


# Parental Views of Promoting Fruit and Vegetable Intake Among Overweight Preschoolers and School-Aged Children

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## Abstract

Given the importance of parental influence on children's eating habits, we explored perceptions of parents of overweight (body mass index–for-age percentile  $\geq 85\%$ ) preschoolers (3–5 years) and overweight school-aged children (6–12 years) regarding challenges in promoting fruit and vegetable intake and how they and other family members influence their overweight children's dietary habits. Focus groups were conducted with 13 parents of overweight preschoolers and 14 parents of overweight school-aged children. Codes and themes were developed by inductive data analysis. Four common themes were identified: short shelf life of fresh fruits and vegetables prohibiting parents from purchasing, children's taste changes in fruits and vegetables, parents having the primary influence on children's dietary intake, and wanting fruits and vegetables "ready to go." Parents of school-aged children were more concerned about their children's weight, and extended family members negatively influenced children's dietary intake compared with parents of preschoolers. Our findings provide valuable insight for nutrition/health educators when developing family-based interventions for weight management.

## Keywords

fruits, vegetables, challenges, influences, parents, overweight, preschoolers, school-aged children

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## Introduction

Fruits and vegetables are nutrient-rich, low in calories, and can be an important part of weight management (Rolls, Ello-Martin, & Tohill, 2004). Compelling evidence suggests that diets rich in fruits and vegetables have health-protective benefits both in adults and children (World Health Organization, 2002). Forming early life strategies to improve children's health behaviors such as consuming the recommended amounts of fruits and vegetables is important as dietary behaviors and food choices established in childhood are more likely to persist into adolescent and adult years (Mikkilä, Rasanen, Raitakari, Pietinen, & Viikari, 2004).

The social ecological framework emphasizes the multiple influences on a person's health behaviors and outcomes including factors at individual, social, and environmental level (Larson & Story, 2009). The home social and physical environment related to healthy eating can be one of the most important settings in regard to a child's dietary intake, nutrition behaviors, and the development and prevention of obesity as 65% to 72% of daily calories are consumed in the home (Rosenkranz & Dzewaltowski, 2008). Parents are seen as the nutritional gatekeepers and the key moderator influencing the provision of fruits and vegetables and other healthy foods to their children (Wansink, 2006). Previous work has

shown that having fruits and vegetables available and accessible in the home, parents being positive role models, and parental encouragement influence the dietary intake of fruits and vegetables among children (Couch, Glanz, Zhou, Sallis, & Saelens, 2014; Pearson, Biddle, & Gorely, 2009). However, despite the recognition of the health benefits of fruits and vegetables, parents face numerous challenges in feeding their children fruits and vegetables (Cason-Wilkerson, Goldberg, Albright, Allison, & Haemer, 2015; Omar, Coleman, & Hoerr, 2001). As a growing number of studies addressed the challenges parents face when improving their children's intake of fruits and vegetables (Cason-Wilkerson et al., 2015; Harnack et al., 2009; Sonnevile, La Pelle, Taveras, Gillman, & Prosser, 2009), few studies further explored how parents and other family members influence their overweight children's eating behaviors in terms of consuming more or less fruits and vegetables. Understanding these issues along with the challenges

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faced by parents is crucial for forming necessary strategies and developing direct interventions for weight management.

Evidence is increasingly pointing to early childhood as a critical period in obesity prevention (Pocock, Trivedi, Willis, Bunn, & Magnusson, 2009). Recently, more research has been focused on preschoolers with the intent of preventing excessive weight gain before the critical period of 6 to 11 years when the rates of childhood overweight and obesity rise significantly (Ogden, Carroll, Kit, & Flegal, 2012). With respect to challenges in promoting healthy eating in the home among children with different age groups, previous work suggests that parents of both preschoolers and school-aged children had similar barriers including children's taste preferences, lack of time, high cost of healthy foods, and lack of confidence in preparing foods and managing conflict over food choices among family members (Hayter et al., 2015; Peters, Parletta, Lynch, & Campbell, 2014; Stenhammar et al., 2012). However, considering different developmental periods during childhood and other relevant factors, parents of preschoolers may face challenges and use their influences in a way that differs from parents of school-aged children particularly when their children have weight problems. To our knowledge, such differences, if they exist, have not been fully explored yet. Further, a previous study involving a survey with 1,551 parents of overweight children and adolescents, aged from 3 to 19 years, found that parents of younger children were more likely to identify their children as normal weight compared with parents of older children (West et al., 2008). Thus, how parents of overweight children with different age groups (e.g., preschoolers vs. school-aged children) view their children's weight issues could be a potential barrier or motivator for them to promote healthy eating at home. In the current study, we explored parental perceptions of challenges in promoting fruit and vegetable consumption in the home and how they and other family members influenced their children's dietary intake among overweight preschoolers (3-5 years) and overweight school-aged children (6-12 years). In this work, the term *overweight* refers to preschoolers or school-aged children with a body mass index (BMI)-for-age percentile  $\geq 85\%$  (Krebs et al., 2007).

