last author, using a thematic discourse analysis approach. Discourse analysis is concerned with people's use of language to describe and make sense of their realities, and is an appropriate approach for qualitative studies that examine people's definitions of and spoken attitudes towards health issues[24,22]. Thematic analysis facilitates the identification of patterns in qualitative data, and therefore allowed the researchers to delineate themes across the data set[23]. Over several in-person meetings and email correspondence, the two coders compared and discussed their codes, to examine and resolve potential disagreements, and reach consensus on the clustering of codes into themes and on the grouping of themes under thematic categories.

RESULTS

In total, 49 family members (70% female) from sixteen families were interviewed. The sample included 22 parents and 27 grandparents – subsample sizes suitable for data saturation [24]. Seven families consisted of single parent with sole responsibility for the child (five single mothers and two single fathers). In ten families, only one grandparent was interviewed; in two families, two grandparents were interviewed; in three families, three grandparents were interviewed; and in one family, four grandparents were interviewed. In five of the families, all grandparents who had contact with the grandchild were interviewed. The most common reason for not being able to include full sets were the other grandparents' residing outside the study area.

Participants' characteristics are summarized in Table 1. All data refer to parents and grandparents who were interviewed as part of the study. Due to the targeted recruitment

process (ads in job advertisement sections) the sample displayed low levels of education and income; as many as 50% of parents were unemployed. The majority of children, parents and grandparents were Caucasian, reflecting the ethnicity profile of this region of the Pacific Northwest.

All the interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. These measurements were taken in order to contextualize the participants' stated perceptions of and attitudes toward childhood overweight/obesity and associated lifestyle factors. The participants' and the children's BMI statuses were not calculated prior to the interviews, so as not to bias the interview process. Thus, the interviewers and the participants were not informed about the child's or any of the adult family members' weight status. More than half of parents and two thirds of grandparents had overweight or obesity, according to World Health Organization criteria[25]. Of the children, 56% were either overweight or obese (overweight: 85th percentile < Body Mass Index (BMI) < 95th percentile; obesity: BMI ≥ 95th percentile) [26-28]; those five who were categorized as obese were in the 95th, 96th, 98th (two children) and 99th percentiles for their BMI.

Insert Table 1 here.

The analysis yielded twelve major themes, clustered under four thematic categories: Perceptions of young children's body sizes, perceptions of the timeline of obesity, perceptions of parental responsibility and blame for childhood obesity, and perceptions of appropriate contexts for speaking about preschoolers' body weights. While the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions

and attitudes, it is possible to say that the participants' responses were consistent across the sample, and no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes. Examples of participant quotes from each of the thematic categories and their constituent themes are presented in table format (Tables 2-5). The complete sets of pertinent participant quotes are provided as supplemental material (Supplementary Tables 1-4).

Insert Tables 2-5 here.

Perceptions of young children's body sizes (Table 2)

None of the participants used the words 'obese' or 'overweight' to describe the preschoolers whom the growth charts defined as such. The participants used a range of words to describe the body sizes of these preschoolers, including 'pudgy', 'chunky', 'solid', 'stout', 'chubby', 'stocky', 'big boned', and 'robust'. Several participants described the preschoolers as 'tall' and/or 'big for their age'. Notably, even the father of the heaviest child in the sample (99th percentile) described his child as 'a little on the heavy side'. Across the sample, including the parents and grandparents of normal weight children, the participants spoke of 'baby fat' as cute and healthy, and even as something to encourage. A few participants also spoke of children's higher percentiles on the growth charts (>90th percentile) in positive terms. The parents and grandparents of the overweight or obese preschoolers said their body weight was not worrisome because children go through 'growth spurts' and 'stretch out', such that their current excess weight will eventually convert into height.

Perceptions of the timeline of obesity (Table 3)

The participants spoke of obesity as a problem that may affect the preschoolers in the future, but not at present. Several participants indicated that a high body weight becomes problematic when the child reaches school age, particularly due to the risk of teasing, social exclusion, and bullying. Participants also said that a high body weight becomes problematic when it negatively affects the child's health, activities, behaviors, or mood. However, only one participant, whose child was in the 99th percentile for weight, said that she could notice the detrimental effects of the child's body weight at present. Thus, even when speaking of obesity in terms of impact on activity and health, the participants placed it outside the remit of the preschoolers' current experience. Participants also spoke of obesity as problematic due to its manifestations in adulthood, expressing that children's body weights and their eating and exercise habits are important because they translate into 'long lasting effects' and 'hav[ing] more trouble as an adult'.

Perceptions of parental responsibility and blame for childhood obesity (Table 4)

The participants identified parents as bearing primary responsibility for their children's eating and exercise habits and for their body weights. Even those participants who spoke of body size as being affected by genetics asserted that parents can still influence their children's body weights. Likewise, participants who mentioned that children may be overweight or obese due to a health condition (e.g. glandular dysfunction) said that parents are responsible for making sure the child's medical problem is identified and resolved. The participants argued that parents are responsible for children's body weights because they can control what their children eat, provide a healthy food environment at home, encourage their children to play outside and be active, and model healthy behaviors themselves.

The participants' concepts of parental responsibility linked with their attitudes towards parental blame for childhood obesity. Several participants said they 'judged' parents whose children were obese; some even said that the parents of obese children were guilty of child neglect or abuse. Participants identified childhood obesity as being transmitted from one generation to the next, and as the result of 'lazy' parenting. Having an obese child was an outward sign of 'failing' as a parent, and one mother whose child was obese spoke of feeling blamed by clinicians for the child's ~~unexplained weight gain~~weight gain, which, as she said, neither she nor the child's clinicians could explain.

Perceptions of appropriate contexts for speaking about preschoolers' body weights (Table 5)

The participants described discussions of preschoolers' body weights as sensitive, often unnecessary, and potentially dangerous. The decision to engage in discussion about children's body weights was context dependent. Participants said they discussed their children's or grandchildren's body weights with them only if the children themselves raised the topic. Those participants whose preschoolers did not mention body weight said they had never discussed the issue with them. Several participants said that children of preschool age do not have body image concepts related to weight~~, and some~~. Some participants cited their preschoolers' '~~comfortable' behaviors~~apparent 'comfort' with – or lack of self-consciousness about – their bodies as signaling a lack of concern with body image. A number of participants also said they avoided discussions of their preschoolers' body weights because these discussions could be harmful to the children's self-esteem and emotional wellbeing.

~~Notably,~~Notably, excepting the parents of the two children with the height weight statuses, all parents avoided discussing their children's body weights not only with the children themselves, but also with the children's grandparents; likewise, excepting one grandmother, all grandparents avoided discussing their grandchildren's body weights with the parents. Participants described these discussions as unnecessary when body weight was 'not an issue'. It was only when a child's body weight was perceived as problematic (in the case of the largest child in the sample) that parents and grandparents said they openly discussed it with each other. However, while most participants said they did not discuss body weights, they identified comments on children's 'healthy' appearance, growth, or muscle definition as appropriate and positive. Thus, although participants were reluctant to discuss the preschoolers' body weights, they did discuss the preschoolers' body sizes, with attention to how 'big' or 'strong' they were.

DISCUSSION

This study's findings suggest that the parents and grandparents of preschool age children face difficulties in identifying and discussing their preschoolers' overweight and obesity. Previous research has found that low income mothers are not concerned about preschoolers' overweight because they attribute body weight to genetic heredity[9]. However, in this study, the participants strongly endorsed the idea that parents bear primary responsibility for their children's eating and exercise habits and body weights. Nevertheless, the participants did not speak of their own children or grandchildren as overweight or obese. Notably, the participants' responses were consistent across the sample, and no generational differences

were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes.

Although the participants recognized obesity in general as a problem, they normalized their own children's and grandchildren's excess body weight as 'toddler pudge' or 'cute baby fat'. Like Jain et al[9], the authors of the present study suggest that ~~the~~most participants used these words not as euphemisms~~. The~~, as underscored by the participants' consistent descriptions of children's higher body weights in positive terms – as 'cute' or 'healthy'~~ underscore the invisibility of preschoolers' obesity among lay persons.~~. While participants said that preschoolers' body weights would be problematic if the child became 'visibly overweight', it was ~~unclear~~less clear how a 'visibly overweight' preschooler might look. The participants' discussions focused, instead, on signs that might negate 'visible overweight' in a preschooler, including tallness, muscularity, and physical strength. As noted by Jones et al[11], when participants described obesity, it was through extreme cases of morbid obesity in later childhood or adulthood, ~~such as~~with some citing examples of older children who were 'miniatures of their parents' and contestants on *The Biggest Loser* who weighed 400 lbs. Future research should explore how a 'visibly overweight' preschooler might look to parents and grandparents.

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Just as the participants visualized obesity through images of older children or adults, they also spoke of obesity as a problem that might affect children later in life, but not in preschool age. Participants spoke of suffering from teasing as a school age child, or from poor health as an adult, as the consequences that marked obesity as a problem. While participants did say that they would recognize a body weight problem if their preschoolers showed negative changes in behavior, activity, and mood, they did not name immediate health risks. The participants'

depictions of obesity revealed a disconnect between knowledge and perception, previously shown by Rich et al[10]. Although they were aware of their preschoolers' growth chart percentiles, most participants did not link these percentiles with the categories of 'overweight' and 'obesity'. Likewise, although participants were aware of the health risks associated with obesity in adulthood, they did not link their preschoolers' body weights with potential problems in the present tense.

While the participants did not associate obesity with early childhood, they did take responsibility for their preschoolers' body weights, and endorsed healthy eating and exercise practices. Along similar lines, however, the participants – including some whose children were classified as obese –blamed parents for childhood obesity. The participants' expressions of judgment toward the parents of obese children were aligned with broader social stigma attached to obesity[~~25 26~~29 30]. Given the participants' stigmatizing attitudes, it is not surprising that they did not discuss their preschoolers' body weights with other family members. Although parents and grandparents did discuss children's body sizes through comments on how 'big', 'strong', 'healthy', or 'muscular' they were, most participants whose preschoolers were classified as overweight or obese did not discuss their body weights with family members, except when there was a perceived health problem. It is possible that, for the participants, discussion of body weight threatened to expose both themselves and their children to the risk of blame, reduced self-esteem, and stigma attached to obesity. At the same time, it is important to note that, in deciding not to discuss body weight with their preschoolers (unless the children themselves raised the topic), the participants protected the children's body image and self-esteem. ~~Moreover, like the parents described by Andreassen et al [27]~~Moreover, like the parents described by Andreassen et al [31], those parents who recognized their children needed to lose weight attempted to enact weight loss strategies without

explicitly mentioning weight. As previous studies have shown, parental comments about body weight are associated with body dissatisfaction and reduced self-esteem in children[28-30,15,32,33], such that the participants' stance on avoiding 'weight talk' with children was positive and should be encouraged. A recent study has proposed a set of guidelines to help parents discuss body image and eating with preschool aged children in a supportive way that is protective of children's self-esteem[16].

The results of this study suggest that there are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents are aware of their preschoolers' growth chart percentiles, these measures do not translate into recognition of young children's overweight or obesity. Without visual examples of how a preschool age child with overweight or obesity might look, such as sketched silhouettes or photographs at different weight categories[31-33,34-36], parents and grandparents continue to speak of children's excess weight as 'cute' or 'healthy', and perceive obesity as problematic only in later childhood or adulthood. Moreover, as parents and grandparents find it difficult to discuss young children's body weights with the children and with one another, this might affect the success of clinical interventions for childhood obesity, in which children's caretakers are forced into a new and uncomfortable discussion.

The clinical implications of this study include several components. In discussions with parents and grandparents of preschool age children, clinicians should clarify how children's fat distribution and body sizes typically change with age. Clinicians should also speak with children's caretakers about the meaning of growth chart percentiles, and provide visual examples of how children might look in each of the percentile categories. Moreover, clinicians should emphasize the immediate problems associated with obesity in early

childhood, such as hypertension (present ~~at~~in more than 50% of children with obesity), dyslipidemia, motor skill development and orthopedic complications[~~34-36~~37-39].

The results also suggest that the countering of stigma should be an important part of the clinical management of childhood obesity. Given the social stigma and blame attached to parents of children with obesity, parents might contest a child's obesity diagnosis and be reluctant to take part in interventions to manage their child's condition[~~37~~ 40]. It is therefore crucial that clinicians directly address stigma when they speak to parents, emphasizing that childhood obesity is not the parents' fault, and that managing this condition together is a positive step. Similarly, clinicians should avoid addressing parents of children with obesity in ways that might make them feel guilty or judged. Finally, it is important that clinicians frame discussions of children's body weights sensitively, and encourage parents and grandparents to address children's eating and physical activity practices through positive words and actions, without emphasizing body weight to the children themselves.

This study had some limitations. While the sample was the largest ever reported in a qualitative investigation of parents' and grandparents' perceptions and attitudes concerning preschoolers' body weights, the ~~children themselves were not interviewed. Moreover, the sample primarily consisted of families~~families were mainly of Caucasian origin, representing the ethnic distribution of the population in Eugene and Springfield, Oregon. Thus, the influence of cultural background on perceptions of children's body sizes, which several studies have identified as important[5 ~~16~~18 ~~26~~30], could not be investigated. As the study targeted families of low socioeconomic status, further research is needed to determine whether the results can be generalized to other populations. Additionally, as several participants were single mothers, the number of fathers was not high enough to enable an assessment of

differences between fathers' and mothers' perceptions and attitudes. Finally, while a number of families had a full or nearly-full set of grandparents participating, some had only one or two grandparents participating, due to circumstances such as the other grandparents' living outside the area.

CONCLUSION

This study was the first to focus on both parents' and grandparents' perceptions of preschoolers' body weights, and is the largest qualitative study to date to include a mixed familial sample of adult caretakers of preschool age children. The study's results demonstrate that while parents and grandparents recognize childhood obesity as problematic, endorse healthy eating and exercise habits, and take responsibility for children's body weights, they find it difficult to recognize and discuss young children's overweight and obesity. The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

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CONTRIBUTORSHIP STATEMENT

Karin Eli: Dr Eli coded the interviews and analyzed them together with Dr Nowicka, wrote the manuscript, and approved the final manuscript as submitted.

Kyndal Howell: Ms Howell coordinated the data collection, critically reviewed the manuscript, and approved the final manuscript as submitted.

Philip A. Fisher: Professor Fisher contributed to the design of the study, critically reviewed the manuscript and approved the final manuscript as submitted.