## Method

### *Recruitment and Participants*

Parents (the term *parents* in this study refers to the primary caretakers and food purchaser/preparers in the household including mothers, fathers, and grandparents) of overweight preschoolers (3-5 years) and overweight school-aged children (6-12 years) participated in the focus group study conducted from February to September 2015. Focus groups were chosen as the primary mode of data collection to gain insight and to explore perceptions and feelings regarding a certain topic (Krueger & Casey, 2000). Focus groups were held separately for parents of preschoolers and parents of

school-aged children because of the importance of keeping focus group homogeneous and participants sharing similar characteristics (children of the same age group; Krueger & Casey, 2000). The eligibility requirements for study participants included having an overweight or obese child (BMI-for-age percentile  $\geq 85\%$ ; Krebs et al., 2007) between the ages of 3 and 5 years (for preschoolers) and 6 and 12 years (school-aged children), and parents being fluent in English, greater than 19 years of age, and the main food purchaser and preparer for the household.

Parents of overweight preschoolers (3-5 years) were recruited from three Early Head Start and Head Start programs in Lincoln, Nebraska, and surrounding communities where their preschoolers were enrolled. Early Head Start and Head Start programs are designed to support the mental, social, and emotional well-being of low-income young children, age birth through 5 years (U.S. Department of Health & Human Services, 2016). The Early Head Start and Head Start nurse at each location identified 57 parents who met the above eligible study criteria and personally recruited them to participate. Thirteen parents agreed to participate. Lack of time and interest were the main reasons for parents who declined to participate. Preschoolers' weight and height were measured and BMI-for-age percentile was calculated by the nurse of each Early Head Start and Head Start program (as part of the routine duties of the nurse at the program) prior to the start of the focus group meetings.

Parents of school-aged children (6-12 years) were recruited by the research team from an in-home food environment assessment study (Nepper & Chai, 2016). During the in-home visit, the research team measured the height and weight and calculated the BMI of the participating children. Parents whose children were eligible for the study (BMI-for-age percentile  $\geq 85\%$ ) were personally invited by the research team to further participate in this focus group study. Of the 33 eligible parents approached, 14 agreed to participate. Similar to the parents of preschoolers, lack of time and interest were the main reasons for not participating. The recruitment rate was higher among parents of overweight school-aged children than those of overweight preschoolers. This was possibly due to the fact that the former group parents (parents of school-aged children) were directly recruited by the researchers and had already known the researchers from another study that they participated in (Nepper & Chai, 2016). Written consent was obtained from the participants prior to the data collection. Participants were assured of maintaining their anonymity and confidentiality. The study was approved by the University of Nebraska-Lincoln Institutional Review Board.

### *Data Collection*

This study used a semistructured focus group qualitative study design. The focus groups were held either in the Early Head Start and Head Start meeting rooms (for parents of

**Table 1.** Focus Group Questions on Parents' Perceptions of Fruit and Vegetable Intake.

Question Category	Questions
Ice-Breaker	What is a healthy food? Why it is important to you that your children eat healthy foods such as fruits and vegetables?
Main questions	What is challenging about feeding your children fruits and vegetables? What would encourage your child to eat more fruits and vegetables at home? Who influences your child's consumption of fruits and vegetables?
Conclusion	What additional comments regarding your challenges in feeding your children fruits and vegetables would you like to share?

preschoolers) or the local community rooms (for parents of school-aged children). Recruitment of participants occurred continuously while we were conducting focus group meetings and performing data analysis. Sample size was determined by the degree of data saturation, in which no new themes developed during the focus group discussions (Creswell, 2002). Approximately 60 to 90 minutes were spent in the actual focus group discussion, and all the conversations were audiotaped. Upon completion of each focus group discussion, each participant received a US\$30 gift card to a local grocery store for participating in the study; gift card value (\$30) was stated on the recruitment flyer used for recruiting participants. In addition, parents also completed a demographic questionnaire. Each focus group used a written script to guide the discussion. Questions were written to gather information from participants on their challenges and how they and other family members influenced their children's fruit and vegetable consumption in the home. These questions reviewed by a qualitative expert, were modified from previous studies (Campbell, Crawford, & Hesketh, 2007; Yeh et al., 2008) and revised to fit the format of the objectives of the current investigation. Standard focus group procedures were followed for each focus group discussion (Krueger & Casey, 2000). It started with ice breaker questions about participant's definition of a healthy food and its benefits, followed by in-depth questions. The in-depth questions asked parents what challenges they had for feeding their children fruits and vegetables, who influenced their children's fruit and vegetable consumption, and how to encourage their children to eat more fruits and vegetables. Questions focused on whole pieces of fruits and vegetables and did not include fruit or vegetable juice, as this was not the focus of the study. At the conclusion of the discussion, participants were asked whether they had any further thoughts on the relevant issues that have been addressed (Table 1). The moderator (primary investigator) guided the discussion by keeping discussion of her own perceptions to a