Paulina Nowicka: Dr Nowicka conceptualized and designed the study, coordinated and supervised data collection and analysis, coded the interviews and analyzed them together with Dr Eli, critically reviewed the manuscript and approved the final manuscript as submitted.

COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

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DATA SHARING

Online supplementary table S6-9 containing complete sets of pertinent participant quotes. No additional data available.

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603 Table 1. Descriptive statistics of the sample

	Child (n=16)	Parent (n=22)	Grandparent (n=27)
Age (mean in years, range)	4.6 (3.1-5.7)	32. 2 (22.7-49.5)	56.9 (43.0-77.9)
Gender:			
Female	8 (50%)	14 (64%)	21 (78%)
Male	8 (50%)	8 (36%)	6 (22%)
Racial background:			
Euro-American/Caucasian	11 (68%)	21 (95%)	23 (84%)
Native American	0	1 (5%)	0
Asian	0	0	1 (4%)
African-American	0	0	1 (4%)
Mixed	5 (32%)	0	2 (8%)
BMI (mean, range)	17.7 (14.3-21.5)	26.8 (16.1-39.1)	29.1 (16.1-49.4)
Weight status:			
Underweight	0	2 (9%)	1 (3%)
Normalweight	7 (44%)	8 (36%)	8 (30%)
Overweight	4 (25%)	6 (27%)	10 (37%)
Obese	5 (31%)	6 (27%)	8 (30%)
Highest school grade completed	n/a		
High school		8 (82%)	20 (74%)
College/University		4 (18%)	7 (26%)
Working situation	n/a		
Full time		7 (32%)	8 (30%)
Part time		4 (18%)	4 (15%)

Not employed*		11 (50%)	15 (55%)
Annual household income	n/a		
Less than 14,999 USD		8 (36%)	7 (26%)
15,000-24,999 USD		6 (27%)	6 (22 %)
25,000 – 39,999 USD		4 (18%)	6 (22 %)
More than 40, 000 USD		4 (18%)	8 (30 %)

* ~~Main~~The main reasons for unemployment among parents were child care, pursuing higher education, and not finding work; among grandparents, unemployment was due to not finding work, ~~going on~~reaching retirement~~,~~ age,, or retiring due to ~~personal~~ health issues.

Table 2. ~~Perceptions~~Examples of participants' quotes on perceptions of young children's body sizes. ~~Examples of participant quotes from each of the thematic categories and their constituent themes. The complete sets of pertinent participant quotes are provided as supplemental material.~~

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age.
1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight.
1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts.
~~1.8 Gp01P1 (Mother) ***: she's also getting really tall, but I have a concern that she's getting a little pudgier (…) She's pudgy, she is a little overweight and we're working on it.~~
1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never been concerned about her weight.
~~1.16 Gp11P1 (Mother) ***: she has always been at the 90 or 100 percentile with her age group but in weight and always under in height. She has always been kind of short and stocky.~~
Theme 2: 'Baby fat' is cute and healthy
2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know.
2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut.
2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles.
2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby.
~~2.13 Gp07G1 (Mother's mother) *: [My daughter] was the only one, like I said that [she] was in the 95th percentile. She was the only one I ever wondered about, but she was cute chubby, that I didn't.~~
Theme 3: Children go through 'growth spurts' and 'stretching out'
3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then

they just, you know they start doing this (makes expanding outward hand movements) and then they just grow like a tree, then they lean up.

3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it.

3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height.

~~3.9 Gp11G1 (Mother's mother) ***: we've never been concerned when she goes through those eating phases because we know it's her growth spurt and it's not like she's gaining weight this way (out) growing this way (up).~~

Table 3. ~~Perceptions~~Examples of participants' quotes on perceptions of the timeline of obesity~~, examples of participant quotes from each~~.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of ~~the thematic categories and their constituent themes. The complete sets~~child with normal weight
** = parent/grandparent of ~~pertinent participant quotes are provided as supplemental material.~~ child with overweight
*** = parent/grandparent of child with obesity

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Theme 4: A high body weight becomes problematic later in childhood
4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy. 4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care. 4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating." 4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.
Theme 5: Children's body weight becomes problematic when it affects their activities or health
5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that. 5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine. 5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern.
Theme 6: Obesity becomes problematic in adulthood
6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age.

6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole life. 6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Table 4. ~~Perceptions~~Examples of participants' quotes on perceptions of parental responsibility and blame for childhood obesity. ~~Examples of participant quotes from each~~

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of ~~the thematic categories and their constituent themes. The complete sets~~child with normal weight
** = parent/grandparent of ~~pertinent participant quotes are provided as supplemental material.~~child with overweight
*** = parent/grandparent of child with obesity

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Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control. ~~7.4 Gp02G1 (Father's mother) *: I think that if you buy a lot of junk food and that's what you have: soda, chips and things like that… and that's what your child is mostly eating, and they're getting overweight from that, then yes, you have a lot of control.~~ 7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem. ~~7.11 Gp04G2 (Mother's father) *: I see a lot of kids just go and play their computer games and TVs sitting down eating chips, and that's not the kid's fault.~~ ~~7.13 Gp12G3 (Father's mother) ***: If you are active, the kids will be active. If you are into nutrition, the kids will be into nutrition.~~ 7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.
Theme 8: The parents of obese children are blamed by themselves and by others
8.1 Gp042 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me. 8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents.

~~8.4 Gp13P1 (Mother) ***: If I had a fat kid, it would be looking at me every day, "I'm a failure. I'm doing something wrong."~~

8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent.

8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.

Table 5. ~~Perceptions~~Examples of participants' quotes on perceptions of appropriate contexts for speaking about preschoolers' body weights. ~~Examples of participant quotes from each~~

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of ~~the thematic categories and their constituent themes. The complete sets~~child with normal weight
** = parent/grandparent of ~~pertinent participant quotes are provided as supplemental material.~~child with overweight
*** = parent/grandparent of child with obesity

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Theme 9: Parents and grandparents ~~do not~~ discuss preschoolers' body weights with them~~, unless~~ only when the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat".
9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level.
9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old".
Theme 10: It's acceptable to discuss how big or strong preschoolers are.
~~10.1 Gp12G2 (Father's father) ***: I can't say that it's [the child's weight] ever come up. Other than to say that "he's sure getting heavy", in growing up.~~
10.2 Gp12G3 (Father's mother) ***: We talk about how fit he is. He's a very fit child.
10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, "Yeah, look at his muscles".
~~10.4 Gp11G1 (Mother's mother) ***: we talk about her weight and her height a lot because she's a big girl, but not that we're concerned.~~
10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always

showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.

Theme 11: Discussing preschoolers' body weights can affect their self-esteem negatively

~~11.1 Gp03P1 (Mother) ***: So when he [the child] asks me stuff like that [about his weight] we talk about being strong versus being big and not strong. So it's all about trying to be strong and healthy so, that's what we talk about.~~

11.2 Gp03P2 (Father) ***: By far I don't think that parents should focus on it [weight] because then it will become a focal point for the child.

11.3 Gp01G1 (Father's mother) ***: I wouldn't sit with an iron fist and say, "You can't have that because it will make you fat." Because that effects their mental (wellbeing).

11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything.

11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.

Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem

12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her.

~~12.5 Gp12G2 (Father's father) ***: I don't think about what his parents think about his weight. I know [his father] is certainly concerned with nutrition~~

12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet.

12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it.

12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.

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SUPPLEMENTAL MATERIAL

Supplementary Table 1. Perceptions of young children's body sizes; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age.
1.2 Gp07G1 (Mother's mother) *: There are going to be kids, that are just by their DNA and genetics, that are a chunkier body build, stuff like that.
1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight.
1.4 Gp13G1 (Mother's mother) ***: [My daughter] was a larger child, she was never 'obese' or fat or whatever, she was never teased or anything like that.
1.5 Gp14P1 (Mother) **: I think [my daughter] has got a big frame, she has big bones.
1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts.
1.7 GP10G4 (Father's stepmother) **: But if a child is just built bigger, then you need to let that go and just realize that's how a child is made.
1.8 Gp01P1 (Mother) ***: she's also getting really tall, but I have a concern that she's getting a little pudgier (…) She's pudgy, she is a little overweight and we're working on it.
1.9 Gp03G01 (Mother's mother) ***: [My grandson] has a little bit of a weight issue.
1.10 Gp10G4 (Father's stepmother) **: I think he is a short little toddler. He is a little bit round.
1.11 Gp10G1 (Father's mother) **: Our middle son, when he was in 4th or 5th grade, he was a little chunky (…) He was 10.6 [lbs] when he was born and just a super stout, robust baby the minute he was born.
1.12 Gp13G2 (Mother's father) ***: He's not overweight at all, he's almost skinny, but he's tall, he's a tall kid. He's always been big and tall for his age.
1.13 Gp16P1 (Father) **: I think it's just, he's a big boy, yeah they are big for their age.
1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never

been concerned about her weight. 1.15 Gp10P1 (Mother) **: I think he has a good amount of weight on his bones. And he is normally big for his age. 1.16 Gp11P1 (Mother) ***: she has always been at the 90 or 100 percentile with her age group but in weight and always under in height. She has always been kind of short and stocky. 1.17 Gp03G1 (Mother's mother) ***: he's very big for his age. He's tall. People think he's six, he's only five.
Theme 2: 'Baby fat' is cute and healthy
2.1 Gp02P1 (Father) *: she's got some cute baby fat but it's nothing to be worried about. 2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know. 2.3 Gp05P3 (Mother's mother) *: You know, she's got that little girl pudge on her, that's so cute. Actually, I think a couple times this past year, I thought she might be a little underweight, because she didn't seem to have that little toddler pudge. 2.4 Gp06P1 (Mother) **: I don't worry about his weight right now, it's really hard at this age because I mean all of them are kinda pudgy. 2.5 Gp07P1 (Mother) *: She's well within range, she's got that cute little extended abdomen of a toddler, you know. 2.6 Gp10G1 (Father's mother) **: our kids were always in the 95th percentile… robust kids. I think he seems very healthy. 2.7 Gp13G1 (Mother's mother) ***: I think he's in the 50th percentile for weight and over a 100th for height. 2.8 Gp14P1 (Mother) **: I think she is fine, she does have a little belly, but it's not anything I would worry about or say anything. (…) I think she is healthy, I think she is just a big strong girl. 2.9 Gp10P1 (Mother) **: when he got chubby when he was younger, they [grandparents] just thought it was the cutest thing. You know… they are like… they just want to pinch his cheeks. 2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut. 2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles. 2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby. 2.13 Gp07G1 (Mother's mother) *: [My daughter] was the only one, like I said that [she] was in the 95th percentile. She was the only one I ever wondered about, but she was cute chubby, that I

didn't.
Theme 3: Children go through 'growth spurts' and 'stretching out'
3.1 Gp10P1 (Mother) **: I really liked how chubby he was. It was really nice to cuddle. And I didn't worry about that. Because I figure when he would grow, that weight would just stretch out. 3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then they just, you know they start doing this (makes expanding outward hand movements) and then they just grow like a tree, then they lean up. 3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it. 3.4 Gp11P1 (Mother) ***: When she starts getting kind of chunky I start waiting for that growth spurt because if it doesn't hit soon I get worried and start watching what she's eating. 3.5 Gp12P2 (Father) ***: When they're growing, they grow up and they grow out. 3.6 Gp14G1 (Mother's mother) **: I know sometimes kids pudge and then they stretch out. 3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height. 3.8 Gp01P1 (Mother) ***: kids go through different phases and right now is a pudgy stage**.** 3.9 Gp11G1 (Mother's mother) ***: we've never been concerned when she goes through those eating phases because we know it's her growth spurt and it's not like she's gaining weight this way (out) growing this way (up). 3.10 Gp14G1 (Mother's mother) **: I know when [my daughter] was in 5th grade, she got heavier, and then she stretched out in high school. 3.11 Gp06G1 (Mother's mother) **: We can tell when he's about to go through a growth-spurt he gets that little teeny tummy.

Supplementary Table 2. Perceptions of the timeline of obesity; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 4: A high body weight becomes problematic later in childhood
4.1 Gp02G1 (Father's mother) *: I think that when you see kids that are very overweight at 5, 7 and on up, that there's something going on with their eating. I think that when you have small children, like babies, who are plump, healthy babies, that's a whole different story. But I think that when they're older there's something to it.
4.2 Gp10G2 (Father's father) **: Someone with a child [my grandson's] age… he is just 3… I don't know what data shows. Is there any issue with childhood obesity at that age? I don't know. When they talk about childhood obesity, later on, because humans go through all these different growth spurts
4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy.
4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care.
4.5 Gp01G1 (Mother's mother) ***: when they [obese children] get to school they're going to be teased (…) they're going to be the last ones picked for teams in school.
4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating."
4.7 Gp15G1 (Mother's mother) *: as he starts to enter the schooling system that [weight] isn't an additional emotional piece of baggage that he has to carry… being ostracized in the area or personally feeling like different.
4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.
Theme 5: Children's body weight becomes problematic when it affects their activities or health
5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that.

5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine. 5.3 Gp05P1 (Mother) *: if the weight is causing problems and issues in their body and … then that's a problem. 5.4 Gp08P1 (Mother) *: If she starts getting like, even more heavier, where I'm noticing maybe that she's depressed, or gaining weight more, or where if I see it affecting the way she looks at herself or her behavior with other kids, her activities, then I would be concerned. 5.5 Gp10P2 (Father) **: If a kid is too fat to do much then it is not going to be healthy. 5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern. 5.7 Gp14P1 (Mother) **: As long as they are healthy [weight is not an issue]; if you can visibly see that a child is overweight, and not getting enough activity, then that would matter.
Theme 6: Obesity becomes problematic in adulthood
6.1 Gp01P1 (Mother) ***: I do think that a child's weight matters. Just because you don't want them to develop unhealthy habits early because it's going to follow them for the rest of their life. 6.2 Gp01G2 (Father's mother) ***: I don't like seeing a child that age to start out being obese. It carries on with them so… I worry about healthy eating with them a little bit because of that. 6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.4 Gp06P1 (Mother) **: what motivated me is looking at my child and what I want him – who I want him to be in 25 years as a young man. 6.5 Gp10G2 (Father's stepfather) **: If a child is not getting proper nutrition, especially during certain critical stages, you can have all kinds of long lasting effects, and yes that does speak to weight, certainly. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age. 6.7 Gp14G2 (Father's mother) **: I think [weight matters] because what they learn as a child can carry on through their life. What they learn to eat. 6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole life. 6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Supplementary Table 3. Perceptions of parental responsibility and blame for childhood obesity; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control.
7.2 Gp01P1 (Father) ***: the parents and grandparents have control of what the children eat.
7.3 Gp02P1 (Father) *: I think with proper feeding and keeping the proper foods in the house you can control the weight. If you have a bunch of snack foods and junk food all throughout the house and people sit around and watch TV and eat food, you're controlling the weight there and not in a good way – you're going to get heavier.
7.4 Gp02G1 (Father's mother) *: I think that if you buy a lot of junk food and that's what you have: soda, chips and things like that… and that's what your child is mostly eating, and they're getting overweight from that, then yes, you have a lot of control.
7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem.
7.6 Gp06G1 (Mother's mother) **: Just make them [fast foods] a treat, a special treat. Not because you are tired and don't want to cook, because then that becomes too easy for them.
7.7 Gp09G1 (Mother's mother) *: I think if you sit down and eat as a family, you're not sitting in front of the TV feeding your face, so you're going to limit the amount… you're talking so you're not eating as much.
7.8 Gp13G1 (Mother's mother) ***: Yeah, a child's weight is easy to control, if you control what goes in and out of their mouth.
7.9 Gp14P1 (Mother) **: She does like to eat, you could hand her a bag of cookies and put her in front of the TV, and she might sit there all day. Or she might not, I don't know, I've never done that. I could see if some parents were lazy, that might be an easy option. I think parents have a lot of influence on the weight of the child.
7.10 Gp13P1 (Mother) ***: They (parents) need to monitor what their child's eating and make

sure they're being active.

7.11 Gp04G2 (Mother's father) *: I see a lot of kids just go and play their computer games and TVs sitting down eating chips, and that's not the kid's fault.

7.12 Gp09P1 (Mother) *: three year-olds should be running around, they should be active and they shouldn't be sitting on the couch eating Cheetos all day. So that's not a very healthy lifestyle and to each their own with parenting but in my personal opinion, I think it can be controlled.

7.13 Gp12G3 (Father's mother) ***: If you are active, the kids will be active. If you are into nutrition, the kids will be into nutrition.

7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.

7.15 Gp15P1 (mother) *: some kids will be more susceptible to gaining weight than others (…) but I think it's totally controllable what you're going to feed them.

Theme 8: The parents of obese children are blamed by themselves and by others

8.1 Gp04P2 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me.

8.2 Gp05G3 (Mother's mother) *: Sometimes I see heavy parents who don't seem to exercise, and don't seem to eat right. And I see their children, and I say, "Oh my gosh, they are passing that down to the next generation."

8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents.

8.4 Gp13P1 (Mother) ***: If I had a fat kid, it would be looking at me every day, "I'm a failure. I'm doing something wrong."

8.5 Gp04P2 (Mother) *: I think most adults who are overweight can probably attribute it to their parents.

8.6 Gp11P1 (Mother) ***: I hate those parents who are like, "Well, she'll only eat at McDonald's." "No! She won't. You let her only eat at McDonald's. Or you let her only eat fruit snacks."

8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent.

8.8 Gp13G2 (Mother's father) ***: to me, seeing an overweight six year old, it's like what is going on here? I think it's the adults, the parents, guardians, are the ones who have the most effect on that.

8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic

and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.

8.10 Gp03P1 (Mother) ***: They [medical staff] kept asking me what I was feeding him because he was getting so chubby (…) I kept thinking, "What am I doing wrong?"

Supplementary Table 4. Perceptions of appropriate contexts for speaking about preschoolers' body weights; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 9: Parents and grandparents do not discuss preschoolers' body weights with them, unless the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat". 9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level. 9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old". 9.4 Gp09P1 (Mother) *: I don't like this but she does have a fascination with my scale—she doesn't know what the numbers mean but she likes to get on there and I'll be like, "Oh my God, you gained a pound!" and she'll get excited (…) but I think she's still too young to know what (body) image is. 9.5 Gp01G1 (Father's mother) ***: I think she is totally oblivious to it [weight] which is good in a way. 9.6 Gp02P1 (Father) *: I don't think she's noticed any difference between the her and her sister… she's not really conscious of it yet, she is just her. 9.7 Gp10P1 (Mother) **: I don't think he thinks about his weight. We never talk about it. It is almost like nonexistent, especially at his age 9.8 Gp05P3 (Mother's mother) *: She's very comfortable with her body. (…) I think she's aware that she has a body, and that it functions. (…) But I don't think she's really aware of, "oh, I'm too skinny, I'm too fat." 9.9 Gp14P1 (Mother) **: I don't think she thinks anything of it. She is comfortable walking around the house with no clothes on. I don't think she thinks anything of it, she has never said anything.
Theme 10: It's acceptable to discuss how big or strong preschoolers are
10.1 Gp12G2 (Father's father) ***: I can't say that it's [the child's weight] ever come up. Other

than to say that “he’s sure getting heavy”, in growing up.

10.2 Gp12G3 (Father’s mother) ***: We talk about how fit he is. He’s a very fit child.

10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, “Yeah, look at his muscles”.

10.4 Gp11G1 (Mother’s mother) ***: we talk about her weight and her height a lot because she’s a big girl, but not that we’re concerned.

10.5 Gp10G1 (Father’s mother) **: We might have in passing commented to how healthy he seems. I mean, just something sort of innocuous and nothing really of concern.

10.6 Gp04P1 (Father) *: We talk about how he's growing and how he weighed and checked up.

10.7 Gp04P2 (Mother) *: He [the child] just thinks it’s a cool number. He gets excited to get weighed, “am I getting bigger?”

10.8 Gp04G3 (Mother’s mother) *: it's been awhile since we've talked about it. We used to talk about it every time he came back from the doctor. The percentile he was in and such.

10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.

10.10 Gp07G1 (Mother’s mother) *: She’s [the child’s mother] never, that I can think has ever expressed any concern about her weight. She makes comments, like “Boy, I can tell [the child] must be going through a growth spurt.”

10.11 Gp09P1 (Mother) *: They [grandparents] always joke and say that she looks just like Daddy because Daddy’s kind of tall and lean.

Theme 11: Discussing preschoolers’ body weights can affect their self-esteem negatively

11.1 Gp03P1 (Mother) ***: So when he [the child] asks me stuff like that [about his weight] we talk about being strong versus being big and not strong. So it’s all about trying to be strong and healthy so, that’s what we talk about.

11.2 Gp03P2 (Father) ***: By far I don’t think that parents should focus on it [weight] because then it will become a focal point for the child.

11.3 Gp01G1 (Father’s mother) ***: I wouldn’t sit with an iron fist and say, “You can’t have that because it will make you fat.” Because that effects their mental (wellbeing).

11.4 Gp01P1 (Mother) ***: I have a concern that she’s getting a little pudgier so I’m like, “If you’re going to do milk, please go down to the skim or 1%, lay off the juice or dilute it”, to start doing the things that she won’t notice.

11.5 Gp14G2 (Father’s mother) **: I don't think a parent should badger them about their eating habits, I think there are ways to slowly and gradually make changes to lose weight rather than

pointing it out. 11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything. 11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.
Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem
12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her. 12.2 GP10G4 (Stepmother of the father) **: I never talk about his [the child's] weight. 12.3 Gp06P1 (Mother) **: No, I don't think she [grandmother] thinks he's at an unhealthy weight. (…) She's never said anything to me. 12.4 Gp12G3 (Father's mother) ***: I think they [the parents] should be very pleased with it [the child's weight], but I don't know. 12.5 Gp12G2 (Father's father) ***: I don't think about what his parents think about his weight. I know [his father] is certainly concerned with nutrition 12.6 Gp07P1 (Mother) *: I think that my mom probably would think it [the child's weight] doesn't matter. (…) [I]t's never something we discuss. 12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet. 12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it. 12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.

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"A Little on the Heavy Side": A Qualitative Analysis of Parents' and Grandparents' Perceptions of Preschoolers' Body Weights

Karin Eli [1], DPhil, Kyndal Howell [2], BS, Philip A. Fisher, PhD [2], Paulina Nowicka, PhD [1,3]

Affiliations: [1] Unit for Biocultural Variation and Obesity, Institute of Social and Cultural Anthropology, University of Oxford, Oxford, UK; [2] Department of Psychology, University of Oregon, Eugene, USA; [3] Unit of Pediatrics, Department of Clinical Sciences, Intervention and Technology, Karolinska Institute, Stockholm, Sweden

Address correspondence to:
Paulina Nowicka, Division of Pediatrics, Department of Clinical Science, Intervention and Technology (CLINTEC), Karolinska Institutet, 141 86 Stockholm, Sweden, Tel: +46 46 70 454 88 33, Email: paulina.nowicka@ki.se

Abstract

OBJECTIVES: Parents' difficulties in perceiving children's weight status accurately pose a barrier for family-based obesity interventions; however, the factors underlying weight misinterpretation still need to be identified. This study's objective was to examine parents and grandparents' perceptions of preschoolers' body sizes. Interview questions also explored perceptions of parental responsibility for childhood obesity and appropriate contexts in which to discuss preschoolers' weights.

DESIGN: Semi-structured interviews, which were videotaped, transcribed, and analyzed qualitatively.

SETTING: Eugene and the Springfield metropolitan area, Oregon, USA

PARTICIPANTS: Families of children aged 3-5 years were recruited in February – May 2011 through advertisements about the study, published in the job seekers' sections of a classified website (Craigslist) and in a local newspaper. 49 participants (22 parents and 27 grandparents, 70% women, 60% with overweight/obesity) from sixteen low-income families of children aged 3-5 years (50% girls, 56% with overweight/obesity) were interviewed.

RESULTS: There are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents were aware of their preschoolers' growth chart percentiles, these measures did not translate into recognition of children's overweight or obesity. The participants spoke of obesity as a problem that may affect the children in the future, but not at present. Participants identified childhood obesity as being transmitted from one generation to the next, and stigmatized it as resulting from 'lazy' parenting. Parents and grandparents avoided discussing the children's weights with each other and with the children themselves.

CONCLUSIONS: The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

Strengths and limitations of this study

- This study's sample is the largest ever reported in a qualitative investigation of family members' perceptions of preschoolers' body weights.
- While most previous studies focused only on mothers' perceptions of their preschoolers' body weights, this study included mothers, fathers, grandmothers, and grandfathers, recognizing that various adult family members influence young children's body image, eating, and exercise habits.
- Although low-income participants tend to be difficult to reach, the study successfully recruited a predominantly low-income sample.
- The sample primarily consisted of families of Caucasian origin, and thus did not allow for an investigation of the influence of cultural background on perceptions of children's body sizes.
- As several participants were single mothers, the number of fathers was not high enough to enable an assessment of potential differences between fathers' and mothers' perceptions.

INTRODUCTION

While there is growing evidence of the superior effectiveness of lifestyle interventions initiated early in childhood[1-3], one of the main barriers in conducting such interventions is parents' lack of recognition of, or concern about, obesity in children. Parents' difficulties in perceiving children's body sizes accurately have been demonstrated since the early 2000s, across many countries, cultures and child ages[4-6]. A recent study of over 16,000 children aged 2-9 years from eight European countries has shown that, among parents of overweight children, 63% perceived their children's weights as 'proper', independent of educational level[7]. Moreover, a meta-analysis of 69 studies on parental perceptions of children's body weights showed that half of the parents underestimated their children's weight.[8]

Most studies have applied a quantitative approach to describe parents' miscategorization of children's weight status; however, the underlying factors have not been identified conclusively[6]. To date, only two studies[9 10] have used in-depth interviews to examine how parents make sense of children's body weights and their health implications. In their study of low income mothers, Jain et al have shown that most mothers did not worry about their children's body weights if the children were active and socially accepted; the mothers, moreover, distrusted pediatric growth charts, and attributed childhood obesity to genetics, rather than to factors modifiable in the home environment [9]. Misinterpretation of growth charts was also highlighted by Rich et al, who found that 80% of parents perceived their child as healthy although the child's weight was at the 95th percentile. These parents, notably, were aware of obesity related health risks[10]. More recently, focus groups revealed that, in assessing their children's body sizes, parents tend not to rely on clinical measurements; rather, they

often compare their children visually to other children whose body sizes can be defined as extreme, thus skewing their perceptions of what a healthy body size is[11].

So far, existing research on parental perceptions of children's body weights has focused almost exclusively on mothers, and has not examined the critical influence of other family members, such as fathers and grandparents [12]. Because family-based interventions have been proposed as the most effective approach to treating child obesity[13 14], knowledge about how other adult caretakers perceive and discuss young children's body weights will contribute to understanding familial barriers to treatment. Moreover, the fostering of sensitive and non-judgmental communication about children's eating practices and body sizes is important for the prevention of body dissatisfaction and disordered eating in childhood and adolescence[15 16]. To examine caretakers' perceptions of young children's body weights from a broader familial perspective, we designed this study to include family sets of parents and grandparents actively involved in taking care of preschool age children. While investigating communication about food and physical activity among parents and grandparents of preschoolers was the main aim of the study, the participants' perceptions of children's body weights were essential to the study. All participants answered several questions about this topic, resulting in rich and unique material. Given this, we found that this topic merited dedicated discussion, apart from the larger study. As childhood obesity remains high among families with low socioeconomic status[17-19], and as it is more difficult to recruit and retain these families in intervention programs [20 21], we chose to target a low income population.

METHODS

Families of children aged 3-5 years from the Pacific Northwest (Eugene and Springfield metropolitan area, Oregon) were recruited in February – May 2011 through advertisements about the study, published in a local newspaper and the volunteers' and job seekers' sections of Craigslist (the most widely used classified advertisement website in the United States). The active involvement of grandparents in family life (defined as spending time with the grandchild at least twice a month) was the primary criterion for inclusion in the study. Consequently, only families in which at least one parent and one grandparent were willing to be interviewed were included in the study. The other inclusion criteria specified that the child's age must be between 3-5 years, and that the child should have no underlying medical condition or disability which would affect his/her weight. All families who contacted the study coordinator and were found to fulfill the inclusion criteria were recruited to the study. The study was approved by the Internal Review Board of the Oregon Social Learning Center. When the participants first met with the researchers, and before the interviews took place, the researchers verbally explained the informed consent forms to each participant, and answered any questions participants had. If the parents/grandparents agreed to participate, they were asked to read and sign the written project description and project consent forms. The families received a copy of the written study description and informed consent forms.