minimum, asking nonjudgmental questions, and probing for clarification and participant insight on discussion topics.

### Data Analysis

All focus groups interviews were fully transcribed and analyzed by hand with data analysis and data collection occurring simultaneously by the primary investigator (Creswell, 2002). Each transcription was also independently analyzed and checked for accuracy by the second investigator, who listened to the audio and reviewed the transcription of the interviews. The preliminary exploratory analysis was used to gain a general sense of the data and to review data organization (Creswell, 2002). Inductive data analysis was used to aggregate the text into codes, and each code was developed into themes that reflected the challenges and influences parents had in increasing their children's fruit and vegetable consumption in the home (Creswell, 2002). Parental responses were grouped into 17 codes according to the frequency of responses from the parents. A cross-case theme synthesis was used to examine similarities and differences of themes across the transcriptions (Yin, 2009). The transcriptions were analyzed for quotes to determine whether they would fit into one of the themes. If a quote was related to a theme, it was placed in that category and used in the working document. The number of quotes per code ranged from two to 18 per theme for the nine focus groups, and codes that represented a dominant theme were analyzed.

To increase credibility and trustworthiness of the study, the following procedures were adopted. Two experts in qualitative research reviewed the transcripts and developed codes and themes independently from the research team to ensure the reliability of the data (Harris et al., 2009). A meeting was held with the research team and the qualitative experts who together came to a consensus on the codes and themes. To verify whether views of participants were correctly represented and interpreted, the moderator (primary investigator) summarized participants' responses and elicited feedback at the end of each focus group meeting (Harris et al., 2009).

### Results

A total of nine focus groups were conducted with 27 participants, of which four groups comprised parents of overweight preschoolers (3-5 years, 13 participants) and five with parents of overweight school-aged children (6-12 years, 14 participants). Focus group sizes ranged from two to five parents. The current study was best accomplished with the focus groups of small size as the goal of the study was to facilitate an in-depth understanding of the participants' perceptions of their challenges in promoting fruit and vegetable consumption and how they and other family members influenced their children's fruit and vegetable intake (Krueger & Casey, 2000).

**Table 2.** Characteristics of Study Participants.

Characteristics	All Participants	Parents of Preschoolers <sup>a</sup>	Parents of School-Aged Children <sup>b</sup>
<i>n</i>	27	13	14
Age, <i>M</i> ± <i>SD</i>	36.8 ± 6.9	34.7 ± 8.0	39.0 ± 5.8
Gender, <i>n</i> (%)			
Male	4 (14.8)	2 (15.4)	2 (14.3)
Female	23 (85.2)	11 (84.6)	12 (85.7)
Relation with the child, <i>n</i> (%)			
Father	4 (14.8)	2 (15.4)	2 (14.3)
Mother	21 (77.8)	9 (69.2)	12 (85.7)
Grandmother	2 (7.4)	2 (15.4)	0 (0.0)
Family income (US\$), <i>n</i> (%)			
<25,000	13 (48.1)	7 (53.8)	6 (42.9)
25,000-75,000	11 (40.7)	6 (46.2)	5 (35.7)
≥75,000	3 (11.1)	0 (0.0)	3 (21.4)
High school graduate, <i>n</i> (%)	19 (70.4)	10 (77.0)	9 (64.4)
College graduate, <i>n</i> (%)	4 (14.8)	1 (7.7)	3 (21.4)

<sup>a</sup>Preschoolers: 3-5 years of age.

<sup>b</sup>School-aged children: 6-12 years of age.

The average age was 34.7 ± 8.0 years for parents of preschoolers and 39.0 ± 5.8 years for parents of school-aged children. Among the participants, 21 were mothers, four were fathers, and two were grandmothers (of preschoolers). Those participants were the primary food shoppers and preparers in the household. Nineteen participants (70.4%) graduated from high school, and 14.8% had a college degree or higher. Approximately 48.1% (13 of 27 participants) had family annual income less than US\$25,000 with 53.8% in preschoolers (seven of 13) and 42.9% (six of 14) in school-aged children (Table 2).

Four major themes emerged during the focus group discussions including (a) short self-life of fresh fruits and vegetables prohibiting parents from purchasing these foods, (b) taste preference issues surrounding fruit and vegetable intake, (c) influences from immediate and extended family members, and (d) wanting fruits and vegetables “ready to go” and accessible for children. Themes were similar between parents of overweight preschoolers and parents of overweight school-aged children (Table 3).

### Parent’s Perceptions of Healthy Foods and Their Health Benefits

Parents defined healthy foods as fresh fruits and vegetables and foods that had vitamins and minerals. However, parents frequently used words such as “raw,” “natural,” “unprocessed,” and “clean” to describe healthy foods. One parent did voice her concerns that eating healthy foods was difficult: “The more natural we can get the better. I try to stay away from the processed foods. It is hard to eat healthy though.”

Providing their children with more energy, promoting good health and well-being, and providing nutrients that are required for children to grow were commonly mentioned by

parents as reasons why their preschoolers and school-aged children should eat more fruits and vegetables. However, several parents of overweight school-aged children shifted the conversation to their children’s weight, either to prevent overweight and obesity or help with their children’s current weight issues. For example, they stated, “I don’t want her to get fat” and “I don’t want my children to have to struggle with that (weight), because once you gain the weight, it is harder to get off.” In contrast, parents of overweight preschoolers did not mention their children’s weight issues and only focused on the overall health benefits (e.g., more energy, feels better).

### Short Shelf Life of Fresh Fruits and Vegetables Prohibiting Parents From Purchasing

Parents felt that the short shelf life of fresh fruits and vegetables and avoiding wasting after purchasing them was a challenge in providing fresh fruits and vegetables to their children in the home. They felt that if the shelf life of fresh fruits and vegetables was longer, it would make it easier to provide more fresh fruits and vegetables to their children, as well as encourage them to purchase more. Parents were concerned about the price of fresh fruits and vegetables and felt they would be “wasting” their money if fresh fruits and vegetables spoiled before eaten. Following are some of their quotes:

Fruits and vegetables go bad fast and I am not going to get them if they go bad.

They have shorter shelf life and sometimes you get busy and you don’t prepare it and by the time that it is back on the menu it goes bad, if you only go grocery shopping once a week.



**Table 3.** Themes and Selected Responses of Focus Group Discussions Among Parents of Overweight Preschoolers (*N* = 13) and Overweight School-Aged Children (*N* = 14).

Theme	Parents of Preschoolers	Parents of School-Aged Children
Avoidance of wasting fruits and vegetables <i>n</i> = 8 (3 preschoolers; 5 school-aged children) <sup>a</sup>	“They have a shorter shelf life and sometimes you get busy and you don’t prepare it and by the time that is back on the menu it goes bad, if you only go grocery shopping once a week”	“If I get it, and they don’t eat it all, it will go bad”
	“It’s not necessarily that they are more expensive, but it feels that way when you are grocery shopping because there are other things that are going to last longer and be more filling than fresh fruits and vegetables”	“They go bad fast and it seems like you buy it and then you have to buy more”
	“I think one of the important things to keep in mind is that it has to have freshness, if it is a food that is going to rot or if it is going to go bad”	“Fruits and vegetables go bad fast and I am not going to get them if they go bad”
Taste preferences of fruits and vegetables <i>n</i> = 30 (14 preschoolers; 16 school-aged children) <sup>a</sup>	“She loves fruits and berries, but vegetables you have to force feed”	“She usually eats fruits for a snack after school and with lunch”
	“He use to eat it and just grab it and chew on it but now he doesn’t touch it. But when he goes to a Chinese restaurant, he will eat it there”	“I think it is the taste, because vegetables are a lot harder than fruits and fruits are sweet but vegetables are different”
	“She eats peaches and yogurt”	“Mine doesn’t eat any vegetables”
	“Bananas would probably go fast in my house if I bought a large quantity”	“It’s all vegetables in the garden. If we had strawberries, then they would eat them. They are more prone to eating fruits”
	“I have a hard time keeping fruits in the house”	“Vegetables not so much, but fruits he likes”
	“He eats pretty much everything like he is starving for whatever reason”	“My daughter’s appetite is up and down and what she decides she is going to eat”
Family influences <i>n</i> = 13 (6 preschoolers; 7 school-aged children) <sup>a</sup>	“We are incorporating more fruits and vegetables into foods, like tacos, shredding the carrots or zucchini and you mix it in with the turkey meat or mix it in beans”	“I will make it one time and she will love it and the next time, she may not eat it”
	“I have been masking her vegetables. There’s a juice out of V8, but it’s masked as a fruit juice. She loves it”	“My son, it just depends, sometimes he will like some things for a little bit and then his tastes will change. You have to drown it in cheese if it is something he normally eats, like broccoli”
	“Me and his mom both, we go ahead and whatever we make stuff, we make fruits and vegetables and so we get it as a positive role model thing and we enjoy it.” <sup>b</sup>	“Us, parents”
	“I would say I try.”	“Me, only because I am pickier than my husband”
	“My dad. He lives upstairs. He has a big garden outside and my son helps him. My mom too. They watch him and if I work late, they will pick him up and help me out.” <sup>b</sup>	“For dinners, it is definitely me, because I buy the groceries”
“Process of Preparation to Plate” <i>n</i> = 18 (9 preschoolers; 9 school-aged children) <sup>a</sup>	“Availability; sometimes the fruits they have need to be peeled and they can get their hands on them”	“Everybody wants to feed my kids junk food when I am not around. Like now, my kids are at Golden Corral with my mom and I have to tell her ‘one dessert’—don’t let them eat all the desserts because that it what they will do.” <sup>b</sup>
	“If it is provided and it is on their plate, 95% of the kids are going to eat it”	“Because they are their grandkids and you know, it is not going to kill them to have it.” <sup>b</sup>
	“Need to learn how to prepare new things”	“You put it in a Tupperware and it is ready to go”
	“I need recipes where I can hide vegetables in”	“You have to have it cut up and ready”
	“Have fruits instead of junk food”	“I would like to know how to prepare the vegetables in a healthy way that is good”
		“For me, not knowing how to prepare them is one of the main barriers”
		“I don’t know how to cook them very well”