Parents and grandparents were interviewed separately at the Oregon Social Learning Center. Free child care was provided on site, and the children were not present during the interviews. Each interviewed participant received compensation of $50 for participating in the study. Prior to the interview, parents and grandparents completed a comprehensive sociodemographic questionnaire routinely used in research projects involving families at the Oregon Social Learning Center; the questionnaire included items concerning family composition, parental education, employment status, and living conditions. All the

interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. The interviews, which were conducted by a single researcher (either the second or the last author), lasted 1.5-2.5 hours and explored the different roles of family members in shaping a child's lifestyle. Before coding, all participant names were changed to ensure confidentiality.

This paper focuses on the parents' and grandparents' perceptions of young children's body weights, with particular emphasis on overweight and obesity, parental responsibility for childhood obesity, and contexts in which parents and grandparents discuss preschoolers' body weights. The main questions are summarized in Table 1.

Insert Table 1 here.

It should be noted that while all participants were asked the same main questions, the interview process allowed for fluidity, and follow-up questions were adapted according to each participant's responses. Additionally, while the majority of data directly refer to the main questions listed, the present analysis includes pertinent comments the participants made throughout the interviews. The interviews were videotaped and transcribed in full; videotaping allowed for the inclusion of non-verbal expressions in the transcriptions. For this paper, transcript sections that related to the main questions were extracted and collated. The transcripts were then coded independently by the first and the last author, using a thematic discourse analysis approach. Discourse analysis is concerned with people's use of language to describe and make sense of their realities, and is an appropriate approach for qualitative studies that examine people's definitions of and spoken attitudes towards health issues[22].

Thematic analysis facilitates the identification of patterns in qualitative data, and therefore allowed the researchers to delineate themes across the data set[23]. Over several in-person meetings and email correspondence, the two coders compared and discussed their codes, to examine and resolve potential disagreements, and reach consensus on the clustering of codes into themes and on the grouping of themes under thematic categories.

RESULTS

In total, 49 family members (70% female) from sixteen families were interviewed. The sample included 22 parents and 27 grandparents – subsample sizes suitable for data saturation [24]. Seven families consisted of single parent with sole responsibility for the child (five single mothers and two single fathers). In ten families, only one grandparent was interviewed; in two families, two grandparents were interviewed; in three families, three grandparents were interviewed; and in one family, four grandparents were interviewed. In five of the families, all grandparents who had contact with the grandchild were interviewed. The most common reason for not being able to include full sets were the other grandparents' residing outside the study area.

Participants' characteristics are summarized in Table 2. All data refer to parents and grandparents who were interviewed as part of the study. Due to the targeted recruitment process (ads in job advertisement sections) the sample displayed low levels of education and income; as many as 50% of parents were unemployed. The majority of children, parents and grandparents were Caucasian, reflecting the ethnicity profile of this region of the Pacific Northwest.

All the interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. These measurements were taken in order to contextualize the participants' stated perceptions of and attitudes toward childhood overweight/obesity and associated lifestyle factors. In most cases, the researcher who took the participants' weight and height measurements also interviewed them. However, this did not influence the study, as the participants' and the children's BMI statuses were not calculated prior to the interviews, so as not to bias the interview process. Thus, the interviewers and the participants were not informed about the child's or any of the adult family members' weight status. The interviewers were informed about the participants' and the children's weight statuses following the interviews; the participants were not informed about their own or their children's weight statuses. More than half of parents and two thirds of grandparents had overweight or obesity, according to World Health Organization criteria[25]. Of the children, 56% were either overweight or obese (overweight: 85th percentile < Body Mass Index (BMI) < 95th percentile; obesity: BMI ≥ 95th percentile) [26-28]; those five who were categorized as obese were in the 95th, 96th, 98th (two children) and 99th percentiles for their BMI.

Insert Table 2 here.

The analysis yielded twelve major themes, clustered under four thematic categories: Perceptions of young children's body sizes, perceptions of the timeline of obesity, perceptions of parental responsibility and blame for childhood obesity, and perceptions of appropriate contexts for speaking about preschoolers' body weights. While the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes, there did not appear to be gender differences in participants' accounts.

Furthermore, no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes. Examples of participant quotes from each of the thematic categories and their constituent themes are presented in table format (Tables 3-6). The complete sets of pertinent participant quotes are provided as supplemental material (Supplementary Tables 1-4).

Insert Tables 3-6 here.

Perceptions of young children's body sizes (Table 3)

None of the participants used the words 'obese' or 'overweight' to describe the preschoolers who were later identified as such. The participants used a range of words to describe the body sizes of these preschoolers, including 'pudgy', 'chunky', 'solid', 'stout', 'chubby', 'stocky', 'big boned', and 'robust'. Several participants described the preschoolers as 'tall' and/or 'big for their age'. Notably, even the father of the heaviest child in the sample (99th percentile) described his child as 'a little on the heavy side'. Across the sample, including the parents and grandparents of normal weight children, the participants spoke of 'baby fat' as cute and healthy, and even as something to encourage. A few participants also spoke of children's higher percentiles on the growth charts (>90th percentile) in positive terms. The parents and grandparents of the overweight or obese preschoolers said their body weight was not worrisome because children go through 'growth spurts' and 'stretch out', such that their current excess weight will eventually convert into height.

Perceptions of the timeline of obesity (Table 4)

The participants spoke of obesity as a problem that may affect the preschoolers in the future, but not at present. Several participants indicated that a high body weight becomes problematic when the child reaches school age, particularly due to the risk of teasing, social exclusion, and bullying. Participants also said that a high body weight becomes problematic when it negatively affects the child's health, activities, behaviors, or mood. However, only one participant, whose child was in the 99th percentile for weight, said that she could notice the detrimental effects of the child's body weight at present. Thus, even when speaking of obesity in terms of impact on activity and health, the participants placed it outside the remit of the preschoolers' current experience. Participants also spoke of obesity as problematic due to its manifestations in adulthood, expressing that children's body weights and their eating and exercise habits are important because they translate into 'long lasting effects' and 'hav[ing] more trouble as an adult'.

Perceptions of parental responsibility and blame for childhood obesity (Table 5)

The participants identified parents as bearing primary responsibility for their children's eating and exercise habits and for their body weights. Even those participants who spoke of body size as being affected by genetics asserted that parents can still influence their children's body weights. Likewise, participants who mentioned that children may be overweight or obese due to a health condition (e.g. glandular dysfunction) said that parents are responsible for making sure the child's medical problem is identified and resolved. The participants argued that parents are responsible for children's body weights because they can control what their children eat, provide a healthy food environment at home, encourage their children to play outside and be active, and model healthy behaviors themselves.

The participants' concepts of parental responsibility linked with their attitudes towards parental blame for childhood obesity. Several participants said they 'judged' parents whose children were obese; some even said that the parents of obese children were guilty of child neglect or abuse. Participants identified childhood obesity as being transmitted from one generation to the next, and as the result of 'lazy' parenting. Having an obese child was an outward sign of 'failing' as a parent, and one mother whose child was obese spoke of feeling blamed by clinicians for the child's weight gain, which, as she said, neither she nor the child's clinicians could explain.

Perceptions of appropriate contexts for speaking about preschoolers' body weights (Table 6)

The participants described discussions of preschoolers' body weights as sensitive, often unnecessary, and potentially dangerous. The decision to engage in discussion about children's body weights was context dependent. Participants said they discussed their children's or grandchildren's body weights with them only if the children themselves raised the topic. Those participants whose preschoolers did not mention body weight said they had never discussed the issue with them. Several participants said that children of preschool age do not have body image concepts related to weight. Some participants cited their preschoolers' 'apparent 'comfort' with – or lack of self-consciousness about – their bodies as signaling a lack of concern with body image. A number of participants also said they avoided discussions of their preschoolers' body weights because these discussions could be harmful to the children's self-esteem and emotional wellbeing.

Notably all parents, with the exception of two, avoided discussing their children's body weights not only with the children themselves, but also with the children's grandparents; likewise, excepting one grandmother, all grandparents avoided discussing their grandchildren's body weights with the parents. Participants described these discussions as unnecessary when body weight was 'not an issue'. It was only when a child's body weight was perceived as problematic (in the case of the largest child in the sample) that parents and grandparents said they openly discussed it with each other. However, while most participants said they did not discuss body weights, they identified comments on children's 'healthy' appearance, growth, or muscle definition as appropriate and positive. Thus, although participants were reluctant to discuss the preschoolers' body weights, they did discuss the preschoolers' body sizes, with attention to how 'big' or 'strong' they were.

DISCUSSION

This study's findings suggest that the parents and grandparents of preschool age children face difficulties in identifying and discussing their preschoolers' overweight and obesity. Previous research has found that low income mothers are not concerned about preschoolers' overweight because they attribute body weight to genetic heredity[9]. However, in this study, the participants strongly endorsed the idea that parents bear primary responsibility for their children's eating and exercise habits and body weights. Nevertheless, the participants did not speak of their own children or grandchildren as overweight or obese. Notably, the participants' responses were consistent across the sample, and no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes.

Although the participants recognized obesity in general as a problem, they normalized their own children's and grandchildren's excess body weight as 'toddler pudge' or 'cute baby fat'. Like Jain et al [9], the authors of the present study suggest that most participants used these words not as euphemisms, as underscored by the participants' consistent descriptions of children's higher body weights in positive terms – as 'cute' or 'healthy'. While participants said that preschoolers' body weights would be problematic if the child became 'visibly overweight', it was less clear how a 'visibly overweight' preschooler might look. The participants' discussions focused, instead, on signs that might negate 'visible overweight' in a preschooler, including tallness, muscularity, and physical strength. As noted by Jones et al[11], when participants described obesity, it was through extreme cases of morbid obesity in later childhood or adulthood, with some citing examples of older children who were 'miniatures of their parents' and contestants on *The Biggest Loser* who weighed 400 lbs. Future research should explore how a 'visibly overweight' preschooler might look to parents and grandparents.

Just as the participants visualized obesity through images of older children or adults, they also spoke of obesity as a problem that might affect children later in life, but not in preschool age. Participants spoke of suffering from teasing as a school age child, or from poor health as an adult, as the consequences that marked obesity as a problem. While participants did say that they would recognize a body weight problem if their preschoolers showed negative changes in behavior, activity, and mood, they did not name immediate health risks. The participants' depictions of obesity revealed a disconnect between knowledge and perception, previously shown by Rich et al[10]. Although they were aware of their preschoolers' growth chart percentiles, most participants did not link these percentiles with the categories of 'overweight'

and 'obesity'. Likewise, although participants were aware of the health risks associated with obesity in adulthood, they did not link their preschoolers' body weights with potential problems in the present tense.

While the participants did not associate obesity with early childhood, they did take responsibility for their preschoolers' body weights, and endorsed healthy eating and exercise practices. Along similar lines, however, the participants – including some whose children were classified as obese –blamed parents for childhood obesity. The participants' expressions of judgment toward the parents of obese children were aligned with broader social stigma attached to obesity[29 30]. Given the participants' stigmatizing attitudes, it is not surprising that they did not discuss their preschoolers' body weights with other family members. Although parents and grandparents did discuss children's body sizes through comments on how 'big', 'strong', 'healthy', or 'muscular' they were, most participants whose preschoolers were classified as overweight or obese did not discuss their body weights with family members, except when there was a perceived health problem. It is possible that, for the participants, discussion of body weight threatened to expose both themselves and their children to the risk of blame, reduced self-esteem, and stigma attached to obesity. At the same time, it is important to note that, in deciding not to discuss body weight with their preschoolers (unless the children themselves raised the topic), the participants protected the children's body image and self-esteem. Moreover, like the parents described by Andreassen et al [31], those parents who recognized their children needed to lose weight attempted to enact weight loss strategies without explicitly mentioning weight. As previous studies have shown, parental comments about body weight are associated with body dissatisfaction and reduced self-esteem in children[15 32 33], such that the participants' stance on avoiding 'weight talk' with children was positive. In cases where children are enrolled in clinical treatment programs for obesity

management, however, it is important that clinicians, parents, and grandparents identify sensitive and supportive ways of framing the topic of body weight. A recent study has proposed a set of guidelines to help parents discuss body image and eating with preschool aged children in a supportive way that is protective of children's self-esteem[16].

The results of this study suggest that there are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents are aware of their preschoolers' growth chart percentiles, these measures do not translate into recognition of young children's overweight or obesity. Without visual examples of how a preschool age child with overweight or obesity might look, such as sketched silhouettes or photographs at different weight categories[34-36], parents and grandparents continue to speak of children's excess weight as 'cute' or 'healthy', and perceive obesity as problematic only in later childhood or adulthood. Moreover, as parents and grandparents find it difficult to discuss young children's body weights with the children and with one another, this might affect the success of clinical interventions for childhood obesity, in which children's caretakers are forced into a new and uncomfortable discussion.

The clinical implications of this study include several components. In discussions with parents and grandparents of preschool age children, clinicians should clarify how children's fat distribution and body sizes typically change with age. Clinicians should also speak with children's caretakers about the meaning of growth chart percentiles, and provide visual examples of how children might look in each of the percentile categories. Moreover, clinicians should emphasize the immediate problems associated with obesity in early childhood, such as hypertension (present in more than 50% of children with obesity), dyslipidemia, motor skill development and orthopedic complications[37-39].

The results also suggest that the countering of stigma should be an important part of the clinical management of childhood obesity. Given the social stigma and blame attached to parents of children with obesity, parents might contest a child's obesity diagnosis and be reluctant to take part in interventions to manage their child's condition[40]. It is therefore crucial that clinicians directly address stigma when they speak to parents, emphasizing that childhood obesity is not the parents' fault, and that managing this condition together is a positive step. Similarly, clinicians should avoid addressing parents of children with obesity in ways that might make them feel guilty or judged. Finally, it is important that clinicians frame discussions of children's body weights sensitively, and encourage parents and grandparents to address children's eating and physical activity practices through positive words and actions, without emphasizing body weight to the children themselves.

This study had some limitations. While the sample was the largest ever reported in a qualitative investigation of parents' and grandparents' perceptions and attitudes concerning preschoolers' body weights, the families were mainly of Caucasian origin, representing the ethnic distribution of the population in Eugene and Springfield, Oregon. Thus, the influence of cultural background on perceptions of children's body sizes, which several studies have identified as important[5 18 30], could not be investigated. As the study targeted families of low socioeconomic status, further research is needed to determine whether the results can be generalized to other populations. Additionally, as several participants were single mothers, the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes. Finally, while a number of families had a full or nearly-full set of grandparents participating, some had only one or two grandparents participating, due to circumstances such as the other grandparents' living outside the area.