Note. Overweight is defined as body mass index (BMI)—for-age percentile  $\geq 85\%$

<sup>a</sup>*n* = total frequency of responses from parents for a theme which reflects the total number of times when parents mentioned the theme. The total frequency of responses (*n*) was further divided into the frequency of responses from parents of preschoolers and the frequency of responses from parents of school-aged children, which are presented in parentheses.

<sup>b</sup>Differences in responses between parents of overweight preschoolers and parents of overweight school-aged children.

If they could stay good longer would be nice. I mean sometimes you base what you are going to buy on how fast they will eat it and if it is going to go bad.

It's not necessarily that they are more expensive, but it feels that way when you are grocery shopping because there are other things that are going to last longer and be more filling that are not fresh fruits and vegetables.

I know it is hard if you are struggling to pay your bills and you are going to buy vegetables that they are probably not going to eat, so it is easy to say since they are not going to eat it, I am not going to buy it. I think that is the biggest problem.

A few parents mentioned canned or frozen fruits and vegetables as an option to purchase, but if purchased, these were not their optimal choice. For example, they said, "Frozen and canned fruits and vegetables are cheaper, but they are not the same and they don't taste as good" and "I preferred not canned fruits and vegetables."

### *Taste Changes Surrounding Eating Fruits and Vegetables*

Parents stated that eating fruits was easily accepted by children because of the sweet flavor, but they had challenges in feeding their overweight preschoolers and school-aged children vegetables. One parent said, "I think it is the taste, because vegetables are a lot harder than fruit and fruits are sweet and yummy but vegetables are different." Parents also stated that their children's appetite and tastes changed frequently and were unsure whether their children would accept vegetables from day to day. For instance, they mentioned, "Sometimes my daughter likes everything and sometimes she hates everything" and "He used to eat it and just grabbed it and chewed on it but now he doesn't touch it (vegetables)."

Both parents of overweight preschoolers and overweight school-aged children masked or hid vegetables into other foods to encourage their children to eat more vegetables. Parents would add shredded carrots or zucchini into meat or beans or other foods or cover vegetables with cheese sauce. They mentioned the following:

My little one loves tacos so I wrap up vegetables and put it into a taco and I get a lot more into her.

If I need them to eat vegetables, I put it in the soup and they will eat it. I cut it in small pieces so they don't see it.

If they are going to eat a vegetable, I have to drown it in cheese or something.

Others would pair vegetables or fruits with their children's favorite foods as a way to overcome taste changes. They mentioned, "He wants popcorn, so he can have a half of

an apple and popcorn" and "I try and pair it (a vegetable or fruit) with a favorite food." Also, parents stated that they often purchased foods that had vegetables in the product (e.g., V8 Splash, veggie pasta) in the hopes that their children will eat more vegetables by purchasing these types of food products. Following are some examples: "Masking it like the V8 Splash. If I buy the V8 Splash with strawberries and carrot, she will eat it" and "I try to buy things that have vegetables in them and they don't know."

### *Influences From Parents and Extended Family Members*

Parents interviewed stated that their extended family members, such as grandparents, uncles, and aunts, and other outside influences, affected, either positively or negatively, their children's fruit and vegetable consumption and overall healthy eating habits. Parents of school-aged children mentioned that grandparents were likely to feed their children unhealthy foods and were a negative influence: "Because they are their grandkids and you know, it is not going to kill them to have that." In contrast, parents of preschoolers more often had extended family members (e.g., grandparents, uncles, aunts) who positively influenced their children's food intake: "My dad. He lives upstairs and he has a big garden outside and we help him, and my son likes to help him." Nevertheless, parents felt that they had the most direct influence on their children's fruit and vegetable intake compared with any other outside influences such as the influences from extended family members, schools, media, and peers. One parent said, "I am an influence at home, because I have started to eat a lot more fruits and vegetables."

### *"Process of Preparation to Plate"*

Both parents of overweight preschoolers and school-aged children mentioned that fruits and vegetables should be "ready to go" and accessible to encourage their children to eat more of these foods. They said the following:

I have a clean bowl of cut up carrots so they can see it and they know what is in there.

Sometimes the fruits need to be peeled and they can get their hands on them.

I think it easier to keep fruits accessible.

I leave them in the refrigerator in the bowl so they can get them.

Parents stated that the inconvenience of following difficult recipes with infrequently used ingredients was a barrier in having healthier meals that included vegetables; they wanted recipes where they could hide vegetables in the dishes easily. Also, they were unsure how to cook vegetables in a way that was

healthy and meanwhile would still be accepted by their children and were eager for new recipe ideas. For example, they said,

I have no idea how to prepare them (vegetables).

Need to learn how to prepare new things.

Not knowing how to prepare them is one of the main barriers.

I need recipes where I can hide vegetables in.

I guess cooking is a big part of it, because I don't know how to cook some things. I always wanted to try greens, but I don't know how to cook them.

I would like to know how to prepare the vegetables in a healthy way that is good and not in bacon grease and there are so many vegetables out there, and I don't know how to cook them. I don't want to buy them and then cook them incorrectly.

When further asked about the best way to provide this type of education, both parents of preschoolers and school-aged children wanted easy recipes with pictures for parents whose English is a second language, learning the best way to feed their children when they were new mothers, and in-home nutrition/healthy food preparation education programs. They said the following:

I guess I served what was thought that he would eat or what people told me what kids should eat. I was just doing what everybody else was doing.

With my oldest, I didn't know how to cook very well, and I was really young so he doesn't eat as much as a variety compared to my youngest who is 3 years old.

When I was younger, I wish I could have had a blog to follow or something to follow or someone to guide me to show me what to feed my son. I would give him chicken nuggets, because everyone told me that kids eat chicken nuggets or something like that.

Something where they tell you how to reuse the ingredients.

As long as there was cooking involved to, like not just tell me about it but show me how to make nutritious meals that are fast because I work full-time. I think people would be willing to have someone come into their kitchen. Why not.

I think some people would. I think I would and there are certain things that I know I should replace, but I just don't know what to replace it with.

## Discussion

This focus group study provides a method to explore perceptions of challenges and influences parents and extended

family members had on their overweight children's fruit and vegetable consumption in the home. There were similar issues that emerged during the focus group discussion from parents of both overweight preschoolers and school-aged children. For example, both groups of parents were concerned that fresh fruits and vegetables would spoil quickly so were less likely to purchase them. Parents also had difficulty in getting their children to eat vegetables and would disguise vegetables such as adding shredded or pureed vegetables to soups and casseroles or cover vegetables with cheese sauce to encourage their children to eat more vegetables. In addition, they stated that fruits and vegetables needed to be "ready to go" to encourage their children to eat more fruits and vegetables and wanted more cooking skills in preparing vegetables.