CONCLUSION

This study was the first to focus on both parents' and grandparents' perceptions of preschoolers' body weights, and is the largest qualitative study to date to include a mixed familial sample of adult caretakers of preschool age children, with subsamples of parents and grandparents that meet data saturation standards[24]. The study's results demonstrate that while parents and grandparents recognize childhood obesity as problematic, endorse healthy eating and exercise habits, and take responsibility for children's body weights, they find it difficult to recognize and discuss young children's overweight and obesity. The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

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CONTRIBUTORSHIP STATEMENT

Karin Eli: Dr Eli coded the interviews and analyzed them together with Dr Nowicka, wrote the manuscript, and approved the final manuscript as submitted.

Kyndal Howell: Ms Howell coordinated the data collection, critically reviewed the manuscript, and approved the final manuscript as submitted.

Philip A. Fisher: Professor Fisher contributed to the design of the study, critically reviewed the manuscript and approved the final manuscript as submitted.

Paulina Nowicka: Dr Nowicka conceptualized and designed the study, coordinated and supervised data collection and analysis, coded the interviews and analyzed them together with Dr Eli, critically reviewed the manuscript and approved the final manuscript as submitted.

COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

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DATA SHARING

Online supplementary table S1-4 containing complete sets of pertinent participant quotes. No additional data available.

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Table 1. Questions included in this study.

1. Do you think that how much a child weighs matters? If yes, why? If not, why?
2. How much do you think that a child's weight is possible to control/controllable? If *yes*, what lifestyle choices do you think are the most important? How/when do you think they can be promoted, and who do you think can do that? And who in the family plays the most important role when it comes to influencing the child's weight? If *no*, what makes you think that way?
3. What do you think about your child's (or grandchild's) weight? (As compared to his/her siblings, cousins, other children, to the child's parents. Are you concerned/not concerned?)
4. What do you think that the parents of your grandchild think about your grandchild's weight (or grandparents of your child about your child's weight)? (Examine: If there are two parents (grandparents) in the house, do they have the same opinion?)
5. Do you talk about your child (grandchild's) weight with his/her grandparents (parents)? (If yes, why, how? If not, why? Examine: If there are two parents in the house, which of them do you talk the most with and why?)
6. Do you know if your child (grandchild) thinks about his/her weight? (Probe: Does he/she ever comment on it? Did that happen in your presence? If yes, what did you say? If your child doesn't think about his/her weight, is it good or bad?)

611 Table 2. Descriptive statistics of the sample

	Child (n=16)	Parent (n=22)	Grandparent (n=27)
Age (mean in years, range)	4.6 (3.1-5.7)	32. 2 (22.7-49.5)	56.9 (43.0-77.9)
Gender:			
Female	8 (50%)	14 (64%)	21 (78%)
Male	8 (50%)	8 (36%)	6 (22%)
Racial background:			
Euro-American/Caucasian	11 (68%)	21 (95%)	23 (84%)
Native American	0	1 (5%)	0
Asian	0	0	1 (4%)
African-American	0	0	1 (4%)
Mixed	5 (32%)	0	2 (8%)
BMI (mean, range)	17.7 (14.3-21.5)	26.8 (16.1-39.1)	29.1 (16.1-49.4)
Weight status:			
Underweight	0	2 (9%)	1 (3%)
Normalweight	7 (44%)	8 (36%)	8 (30%)
Overweight	4 (25%)	6 (27%)	10 (37%)
Obese	5 (31%)	6 (27%)	8 (30%)
Highest school grade completed	n/a		
High school		8 (82%)	20 (74%)
College/University		4 (18%)	7 (26%)
Working situation	n/a		
Full time		7 (32%)	8 (30%)
Part time		4 (18%)	4 (15%)

Not employed*		11 (50%)	15 (55%)
Annual household income	n/a		
Less than 14,999 USD		8 (36%)	7 (26%)
15,000-24,999 USD		6 (27%)	6 (22 %)
25,000 – 39,999 USD		4 (18%)	6 (22 %)
More than 40, 000 USD		4 (18%)	8 (30 %)

* The main reasons for unemployment among parents were child care, pursuing higher education, and not finding work; among grandparents, unemployment was due to not finding work, reaching retirement age, or retiring due to health issues.

Table 3. Examples of participants' quotes on perceptions of young children's body sizes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age. 1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight. 1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts. 1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never been concerned about her weight.
Theme 2: 'Baby fat' is cute and healthy
2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know. 2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut. 2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles. 2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby.
Theme 3: Children go through 'growth spurts' and 'stretching out'
3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then they just, you know they start doing this (makes expanding outward hand movements) and then they just grow like a tree, then they lean up. 3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it. 3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height.

Table 4. Examples of participants' quotes on perceptions of the timeline of obesity.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 4: A high body weight becomes problematic later in childhood
4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy. 4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care. 4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating." 4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.
Theme 5: Children's body weight becomes problematic when it affects their activities or health
5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that. 5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine. 5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern.
Theme 6: Obesity becomes problematic in adulthood
6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age. 6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole

life.

6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Table 5. Examples of participants' quotes on perceptions of parental responsibility and blame for childhood obesity.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control. 7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem. 7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.
Theme 8: The parents of obese children are blamed by themselves and by others
8.1 Gp042 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me. 8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents. 8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent. 8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.

Table 6. Examples of participants' quotes on perceptions of appropriate contexts for speaking about preschoolers' body weights.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 9: Parents and grandparents discuss preschoolers' body weights with them only when the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat". 9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level. 9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old".
Theme 10: It's acceptable to discuss how big or strong preschoolers are.
10.2 Gp12G3 (Father's mother) ***: We talk about how fit he is. He's a very fit child. 10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, "Yeah, look at his muscles". 10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.
Theme 11: Discussing preschoolers' body weights can affect their self-esteem negatively
11.2 Gp03P2 (Father) ***: By far I don't think that parents should focus on it [weight] because then it will become a focal point for the child. 11.3 Gp01G1 (Father's mother) ***: I wouldn't sit with an iron fist and say, "You can't have that because it will make you fat." Because that effects their mental (wellbeing). 11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything. 11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.
Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem

12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her.

12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet.

12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it.

12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.

"A ~~little~~ Little on the ~~heavy~~ Heavy ~~side~~Side": A Qualitative Analysis of Parents' and Grandparents' Perceptions of Preschoolers' Body Weights

Karin Eli [1], DPhil, Kyndal Howell [2], BS, Philip A. Fisher, PhD [2], Paulina Nowicka, PhD [1,3]

Affiliations: [1] Unit for Biocultural Variation and Obesity, Institute of Social and Cultural Anthropology, University of Oxford, Oxford, UK; [2] Department of Psychology, University of Oregon, Eugene, USA; [3] Unit of Pediatrics, Department of Clinical Sciences, Intervention and Technology, Karolinska Institute, Stockholm, Sweden

Address correspondence to:
Paulina Nowicka, Division of Pediatrics, Department of Clinical Science, Intervention and Technology (CLINTEC), Karolinska Institutet, 141 86 Stockholm, Sweden, Tel: +46 46 70 454 88 33, Email: paulina.nowicka@ki.se

Abstract

OBJECTIVES: Parents' difficulties in perceiving children's weight status accurately pose a barrier for family-based obesity interventions; however, the factors underlying weight misinterpretation still need to be identified. This study's objective was to examine parents and grandparents' perceptions of preschoolers' body sizes. Interview questions also explored perceptions of parental responsibility for childhood obesity and appropriate contexts in which to discuss preschoolers' weights.

DESIGN: Semi-structured interviews, which were videotaped, transcribed, and analyzed qualitatively.

SETTING: Eugene and the Springfield metropolitan area, Oregon, USA

PARTICIPANTS: Families of children aged 3-5 years were recruited in February – May 2011 through advertisements about the study, published in the job seekers' sections of a classified website (Craigslist) and in a local newspapers. 49 participants (22 parents and 27 grandparents, 70% women, 60% with overweight/obesity) from sixteen low-income families of children aged 3-5 years (50% girls, 56% with overweight/obesity) were interviewed.

RESULTS: There are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents were aware of their preschoolers' growth chart percentiles, these measures did not translate into recognition of children's overweight or obesity. The participants spoke of obesity as a problem that may affect the children in the future, but not at present. Participants identified childhood obesity as being transmitted from one generation to the next, and stigmatized it as resulting from 'lazy' parenting. Parents and grandparents avoided discussing the children's weights with each other and with the children themselves.

CONCLUSIONS: The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

Strengths and limitations of this study

- This study's sample is the largest ever reported in a qualitative investigation of family members' perceptions of preschoolers' body weights.
- While most previous studies focused only on mothers' perceptions of their preschoolers' body weights, this study included mothers, fathers, grandmothers, and grandfathers, recognizing that various adult family members influence young children's body image, eating, and exercise habits.
- Although low-income participants tend to be difficult to reach, the study successfully recruited a predominantly low-income sample.
- The sample primarily consisted of families of Caucasian origin, and thus did not allow for an investigation of the influence of cultural background on perceptions of children's body sizes.
- As several participants were single mothers, the number of fathers was not high enough to enable an assessment of potential differences between fathers' and mothers' perceptions.

INTRODUCTION

While there is growing evidence of the superior effectiveness of lifestyle interventions initiated early in childhood[1-3], one of the main barriers in conducting such interventions is parents' lack of recognition of, or concern about, obesity in children. Parents' difficulties in perceiving children's body sizes accurately have been demonstrated since the early 2000s, across many countries, cultures and child ages[4-6]. A recent study of over 16,000 children aged 2-9 years from eight European countries has shown that, among parents of overweight children, 63% perceived their children's weights as 'proper', independent of educational level[7]. Moreover, a meta-analysis of 69 studies on parental perceptions of children's body weights showed that half of the parents underestimated their children's weight.[8]

Most studies have applied a quantitative approach to describe parents' miscategorization of children's weight status; however, the underlying factors have not been identified conclusively[6]. To date, only two studies[9 10] have used in-depth interviews to examine how parents make sense of children's body weights and their health implications. In their study of low income mothers, Jain et al have shown that most mothers did not worry about their children's body weights if the children were active and socially accepted; the mothers, moreover, distrusted pediatric growth charts, and attributed childhood obesity to genetics, rather than to factors modifiable in the home environment [9]. Misinterpretation of growth charts was also highlighted by Rich et al, who found that 80% of parents perceived their child as healthy although the child's weight was at the 95th percentile. These parents, notably, were aware of obesity related health risks[10]. More recently, focus groups revealed that, in assessing their children's body sizes, parents tend not to rely on clinical measurements; rather, they

often compare their children visually to other children whose body sizes can be defined as extreme, thus skewing their perceptions of what a healthy body size is[11].

So far, existing research on parental perceptions of children's body weights has focused almost exclusively on mothers, and has not examined the critical influence of other family members, such as fathers and grandparents [12]. Because family-based interventions have been proposed as the most effective approach to treating child obesity[13 14], knowledge about how other adult caretakers perceive and discuss young children's body weights will contribute to understanding familial barriers to treatment. Moreover, the fostering of sensitive and non-judgmental communication about children's eating practices and body sizes is important for the prevention of body dissatisfaction and disordered eating in childhood and adolescence[15 16]. To examine caretakers' perceptions of young children's body weights from a broader familial perspective, we designed this study to include family sets of parents and grandparents actively involved in taking care of preschool age children. While investigating communication about food and physical activity among parents and grandparents of preschoolers was the main aim of the study, the participants' perceptions of children's body weights were essential to the study. All participants answered several questions about this topic, resulting in rich and unique material. Given this, we found that this topic merited dedicated discussion, apart from the larger study. As childhood obesity remains high among families with low socioeconomic status[17-19], and as it is more difficult to recruit and retain these families in intervention programs [20 21], we chose to target a low income population.

METHODS

Families of children aged 3-5 years from the Pacific Northwest (Eugene and Springfield metropolitan area, Oregon) were recruited in February – May 2011 through advertisements about the study, published in a local newspaper and the volunteers' and job seekers' sections of Craigslist (the most widely used classified advertisement website in the United States). The active involvement of grandparents in family life (defined as spending time with the grandchild at least twice a month) was the primary criterion for inclusion in the study. Consequently, only families in which at least one parent and one grandparent were willing to be interviewed were included in the study. The other inclusion criteria specified that the child's age must be between 3-5 years, and that the child should have no underlying medical condition or disability which would affect his/her weight. All families who contacted the study coordinator and were found to fulfill the inclusion criteria were recruited to the study. The study was approved by the Internal Review Board of the Oregon Social Learning Center. When the participants first met with the researchers, and before the interviews took place, the researchers verbally explained the informed consent forms to each participant, and answered any questions participants had. If the parents/grandparents agreed to participate, they were asked to read and sign the written project description and project consent forms. The families received a copy of the written study description and informed consent forms.

Parents and grandparents were interviewed separately at the Oregon Social Learning Center. Free child care was provided on site, and the children were not present during the interviews. Each interviewed participant received compensation of $50 for participating in the study. Prior to the interview, parents and grandparents completed a comprehensive sociodemographic questionnaire routinely used in research projects involving families at the Oregon Social Learning Center; the questionnaire included items concerning family composition, parental education, employment status, and living conditions. All the

interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. ~~The weight status using height and weight was not calculated prior the interview, thus the interviewer and the family members were not informed about the child's or family members' weight status.~~ The interviews, which were conducted by a single researcher (either the second or the last author), lasted 1.5-2.5 hours and explored the different roles of family members in shaping a child's lifestyle. Before coding, all participant names were changed to ensure confidentiality.

This paper focuses on the parents' and grandparents' perceptions of young children's body weights, with particular emphasis on overweight and obesity, parental responsibility for childhood obesity, and contexts in which parents and grandparents discuss preschoolers' body weights. The main questions are summarized in Table 1. ~~were: (1) Do you think that how much a child weighs matters? If yes, why? If not, why? (2) How much do you think that a child's weight is possible to control/controllable? If yes, what lifestyle choices do you think are the most important? How/when do you think they can be promoted, and who do you think can do that? And who in the family plays the most important role when it comes to influencing the child's weight? If no, what makes you think that way? (3) What do you think about your child's (or grandchild's) weight? As compared to his/her siblings, cousins, other children, to the child's parents. Are you concerned/not concerned? (4) What do you think that the parents of your grandchild think about your grandchild's weight (or grandparents of your child about your child's weight)? Examine: If there are two parents (grandparents) in the house, do they have the same opinion? (5) Do you talk about your child (grandchild's) weight with his/her grandparents (parents)? If yes, why, how? If not, why? Examine: If there are two parents in the house, which of them do you talk the most with and why? (6) Do you know if~~

~~your child (grandchild) thinks about his/her weight? Probe: Does he/she ever comment on it? Did that happen in your presence? If yes, what did you say? If your child doesn't think about his/her weight, is it good or bad?~~

Insert Table 1 here.

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It should be noted that while all participants were asked the same main questions, the interview process allowed for fluidity, and follow-up questions were adapted according to each participant's responses. Additionally, while the majority of data directly refer to the main questions listed, the present analysis includes pertinent comments the participants made throughout the interviews. The interviews were videotaped and transcribed in full; videotaping allowed for the inclusion of non-verbal expressions in the transcriptions. For this paper, transcript sections that related to the main questions were extracted and collated. The transcripts were then coded independently by the first and the last author, using a thematic discourse analysis approach. Discourse analysis is concerned with people's use of language to describe and make sense of their realities, and is an appropriate approach for qualitative studies that examine people's definitions of and spoken attitudes towards health issues[22]. Thematic analysis facilitates the identification of patterns in qualitative data, and therefore allowed the researchers to delineate themes across the data set[23]. Over several in-person meetings and email correspondence, the two coders compared and discussed their codes, to examine and resolve potential disagreements, and reach consensus on the clustering of codes into themes and on the grouping of themes under thematic categories.

RESULTS

In total, 49 family members (70% female) from sixteen families were interviewed. The sample included 22 parents and 27 grandparents – subsample sizes suitable for data saturation [24]. Seven families consisted of single parent with sole responsibility for the child (five single mothers and two single fathers). In ten families, only one grandparent was interviewed; in two families, two grandparents were interviewed; in three families, three grandparents were interviewed; and in one family, four grandparents were interviewed. In five of the families, all grandparents who had contact with the grandchild were interviewed. The most common reason for not being able to include full sets were the other grandparents' residing outside the study area.

Participants' characteristics are summarized in Table ~~1~~2. All data refer to parents and grandparents who were interviewed as part of the study. Due to the targeted recruitment process (ads in job advertisement sections) the sample displayed low levels of education and income; as many as 50% of parents were unemployed. The majority of children, parents and grandparents were Caucasian, reflecting the ethnicity profile of this region of the Pacific Northwest.

All the interviewed parents and grandparents as well as the preschooler in focus had their height and weight measured, without shoes and wearing only light clothing, by trained research staff prior to the interviews. These measurements were taken in order to contextualize the participants' stated perceptions of and attitudes toward childhood overweight/obesity and associated lifestyle factors. In most cases, the researcher who took the participants' weight and height measurements also interviewed them. However, this did not influence the study, ~~The~~ as the participants' and the children's BMI statuses were not calculated prior to the interviews, so as not to bias the interview process. Thus, the

interviewers and the participants were not informed about the child's or any of the adult family members' weight status. The interviewers were informed about the participants' and the children's weight statuses following the interviews; the participants were not informed about their own or their children's weight statuses. More than half of parents and two thirds of grandparents had overweight or obesity, according to World Health Organization criteria[25]. Of the children, 56% were either overweight or obese (overweight: 85th percentile < Body Mass Index (BMI) < 95th percentile; obesity: BMI ≥ 95th percentile) [26-28]; those five who were categorized as obese were in the 95th, 96th, 98th (two children) and 99th percentiles for their BMI.

Insert Table ~~1~~ 2 here.

The analysis yielded twelve major themes, clustered under four thematic categories: Perceptions of young children's body sizes, perceptions of the timeline of obesity, perceptions of parental responsibility and blame for childhood obesity, and perceptions of appropriate contexts for speaking about preschoolers' body weights. While the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes, there did not appear to be gender differences in participants' accounts. Furthermore, no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes~~While the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes, it is possible to say that the participants' responses were consistent across the sample, and no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes~~. Examples of participant quotes from each of the thematic categories and their constituent themes are presented in table

format (Tables ~~2~~3-~~5~~6). The complete sets of pertinent participant quotes are provided as supplemental material (Supplementary Tables 1-4).

Insert Tables ~~2~~3-~~5~~ 6 here.

Perceptions of young children's body sizes (Table ~~2~~3)

None of the participants used the words 'obese' or 'overweight' to describe the preschoolers who were later identified ~~whom the growth charts defined~~ as such. The participants used a range of words to describe the body sizes of these preschoolers, including 'pudgy', 'chunky', 'solid', 'stout', 'chubby', 'stocky', 'big boned', and 'robust'. Several participants described the preschoolers as 'tall' and/or 'big for their age'. Notably, even the father of the heaviest child in the sample (99th percentile) described his child as 'a little on the heavy side'. Across the sample, including the parents and grandparents of normal weight children, the participants spoke of 'baby fat' as cute and healthy, and even as something to encourage. A few participants also spoke of children's higher percentiles on the growth charts (>90th percentile) in positive terms. The parents and grandparents of the overweight or obese preschoolers said their body weight was not worrisome because children go through 'growth spurts' and 'stretch out', such that their current excess weight will eventually convert into height.

Perceptions of the timeline of obesity (Table ~~3~~4)

The participants spoke of obesity as a problem that may affect the preschoolers in the future, but not at present. Several participants indicated that a high body weight becomes problematic when the child reaches school age, particularly due to the risk of teasing, social exclusion, and bullying. Participants also said that a high body weight becomes problematic when it

negatively affects the child's health, activities, behaviors, or mood. However, only one participant, whose child was in the 99th percentile for weight, said that she could notice the detrimental effects of the child's body weight at present. Thus, even when speaking of obesity in terms of impact on activity and health, the participants placed it outside the remit of the preschoolers' current experience. Participants also spoke of obesity as problematic due to its manifestations in adulthood, expressing that children's body weights and their eating and exercise habits are important because they translate into 'long lasting effects' and 'hav[ing] more trouble as an adult'.

Perceptions of parental responsibility and blame for childhood obesity (Table 45)

The participants identified parents as bearing primary responsibility for their children's eating and exercise habits and for their body weights. Even those participants who spoke of body size as being affected by genetics asserted that parents can still influence their children's body weights. Likewise, participants who mentioned that children may be overweight or obese due to a health condition (e.g. glandular dysfunction) said that parents are responsible for making sure the child's medical problem is identified and resolved. The participants argued that parents are responsible for children's body weights because they can control what their children eat, provide a healthy food environment at home, encourage their children to play outside and be active, and model healthy behaviors themselves.

The participants' concepts of parental responsibility linked with their attitudes towards parental blame for childhood obesity. Several participants said they 'judged' parents whose children were obese; some even said that the parents of obese children were guilty of child neglect or abuse. Participants identified childhood obesity as being transmitted from one generation to the next, and as the result of 'lazy' parenting. Having an obese child was an

outward sign of 'failing' as a parent, and one mother whose child was obese spoke of feeling blamed by clinicians for the child's weight gain, which, as she said, neither she nor the child's clinicians could explain.

Perceptions of appropriate contexts for speaking about preschoolers' body weights (Table ~~5~~6)

The participants described discussions of preschoolers' body weights as sensitive, often unnecessary, and potentially dangerous. The decision to engage in discussion about children's body weights was context dependent. Participants said they discussed their children's or grandchildren's body weights with them only if the children themselves raised the topic. Those participants whose preschoolers did not mention body weight said they had never discussed the issue with them. Several participants said that children of preschool age do not have body image concepts related to weight. Some participants cited their preschoolers' 'apparent 'comfort' with – or lack of self-consciousness about – their bodies as signaling a lack of concern with body image. A number of participants also said they avoided discussions of their preschoolers' body weights because these discussions could be harmful to the children's self-esteem and emotional wellbeing.

Notably~~, excepting the parents of the two children with the height weight statuses,~~ all parents, with the exception of two, ~~-~~avoided discussing their children's body weights not only with the children themselves, but also with the children's grandparents; likewise, excepting one grandmother, all grandparents avoided discussing their grandchildren's body weights with the parents. Participants described these discussions as unnecessary when body weight was 'not an issue'. It was only when a child's body weight was perceived as problematic (in the case of

the largest child in the sample) that parents and grandparents said they openly discussed it with each other. However, while most participants said they did not discuss body weights, they identified comments on children's 'healthy' appearance, growth, or muscle definition as appropriate and positive. Thus, although participants were reluctant to discuss the preschoolers' body weights, they did discuss the preschoolers' body sizes, with attention to how 'big' or 'strong' they were.

DISCUSSION

This study's findings suggest that the parents and grandparents of preschool age children face difficulties in identifying and discussing their preschoolers' overweight and obesity. Previous research has found that low income mothers are not concerned about preschoolers' overweight because they attribute body weight to genetic heredity[9]. However, in this study, the participants strongly endorsed the idea that parents bear primary responsibility for their children's eating and exercise habits and body weights. Nevertheless, the participants did not speak of their own children or grandchildren as overweight or obese. Notably, the participants' responses were consistent across the sample, and no generational differences were observed between the parents' and the grandparents' perceptions of their preschoolers' body sizes.

Although the participants recognized obesity in general as a problem, they normalized their own children's and grandchildren's excess body weight as 'toddler pudge' or 'cute baby fat'. Like Jain et al [9], the authors of the present study suggest that most participants used these words not as euphemisms, as underscored by the participants' consistent descriptions of

children's higher body weights in positive terms – as 'cute' or 'healthy'. While participants said that preschoolers' body weights would be problematic if the child became 'visibly overweight', it was less clear how a 'visibly overweight' preschooler might look. The participants' discussions focused, instead, on signs that might negate 'visible overweight' in a preschooler, including tallness, muscularity, and physical strength. As noted by Jones et al[11], when participants described obesity, it was through extreme cases of morbid obesity in later childhood or adulthood, with some citing examples of older children who were 'miniatures of their parents' and contestants on *The Biggest Loser* who weighed 400 lbs. Future research should explore how a 'visibly overweight' preschooler might look to parents and grandparents.

Just as the participants visualized obesity through images of older children or adults, they also spoke of obesity as a problem that might affect children later in life, but not in preschool age. Participants spoke of suffering from teasing as a school age child, or from poor health as an adult, as the consequences that marked obesity as a problem. While participants did say that they would recognize a body weight problem if their preschoolers showed negative changes in behavior, activity, and mood, they did not name immediate health risks. The participants' depictions of obesity revealed a disconnect between knowledge and perception, previously shown by Rich et al[10]. Although they were aware of their preschoolers' growth chart percentiles, most participants did not link these percentiles with the categories of 'overweight' and 'obesity'. Likewise, although participants were aware of the health risks associated with obesity in adulthood, they did not link their preschoolers' body weights with potential problems in the present tense.

While the participants did not associate obesity with early childhood, they did take responsibility for their preschoolers' body weights, and endorsed healthy eating and exercise practices. Along similar lines, however, the participants – including some whose children were classified as obese –blamed parents for childhood obesity. The participants' expressions of judgment toward the parents of obese children were aligned with broader social stigma attached to obesity[29 30]. Given the participants' stigmatizing attitudes, it is not surprising that they did not discuss their preschoolers' body weights with other family members. Although parents and grandparents did discuss children's body sizes through comments on how 'big', 'strong', 'healthy', or 'muscular' they were, most participants whose preschoolers were classified as overweight or obese did not discuss their body weights with family members, except when there was a perceived health problem. It is possible that, for the participants, discussion of body weight threatened to expose both themselves and their children to the risk of blame, reduced self-esteem, and stigma attached to obesity. At the same time, it is important to note that, in deciding not to discuss body weight with their preschoolers (unless the children themselves raised the topic), the participants protected the children's body image and self-esteem. Moreover, like the parents described by Andreassen et al [31], those parents who recognized their children needed to lose weight attempted to enact weight loss strategies without explicitly mentioning weight. As previous studies have shown, parental comments about body weight are associated with body dissatisfaction and reduced self-esteem in children[15 32 33], such that the participants' stance on avoiding 'weight talk' with children was positive. In cases where children are enrolled in clinical treatment programs for obesity management, however, it is important that clinicians, parents, and grandparents identify sensitive and supportive ways of framing the topic of body weight. A recent study has proposed a set of guidelines to help parents discuss body image and eating with preschool aged children in a supportive way that is protective of children's self-esteem[16].

The results of this study suggest that there are important gaps between clinical definitions and lay perceptions of childhood obesity. While parents and grandparents are aware of their preschoolers' growth chart percentiles, these measures do not translate into recognition of young children's overweight or obesity. Without visual examples of how a preschool age child with overweight or obesity might look, such as sketched silhouettes or photographs at different weight categories[34-36], parents and grandparents continue to speak of children's excess weight as 'cute' or 'healthy', and perceive obesity as problematic only in later childhood or adulthood. Moreover, as parents and grandparents find it difficult to discuss young children's body weights with the children and with one another, this might affect the success of clinical interventions for childhood obesity, in which children's caretakers are forced into a new and uncomfortable discussion.

The clinical implications of this study include several components. In discussions with parents and grandparents of preschool age children, clinicians should clarify how children's fat distribution and body sizes typically change with age. Clinicians should also speak with children's caretakers about the meaning of growth chart percentiles, and provide visual examples of how children might look in each of the percentile categories. Moreover, clinicians should emphasize the immediate problems associated with obesity in early childhood, such as hypertension (present in more than 50% of children with obesity), dyslipidemia, motor skill development and orthopedic complications[37-39].

The results also suggest that the countering of stigma should be an important part of the clinical management of childhood obesity. Given the social stigma and blame attached to parents of children with obesity, parents might contest a child's obesity diagnosis and be

reluctant to take part in interventions to manage their child's condition[40]. It is therefore crucial that clinicians directly address stigma when they speak to parents, emphasizing that childhood obesity is not the parents' fault, and that managing this condition together is a positive step. Similarly, clinicians should avoid addressing parents of children with obesity in ways that might make them feel guilty or judged. Finally, it is important that clinicians frame discussions of children's body weights sensitively, and encourage parents and grandparents to address children's eating and physical activity practices through positive words and actions, without emphasizing body weight to the children themselves.