Parents correctly identified fruits and vegetables as healthy foods. However, some parents stated that for a food to be healthy, it needed to be "raw," "clean," and "unprocessed." Also, parents were likely to state that foods with fewer additives and labeled as *natural* were healthier foods. The misconception that "healthy foods" should be natural has been reported in a previous study in which a diverse sample of adult participants defined healthy foods as low in fat, natural, balanced, prevent disease and help with weight control (Falk, Sobal, Bisogni, Connors, & Devine, 2001). This brings a challenge on how to educate parents to correctly define healthy, nutritious foods as many people in our society are confused with contradictory messages in the media on healthy food choices (Stenhammar et al., 2012). The misunderstanding of healthy foods and processed foods potentially prevented parents from feeding more fruits and vegetables to their children in the home as parents felt that it would be "wasting" their money on fresh fruits and vegetables because these foods were spoiling quickly before eaten. A few parents mentioned canned or frozen fruits and vegetables as options; however, these foods were not their ideal choices to purchase. National Health and Nutrition Examination Survey (NHANES) 2003-2006 dietary records were examined to better understand the contribution of fresh and processed fruits and vegetables to energy and nutrient intakes in the U.S. population. The study results suggest that while fresh fruits and vegetables contributed significant amounts of vitamin A, fiber, and folate intakes, processed fruits and vegetables contributed more of dietary vitamin E, vitamin C, and potassium (J. T. Dwyer, Fulgoni, Clemens, Schmidt, & Freedman, 2012). Because of the incorrect information frequently presented by the media in terms of nutrition and health (Korownyk et al., 2014), family-based nutrition education needs to provide parents with science-based information about processed fruits and vegetables. The fact that canned and frozen fruits and vegetables may have similar health benefits and nutritional qualities with a longer shelf life and lower cost compared with the fresh ones needs to be addressed when providing nutrition education.

Parents were unsure how to prepare recipes with vegetables that would be accepted by their children. Therefore, in addition to educating parents on alternative, low-cost, and less perishable fruit and vegetable options, such as canned, unsweetened fruits and vegetables, and dried fruits and frozen vegetables, teaching parents to make quick and nutritious meals with a variety of vegetables and fruits is also an important strategy for promoting healthy eating in the family. An intervention study among 44 child/parent dyads that included cooking skill building and hands-on meal preparation resulted in an increased trend in fruit and vegetable intake in the intervention group compared with the control group (Fulkerson et al., 2010), suggesting that these types of educational interventions are worthwhile when attempting to increase fruit and vegetable intake among children.

Consistent with previous findings (J. Dwyer, Needham, Simpson, & Heeney, 2007; Vanhala, Laitinen, Kaikkonen, Keinanen-Kiukaanniemi, & Korpelainen, 2010), parents in our study stated that their children's taste preferences were challenging in feeding vegetables to their children and that children's taste changes caused frustration for parents when encouraging vegetable intake in the home. Parents of overweight preschoolers also said that their young children were more likely to eat fruits compared with vegetables and that both parents of preschoolers and school-aged children mentioned that feeding their children vegetables was more challenging than feeding them fruits. This could be explained by the fact that young children have been found to have a taste predisposition for sweet and salty foods and dislike bitter and sour tastes such as vegetables (e.g., broccoli; Hill, 2002). As eating fruits was found not to be difficult for both overweight preschoolers and school-aged children in our study, greater efforts should be made to help children overcome the barriers to increase their vegetables consumption. Disliking the tastes of vegetables could be more of an issue with overweight children relative to healthy weight children. Although the current study did not include parents of healthy weight children, a previous study made such a comparison and reported that overweight children were less likely to eat vegetables compared with their normal weight counterparts (Vanhala et al., 2010). However, the same study also reported overweight children were more likely to eat vegetables if served at home for lunch or dinner (Vanhala et al., 2010). This raises a question of utilizing strategies to encourage children to consume more vegetables even though the tastes of many vegetables are not preferred by the children. One strategy that parents mentioned in our study was that they would disguise the vegetables served to their children to make them eat more vegetables. For example, parents would often add small pieces of vegetables to soup or shredded zucchini or carrots to taco meat and cover vegetables with cheese sauce. The similar strategy has been reported in a previous study in which parents would cover certain healthy foods such as vegetables to increase their children's intake of these foods (Peters et al., 2014). While adding vegetables to other

foods (e.g., soups, taco meat, beans) can be a useful strategy to enhance children's vegetable consumption, it may not be the best approach to increasing vegetable acceptance and intake by children (Jarrett, McPherson, & Bahar, 2013). If this practice was used by parents exclusively, it would discourage children to accept vegetables in their whole form particularly when children enter the adolescent and adult years and start to prepare their own meals. Thus, other strategies mentioned by both groups of parents, such as easy to follow recipes and in-home education on how to prepare healthy meals with vegetables could also be better approaches to increase fruit and vegetable intake among children.

A key difference that emerged between preschooler and school-aged children groups was that parents of overweight school-aged children were more concerned about their children's weight and shifted the conversation more frequently to discuss their children's weight issues. This suggests the weight issue may become more worrisome for parents as their children grow older. Our finding was consistent with previous report suggesting parents of younger children were more likely to identify their children as normal weight compared with parents of older children (West et al., 2008). In our study, the discrepancy in parents' perceptions of their children's weight between younger and older children also suggests a continued need for education on appropriate weight status especially because parents who correctly perceive their children as overweight would more likely institute behaviors to prevent excess weight gain.