This study had some limitations. While the sample was the largest ever reported in a qualitative investigation of parents' and grandparents' perceptions and attitudes concerning preschoolers' body weights, the families were mainly of Caucasian origin, representing the ethnic distribution of the population in Eugene and Springfield, Oregon. Thus, the influence of cultural background on perceptions of children's body sizes, which several studies have identified as important[5 18 30], could not be investigated. As the study targeted families of low socioeconomic status, further research is needed to determine whether the results can be generalized to other populations. Additionally, as several participants were single mothers, the number of fathers was not high enough to enable an assessment of differences between fathers' and mothers' perceptions and attitudes. Finally, while a number of families had a full or nearly-full set of grandparents participating, some had only one or two grandparents participating, due to circumstances such as the other grandparents' living outside the area.

CONCLUSION

This study was the first to focus on both parents' and grandparents' perceptions of preschoolers' body weights, and is the largest qualitative study to date to include a mixed familial sample of adult caretakers of preschool age children, with subsamples of parents and grandparents that meet data saturation standards[24]. The study's results demonstrate that while parents and grandparents recognize childhood obesity as problematic, endorse healthy eating and exercise habits, and take responsibility for children's body weights, they find it difficult to recognize and discuss young children's overweight and obesity. The results suggest that clinicians should clearly communicate with parents and grandparents about the meaning and appearance of obesity in early childhood, as well as counteract the social stigma attached to obesity, in order to improve the effectiveness of family-based interventions to manage obesity in early childhood.

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CONTRIBUTORSHIP STATEMENT

Karin Eli: Dr Eli coded the interviews and analyzed them together with Dr Nowicka, wrote the manuscript, and approved the final manuscript as submitted.

Kyndal Howell: Ms Howell coordinated the data collection, critically reviewed the manuscript, and approved the final manuscript as submitted.

Philip A. Fisher: Professor Fisher contributed to the design of the study, critically reviewed the manuscript and approved the final manuscript as submitted.

Paulina Nowicka: Dr Nowicka conceptualized and designed the study, coordinated and supervised data collection and analysis, coded the interviews and analyzed them together with Dr Eli, critically reviewed the manuscript and approved the final manuscript as submitted.

COMPETING INTERESTS

We have read and understood BMJ policy on declaration of interests and declare that we have no competing interests.

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DATA SHARING

Online supplementary table S1-4 containing complete sets of pertinent participant quotes. No additional data available.

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Table 1. Questions included in this study.

1. Do you think that how much a child weighs matters? If yes, why? If not, why?
2. How much do you think that a child's weight is possible to control/controllable?

If *yes*, what lifestyle choices do you think are the most important? How/when do you think they can be promoted, and who do you think can do that? And who in the family plays the most important role when it comes to influencing the child's weight?

If *no*, what makes you think that way?

3. What do you think about your child's (or grandchild's) weight? (As compared to his/her siblings, cousins, other children, to the child's parents. Are you concerned/not concerned?)
4. What do you think that the parents of your grandchild think about your grandchild's weight (or grandparents of your child about your child's weight)? (Examine: If there are two parents (grandparents) in the house, do they have the same opinion?)
5. Do you talk about your child (grandchild's) weight with his/her grandparents (parents)? (If yes, why, how? If not, why? Examine: If there are two parents in the house, which of them do you talk the most with and why?)
6. Do you know if your child (grandchild) thinks about his/her weight? (Probe: Does he/she ever comment on it? Did that happen in your presence? If yes, what did you say? If your child doesn't think about his/her weight, is it good or bad?)

Table ~~1~~2. Descriptive statistics of the sample

	Child (n=16)	Parent (n=22)	Grandparent (n=27)
Age (mean in years, range)	4.6 (3.1-5.7)	32. 2 (22.7-49.5)	56.9 (43.0-77.9)
Gender:			
Female	8 (50%)	14 (64%)	21 (78%)
Male	8 (50%)	8 (36%)	6 (22%)
Racial background:			
Euro-American/Caucasian	11 (68%)	21 (95%)	23 (84%)
Native American	0	1 (5%)	0
Asian	0	0	1 (4%)
African-American	0	0	1 (4%)
Mixed	5 (32%)	0	2 (8%)
BMI (mean, range)	17.7 (14.3-21.5)	26.8 (16.1-39.1)	29.1 (16.1-49.4)
Weight status:			
Underweight	0	2 (9%)	1 (3%)
Normalweight	7 (44%)	8 (36%)	8 (30%)
Overweight	4 (25%)	6 (27%)	10 (37%)
Obese	5 (31%)	6 (27%)	8 (30%)
Highest school grade completed	n/a		
High school		8 (82%)	20 (74%)
College/University		4 (18%)	7 (26%)
Working situation	n/a		
Full time		7 (32%)	8 (30%)
Part time		4 (18%)	4 (15%)

Not employed*		11 (50%)	15 (55%)
Annual household income	n/a		
Less than 14,999 USD		8 (36%)	7 (26%)
15,000-24,999 USD		6 (27%)	6 (22 %)
25,000 – 39,999 USD		4 (18%)	6 (22 %)
More than 40, 000 USD		4 (18%)	8 (30 %)

* The main reasons for unemployment among parents were child care, pursuing higher education, and not finding work; among grandparents, unemployment was due to not finding work, reaching retirement age, or retiring due to health issues.

Table ~~2~~3. Examples of participants' quotes on perceptions of young children's body sizes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age. 1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight. 1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts. 1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never been concerned about her weight.
Theme 2: 'Baby fat' is cute and healthy
2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know. 2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut. 2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles. 2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby.
Theme 3: Children go through 'growth spurts' and 'stretching out'
3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then they just, you know they start doing this (makes expanding outward hand movements) and then they just grow like a tree, then they lean up. 3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it. 3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height.

Table ~~3~~4. Examples of participants' quotes on perceptions of the timeline of obesity.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 4: A high body weight becomes problematic later in childhood
4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy. 4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care. 4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating." 4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.
Theme 5: Children's body weight becomes problematic when it affects their activities or health
5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that. 5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine. 5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern.
Theme 6: Obesity becomes problematic in adulthood
6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age. 6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole

life.

6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Table 45. Examples of participants' quotes on perceptions of parental responsibility and blame for childhood obesity.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control. 7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem. 7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.
Theme 8: The parents of obese children are blamed by themselves and by others
8.1 Gp042 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me. 8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents. 8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent. 8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.

Table ~~5~~6. Examples of participants' quotes on perceptions of appropriate contexts for speaking about preschoolers' body weights.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
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Theme 9: Parents and grandparents discuss preschoolers' body weights with them only when the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat". 9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level. 9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old".
Theme 10: It's acceptable to discuss how big or strong preschoolers are.
10.2 Gp12G3 (Father's mother) ***: We talk about how fit he is. He's a very fit child. 10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, "Yeah, look at his muscles". 10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.
Theme 11: Discussing preschoolers' body weights can affect their self-esteem negatively
11.2 Gp03P2 (Father) ***: By far I don't think that parents should focus on it [weight] because then it will become a focal point for the child. 11.3 Gp01G1 (Father's mother) ***: I wouldn't sit with an iron fist and say, "You can't have that because it will make you fat." Because that effects their mental (wellbeing). 11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything. 11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.
Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem

12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her.

12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet.

12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it.

12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.

SUPPLEMENTAL MATERIAL

Supplementary Table 1. Perceptions of young children's body sizes; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 1: Young children are 'pudgy' or 'big for their age', but not obese
1.1 Gp03P2 (Father) ***: Yeah, I think personally, my son is a little on the heavy side. (…)But he, in my opinion, I think he's a little on the big side, but he's also strong as an ox, so how much is muscle and fat I don't know. You know, it's hard to tell when they're that age.
1.2 Gp07G1 (Mother's mother) *: There are going to be kids, that are just by their DNA and genetics, that are a chunkier body build, stuff like that.
1.3 Gp11G1 (Mother's mother) ***: [My granddaughter's] not small… she's not fat but she's solid. (…) I never find her overweight.
1.4 Gp13G1 (Mother's mother) ***: [My daughter] was a larger child, she was never 'obese' or fat or whatever, she was never teased or anything like that.
1.5 Gp14P1 (Mother) **: I think [my daughter] has got a big frame, she has big bones.
1.6 Gp01P1 (Father) ***: but [my daughter], unfortunately… she just is blessed where she is a little chunky at parts.
1.7 GP10G4 (Father's stepmother) **: But if a child is just built bigger, then you need to let that go and just realize that's how a child is made.
1.8 Gp01P1 (Mother) ***: she's also getting really tall, but I have a concern that she's getting a little pudgier (…) She's pudgy, she is a little overweight and we're working on it.
1.9 Gp03G01 (Mother's mother) ***: [My grandson] has a little bit of a weight issue.
1.10 Gp10G4 (Father's stepmother) **: I think he is a short little toddler. He is a little bit round.
1.11 Gp10G1 (Father's mother) **: Our middle son, when he was in 4th or 5th grade, he was a little chunky (…) He was 10.6 [lbs] when he was born and just a super stout, robust baby the minute he was born.
1.12 Gp13G2 (Mother's father) ***: He's not overweight at all, he's almost skinny, but he's tall, he's a tall kid. He's always been big and tall for his age.
1.13 Gp16P1 (Father) **: I think it's just, he's a big boy, yeah they are big for their age.
1.14 Gp11G1 (Mother's mother) ***: She is a big girl. She is solid and she's like 54 pounds. (…) But we're not concerned… she's definitely not fat or overweight… the doctor has never

been concerned about her weight.

1.15 Gp10P1 (Mother) **: I think he has a good amount of weight on his bones. And he is normally big for his age.

1.16 Gp11P1 (Mother) ***: she has always been at the 90 or 100 percentile with her age group but in weight and always under in height. She has always been kind of short and stocky.

1.17 Gp03G1 (Mother's mother) ***: he's very big for his age. He's tall. People think he's six, he's only five.

Theme 2: 'Baby fat' is cute and healthy

2.1 Gp02P1 (Father) *: she's got some cute baby fat but it's nothing to be worried about.

2.2 Gp05P2 (Father) *: I think children should be nice and thick. (…) A healthy baby, nice thick chubby cheeks, chubby little legs, you know.

2.3 Gp05P3 (Mother's mother) *: You know, she's got that little girl pudge on her, that's so cute. Actually, I think a couple times this past year, I thought she might be a little underweight, because she didn't seem to have that little toddler pudge.

2.4 Gp06P1 (Mother) **: I don't worry about his weight right now, it's really hard at this age because I mean all of them are kinda pudgy.

2.5 Gp07P1 (Mother) *: She's well within range, she's got that cute little extended abdomen of a toddler, you know.

2.6 Gp10G1 (Father's mother) **: our kids were always in the 95th percentile… robust kids. I think he seems very healthy.

2.7 Gp13G1 (Mother's mother) ***: I think he's in the 50th percentile for weight and over a 100th for height.

2.8 Gp14P1 (Mother) **: I think she is fine, she does have a little belly, but it's not anything I would worry about or say anything. (…) I think she is healthy, I think she is just a big strong girl.

2.9 Gp10P1 (Mother) **: when he got chubby when he was younger, they [grandparents] just thought it was the cutest thing. You know… they are like… they just want to pinch his cheeks.

2.10 Gp11P1 (Mother) ***: Well we kind of joke about it because my daughter's kind of got the little girl gut.

2.11 Gp01G1 (Mother's mother) ***: she does have cute little love handles.

2.12 Gp10P1 (Mother) **: I just think chubbier kids are cuter. So I try to keep him a little chubby.

2.13 Gp07G1 (Mother's mother) *: [My daughter] was the only one, like I said that [she] was in the 95th percentile. She was the only one I ever wondered about, but she was cute chubby, that I

didn't.

Theme 3: Children go through 'growth spurts' and 'stretching out'

3.1 Gp10P1 (Mother) **: I really liked how chubby he was. It was really nice to cuddle. And I didn't worry about that. Because I figure when he would grow, that weight would just stretch out.

3.2 Gp01P1 (Mother) ***: But I do also believe that children have hills and valleys. They are all going to grow at different rates and they going to go through the pudgy phase and then they just, you know they start doing this (makes expanding outward hand movements) and then they just grow like a tree, then they lean up.

3.3 Gp02G1 (Father's mother) ***: My son goes up and down, my 7 year-old, goes up and down in his weight…but he usually gets plump and then has a growth spurt and so then it evens out. So I don't worry too much about it.

3.4 Gp11P1 (Mother) ***: When she starts getting kind of chunky I start waiting for that growth spurt because if it doesn't hit soon I get worried and start watching what she's eating.

3.5 Gp12P2 (Father) ***: When they're growing, they grow up and they grow out.

3.6 Gp14G1 (Mother's mother) **: I know sometimes kids pudge and then they stretch out.

3.7 Gp03P2 (Father) ***: by the time [my friends] graduated from high school, all of a sudden they went a foot taller, and I think all the width went to height.

3.8 Gp01P1 (Mother) ***: kids go through different phases and right now is a pudgy stage.

3.9 Gp11G1 (Mother's mother) ***: we've never been concerned when she goes through those eating phases because we know it's her growth spurt and it's not like she's gaining weight this way (out) growing this way (up).

3.10 Gp14G1 (Mother's mother) **: I know when [my daughter] was in 5th grade, she got heavier, and then she stretched out in high school.

3.11 Gp06G1 (Mother's mother) **: We can tell when he's about to go through a growth-spurt he gets that little teeny tummy.

Supplementary Table 2. Perceptions of the timeline of obesity; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 4: A high body weight becomes problematic later in childhood
4.1 Gp02G1 (Father's mother) *: I think that when you see kids that are very overweight at 5, 7 and on up, that there's something going on with their eating. I think that when you have small children, like babies, who are plump, healthy babies, that's a whole different story. But I think that when they're older there's something to it.
4.2 Gp10G2 (Father's father) **: Someone with a child [my grandson's] age… he is just 3… I don't know what data shows. Is there any issue with childhood obesity at that age? I don't know. When they talk about childhood obesity, later on, because humans go through all these different growth spurts
4.3 Gp01G1 (Father's mother) ***: I think she is probably okay right now but if she continues on the growth pattern that she's going she's going to be an obese little girl and I think that's sad because kids make fun of kids when they are growing up and they're heavy.
4.4 Gp01P1 (Father) ***: at that young of an age I don't think it really matters. (…) I would say (weight matters) when they hit junior high or middle school. It probably, that's when they're, that's as a girl, as a guy I don't think we really ever care.
4.5 Gp01G1 (Mother's mother) ***: when they [obese children] get to school they're going to be teased (…) they're going to be the last ones picked for teams in school.
4.6 Gp13P1 (Mother) ***: I have one friend whose 11 year old is starting to get really chunky… my friends and I have that hard conversation with her: "(…) Look at [your son], he's going to get made fun of at school and he's starting to get really fat, and you need to watch what he's eating."
4.7 Gp15G1 (Mother's mother) *: as he starts to enter the schooling system that [weight] isn't an additional emotional piece of baggage that he has to carry… being ostracized in the area or personally feeling like different.
4.8 Gp13G1 (Mother's mother) ***: [His mother] has a pediatrician that is particularly in-tune with larger children, and he's been able to make her aware of possible pitfalls in the future. The importance of getting in to school, getting socialized, cause he's always going to be the big kid.
Theme 5: Children's body weight becomes problematic when it affects their activities or health
5.1 Gp03P1 (Mother) ***: I still feel like it limits him, it makes him tired quicker, things like that. And I wish that that was not the case, I wish things were a little more effortless and things like that.

5.2 Gp11P1 (Mother) ***: Her doctor has always said that she's very healthy; she's really bright and wants to learn everything and she's still very physically active. (…) And so that has encouraged me that her weight is okay and her doctor has always said that she's just fine. 5.3 Gp05P1 (Mother) *: if the weight is causing problems and issues in their body and … then that's a problem. 5.4 Gp08P1 (Mother) *: If she starts getting like, even more heavier, where I'm noticing maybe that she's depressed, or gaining weight more, or where if I see it affecting the way she looks at herself or her behavior with other kids, her activities, then I would be concerned. 5.5 Gp10P2 (Father) **: If a kid is too fat to do much then it is not going to be healthy. 5.6 Gp01P1 (Father) ***: I think if they are happy within themselves and they're being active, I don't think it's really a concern. 5.7 Gp14P1 (Mother) **: As long as they are healthy [weight is not an issue]; if you can visibly see that a child is overweight, and not getting enough activity, then that would matter.
Theme 6: Obesity becomes problematic in adulthood
6.1 Gp01P1 (Mother) ***: I do think that a child's weight matters. Just because you don't want them to develop unhealthy habits early because it's going to follow them for the rest of their life. 6.2 Gp01G2 (Father's mother) ***: I don't like seeing a child that age to start out being obese. It carries on with them so… I worry about healthy eating with them a little bit because of that. 6.3 Gp02P1 (Father) *: You're setting the foundation for what your body's going to be like as an adult. 6.4 Gp06P1 (Mother) **: what motivated me is looking at my child and what I want him – who I want him to be in 25 years as a young man. 6.5 Gp10G2 (Father's stepfather) **: If a child is not getting proper nutrition, especially during certain critical stages, you can have all kinds of long lasting effects, and yes that does speak to weight, certainly. 6.6 Gp13G2 (Mother's father) ***: I think if they are becoming obese and overweight, and are inactive, that's not a good place to be as a child. *Why?* Because then they are probably going to have more trouble as an adult, if it's already manifesting itself at a young age. 6.7 Gp14G2 (Father's mother) **: I think [weight matters] because what they learn as a child can carry on through their life. What they learn to eat. 6.8 Gp16G1 (Father's mother) ***: I think it's not just your weight as a child but it goes with you your whole life, if you struggle with weight as a child then you probably will your whole life. 6.9 Gp06P1 (Mother) **: we are more concerned with lifelong patterns and habits, because… they are going to take all those habits into adulthood.

Supplementary Table 3. Perceptions of parental responsibility and blame for childhood obesity; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 7: Parents have control over children's eating, physical activity, and body weights
7.1 Gp01P1 (Mother) ***: We're the ones that are solely responsible for their food that goes into their mouth, how much food goes onto their plate, and what their activities are. (…) If they have some thymus gland issue, or whatever, then obviously that's going to be out of your control but you're going to be looking to a doctor to get it back under control.
7.2 Gp01P1 (Father) ***: the parents and grandparents have control of what the children eat.
7.3 Gp02P1 (Father) *: I think with proper feeding and keeping the proper foods in the house you can control the weight. If you have a bunch of snack foods and junk food all throughout the house and people sit around and watch TV and eat food, you're controlling the weight there and not in a good way – you're going to get heavier.
7.4 Gp02G1 (Father's mother) *: I think that if you buy a lot of junk food and that's what you have: soda, chips and things like that… and that's what your child is mostly eating, and they're getting overweight from that, then yes, you have a lot of control.
7.5 Gp04G3 (Mother's mother) *: Genetics are a factor, but not strong enough to be above food and activity levels. I think it's completely manageable no matter what if you are making it a priority and taking your kid to the doctor and following good nutrition then I think it will be an acceptable weight, unless there is a medical problem but they should be able to figure out if it's a medical problem.
7.6 Gp06G1 (Mother's mother) **: Just make them [fast foods] a treat, a special treat. Not because you are tired and don't want to cook, because then that becomes too easy for them.
7.7 Gp09G1 (Mother's mother) *: I think if you sit down and eat as a family, you're not sitting in front of the TV feeding your face, so you're going to limit the amount… you're talking so you're not eating as much.
7.8 Gp13G1 (Mother's mother) ***: Yeah, a child's weight is easy to control, if you control what goes in and out of their mouth.
7.9 Gp14P1 (Mother) **: She does like to eat, you could hand her a bag of cookies and put her in front of the TV, and she might sit there all day. Or she might not, I don't know, I've never done that. I could see if some parents were lazy, that might be an easy option. I think parents have a lot of influence on the weight of the child.
7.10 Gp13P1 (Mother) ***: They (parents) need to monitor what their child's eating and make

sure they're being active.

7.11 Gp04G2 (Mother's father) *: I see a lot of kids just go and play their computer games and TVs sitting down eating chips, and that's not the kid's fault.

7.12 Gp09P1 (Mother) *: three year-olds should be running around, they should be active and they shouldn't be sitting on the couch eating Cheetos all day. So that's not a very healthy lifestyle and to each their own with parenting but in my personal opinion, I think it can be controlled.

7.13 Gp12G3 (Father's mother) ***: If you are active, the kids will be active. If you are into nutrition, the kids will be into nutrition.

7.14 Gp12P2 (Father) ***: There are some genetic factors. In terms of parents directing nutrition and activity, they have probably 95% control.

7.15 Gp15P1 (mother) *: some kids will be more susceptible to gaining weight than others (…) but I think it's totally controllable what you're going to feed them.

Theme 8: The parents of obese children are blamed by themselves and by others

8.1 Gp04P2 (Mother) *: Honestly, when I see kids that are incredibly overweight I think it's child abuse, it really upsets me.

8.2 Gp05G3 (Mother's mother) *: Sometimes I see heavy parents who don't seem to exercise, and don't seem to eat right. And I see their children, and I say, "Oh my gosh, they are passing that down to the next generation."

8.3 GP10G4 (Stepmother of the father) **: They [obese children] are trying to get some safety net through food because they are neglected by their parents or grandparents.

8.4 Gp13P1 (Mother) ***: If I had a fat kid, it would be looking at me every day, "I'm a failure. I'm doing something wrong."

8.5 Gp04P2 (Mother) *: I think most adults who are overweight can probably attribute it to their parents.

8.6 Gp11P1 (Mother) ***: I hate those parents who are like, "Well, she'll only eat at McDonald's." "No! She won't. You let her only eat at McDonald's. Or you let her only eat fruit snacks."

8.7 Gp13P1 (Mother) ***: you see these kids that can barely move, and it's like how do you not be judgmental about that, because you look at the parent, and they look like a miniature of their parent.

8.8 Gp13G2 (Mother's father) ***: to me, seeing an overweight six year old, it's like what is going on here? I think it's the adults, the parents, guardians, are the ones who have the most effect on that.

8.9 Gp11G1 (Mother's mother) ***: if I were to see my child gaining weight and being lethargic

and had no interest… [I'd] say, okay, I've messed up and I've got to fix this now… because I wouldn't want them to spend the rest of their life having to be on *The Biggest Loser* or something at 400 pounds because I was too lazy.

8.10 Gp03P1 (Mother) ***: They [medical staff] kept asking me what I was feeding him because he was getting so chubby (…) I kept thinking, "What am I doing wrong?"

Supplementary Table 4. Perceptions of appropriate contexts for speaking about preschoolers' body weights; the complete sets of pertinent participant quotes.

Table Legends: Gp# - family group number; P - parent; G – grandparent.
* = parent/grandparent of child with normal weight
** = parent/grandparent of child with overweight
*** = parent/grandparent of child with obesity

Theme 9: Parents and grandparents do not discuss preschoolers' body weights with them, unless the children raise the topic
9.1 Gp01G1 (Mother's mother) ***: And with [the child], she steps on the scale and she knows she weighs more than her brother but we've never, I've always told her, "Look at me, I'm fat, you're not fat". 9.2 Gp03P1 (Mother) ***: I have never talked to him about being heavy, but like, a few weeks ago he talked about being fat, and I don't know where he got that from, like another kid, or if he saw it on TV, I have no idea. But he is kind of aware of it, but only on kind of a surface level. 9.3 Gp13G1 (Mother's mother) ***: He knows that he's taller than most. Probably more than anything, he's probably tired of hearing that he's bigger, [he says,] "It's not my fault I'm bigger, I'm still only five years old". 9.4 Gp09P1 (Mother) *: I don't like this but she does have a fascination with my scale—she doesn't know what the numbers mean but she likes to get on there and I'll be like, "Oh my God, you gained a pound!" and she'll get excited (…) but I think she's still too young to know what (body) image is. 9.5 Gp01G1 (Father's mother) ***: I think she is totally oblivious to it [weight] which is good in a way. 9.6 Gp02P1 (Father) *: I don't think she's noticed any difference between the her and her sister… she's not really conscious of it yet, she is just her. 9.7 Gp10P1 (Mother) **: I don't think he thinks about his weight. We never talk about it. It is almost like nonexistent, especially at his age 9.8 Gp05P3 (Mother's mother) *: She's very comfortable with her body. (…) I think she's aware that she has a body, and that it functions. (…) But I don't think she's really aware of, "oh, I'm too skinny, I'm too fat." 9.9 Gp14P1 (Mother) **: I don't think she thinks anything of it. She is comfortable walking around the house with no clothes on. I don't think she thinks anything of it, she has never said anything.
Theme 10: It's acceptable to discuss how big or strong preschoolers are
10.1 Gp12G2 (Father's father) ***: I can't say that it's [the child's weight] ever come up. Other

than to say that "he's sure getting heavy", in growing up.

10.2 Gp12G3 (Father's mother) ***: We talk about how fit he is. He's a very fit child.

10.3 Gp13P1 (Mother) ***: His body shape is very athletic, so we go, "Yeah, look at his muscles".

10.4 Gp11G1 (Mother's mother) ***: we talk about her weight and her height a lot because she's a big girl, but not that we're concerned.

10.5 Gp10G1 (Father's mother) **: We might have in passing commented to how healthy he seems. I mean, just something sort of innocuous and nothing really of concern.

10.6 Gp04P1 (Father) *: We talk about how he's growing and how he weighed and checked up.

10.7 Gp04P2 (Mother) *: He [the child] just thinks it's a cool number. He gets excited to get weighed, "am I getting bigger?"

10.8 Gp04G3 (Mother's mother) *: it's been awhile since we've talked about it. We used to talk about it every time he came back from the doctor. The percentile he was in and such.

10.9 Gp16P1 (Father) **: Oh we always talk about how big they are and they are always showing their muscles and stuff like that. We encourage them to eat their veggies so then they can get big muscles and then they want to show off their muscles.

10.10 Gp07G1 (Mother's mother) *: She's [the child's mother] never, that I can think has ever expressed any concern about her weight. She makes comments, like "Boy, I can tell [the child] must be going through a growth spurt."

10.11 Gp09P1 (Mother) *: They [grandparents] always joke and say that she looks just like Daddy because Daddy's kind of tall and lean.

Theme 11: Discussing preschoolers' body weights can affect their self-esteem negatively

11.1 Gp03P1 (Mother) ***: So when he [the child] asks me stuff like that [about his weight] we talk about being strong versus being big and not strong. So it's all about trying to be strong and healthy so, that's what we talk about.

11.2 Gp03P2 (Father) ***: By far I don't think that parents should focus on it [weight] because then it will become a focal point for the child.

11.3 Gp01G1 (Father's mother) ***: I wouldn't sit with an iron fist and say, "You can't have that because it will make you fat." Because that effects their mental (wellbeing).

11.4 Gp01P1 (Mother) ***: I have a concern that she's getting a little pudgier so I'm like, "If you're going to do milk, please go down to the skim or 1%, lay off the juice or dilute it", to start doing the things that she won't notice.

11.5 Gp14G2 (Father's mother) **: I don't think a parent should badger them about their eating habits, I think there are ways to slowly and gradually make changes to lose weight rather than

pointing it out. 11.6 Gp14G1 (Mother's mother) **: I think it's dangerous to make a child conscious of their weight in some ways. Especially when it's just a healthy thing. I think it's best to not say anything. 11.7 Gp02G1 (Father's mother) *: I probably wouldn't want to talk about her weight too much because I do think that girls get set up in this world to worry a lot about that and that it could lead to some problems.
Theme 12: Parents and grandparents do not discuss preschoolers' body weights with each other, unless there is a perceived problem
12.1 Gp10G1 (Father's mother) **: I think she [the child's mother] over worries [about] that a bit, personally, but I don't know because I haven't asked her. 12.2 GP10G4 (Stepmother of the father) **: I never talk about his [the child's] weight. 12.3 Gp06P1 (Mother) **: No, I don't think she [grandmother] thinks he's at an unhealthy weight. (…) She's never said anything to me. 12.4 Gp12G3 (Father's mother) ***: I think they [the parents] should be very pleased with it [the child's weight], but I don't know. 12.5 Gp12G2 (Father's father) ***: I don't think about what his parents think about his weight. I know [his father] is certainly concerned with nutrition 12.6 Gp07P1 (Mother) *: I think that my mom probably would think it [the child's weight] doesn't matter. (…) [I]t's never something we discuss. 12.7 Gp01G1 (Father's mother) ***: I haven't yet [discussed the child's weight]. They [the parents] – I am not sure they consider it an issue yet. 12.8 Gp03P1 (Mother) ***: I always tell them like, "Please don't' encourage this, or that because I don't want him eating it if that's ok". That sort of thing. So we have talked about it. 12.9 Gp03G1 (Mother's mother) ***: with [my daughter], I've talked about it [the child's weight]. *(Interviewer: Not with [her husband]?)* Um, [my daughter] and I have a closer, more intimate [connection], like [we can] talk about that kind of thing.