In terms of the influences that family members had on children's dietary intakes of fruits and vegetables, overall parents felt that they had a positive influence because by recognizing the health benefits of fruits and vegetables, parents increased the consumption of these foods in the home. In addition, they were the main grocery shopper and food preparer in the household, which made it easier to provide more fruits and vegetables to their children. However, compared with overweight preschoolers, parents of overweight school-aged children felt that extended family members (e.g., grandparents, uncles, and aunts) were more of a negative influence. Although parents of younger children (preschoolers) did not feel the same way about the extended family members as did parents of older children (school-aged), they can be made aware of the potential unhealthy eating influences by extended family members when their young children grow older and have more interactions with their grandparents, uncles, aunts, and cousins. However, regardless of children's age (preschoolers or school-aged children), parents need to communicate regularly with other family members by expressing their concerns on what to feed their children and encourage them to be a role model for healthy eating.

There were several strengths of our study. Focus group discussions were conducted separately with parents of overweight preschoolers and parents of overweight school-aged children. This allowed us to give the consideration of the potential contribution of the developmental



changes that occur from preschool to school-aged years, such as older children becoming less dependent on their parents for food. Even though parents of school-aged children were not asked specifically what they would have done differently in feeding their children fruits and vegetables when they were in the preschool years, this study nevertheless provided valuable insight to parents on how to encourage fruit and vegetable consumption and develop healthy eating habits when their children are in the early childhood such as their preschool years. In addition, the trust that was established between the moderator (investigator) and parents, the comfortable places where the focus group meetings were held, and other relevant efforts made by the investigator ensured that the participants felt comfortable to openly respond to the questions during the group discussion.

Our study had limitations. The responses of parents of preschoolers may have been affected by the degree of familiarity as they attended the same Early Head Start and Head Start program. However, having participants be familiar with each other in focus groups can be an advantage in that trust has already been developed within the group and participants are more likely to express their views and opinions freely (Krueger & Casey, 2000). Some parents approached declined to participate due to lack of time and interest. Therefore, our findings might not represent the perceptions of parents who were unwilling to participate. In addition, the offer of voucher (US\$30) for participation in our study might help with participant recruitment, but it would also cause selection bias; that is, parents were interested in the study because of the voucher. Nevertheless, the above bias should always be anticipated in research involving human subjects as the participation is solely voluntary. Furthermore, the parents from overweight preschoolers were recruited from the Early Head Start and Head Start program due to the availability and accessibility of study participants. As a result, we had a relatively higher proportion of low-income families (annual income <US\$25,000) among preschoolers compared with school-aged children (seven out of 13 [53.2%] vs. six out of 14 [42.9%]). While our results from overweight preschoolers may reflect more on the views of parents of low-income families, the current findings nevertheless suggest that common themes, such as short shelf life of fresh fruits and vegetables, children's taste changes, parents having the primary influence on children's dietary intake, and lack of time and wanting fruits and vegetables "ready to go," were shared across both groups of parents, suggesting the potential generalizability of our study results. Finally, although every effort was made to ensure that the participants spoke freely and felt comfortable, some participants may have involuntarily voiced their opinions positively or negatively. However, the goal of focus group study was to go into greater depth into a topic, which was achieved in the current investigation (Krueger & Casey, 2000).

## Conclusion

The current study further explored parental views of challenges and the potential influences they and extended family members had in promoting fruits and vegetables in the home environment among overweight preschoolers and school-aged children. Parents faced challenges with children's aversions to vegetables and some of the negative influences from extended family members, as well as had their concerns about the short shelf life of fresh fruits and vegetables. Parents also suggested that fruits and vegetables needed to be "ready to go" for their children to encourage them to eat more of these foods and wanted more cooking skills when preparing vegetables. In addition, parents of older children (school-aged children) were more concerned about their children's weight problem compared with parents of younger children (preschoolers). Understanding these issues is important and valuable for family-based intervention when engaging parents to overcome barriers and positively influence their children to consume more fruits and vegetables. The current qualitative findings that emerged from the focus group discussions may need to be confirmed using quantitative surveys with larger and more representative samples of parents of overweight preschoolers and school-aged children. Furthermore, a comparison of parents' perceptions of challenges and other relevant factors that influence children's fruit and vegetable consumption among children with different weight statuses (e.g., overweight vs. healthy weight children) is warranted in the future.

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## Declaration of Conflicting Interests

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