Medical Research Archives

ESMED
European Society of Medicine

OPEN ACCESS

Published: March 31, 2023

Citation: Cooper CC, Northrup A, et al., 2023. Understanding Attitudes and Practices of Low-Income Caregivers Toward Sugar-Sweetened Beverage Consumption in Preschool-Aged Children, Medical Research Archives, [online] 11(3). https://doi.org/10.18103/mra.v11i3.3459

DOI
https://doi.org/10.18103/mra.v11i3.3459

ISSN: 2375-1924

RESEARCH ARTICLE

Understanding Attitudes and Practices of Low-Income Caregivers Toward Sugar-Sweetened Beverage Consumption in Preschool-Aged Children

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ABSTRACT

Sugar-sweetened beverage (SSB) consumption during early childhood has been linked to adverse health outcomes across the lifespan. Caregivers of young children are often unaware of the potential health harms of SSB and may lack knowledge, skills and environmental supports to limit SSB. The objectives of this study were to explore caregivers' attitudes and practices with regard to SSB and to identify themes that may inform future policies and interventions to limit these beverages. Guided by the Social Ecological Model (SEM), the research team interviewed low-income caregivers of children ages two to five at a health clinic in urban New York State. Interviews were recorded, transcribed, and coded for themes and further analyzed for determinants of behavior with regard to providing SSB. Five major themes emerged: Greater SSB knowledge led to healthier choices; confusion about the healthfulness of some SSB; SSB affordability, accessibility and cultural acceptability; children's "pester power" to obtain SSB; and, lack of SSB information from healthcare providers. Determinants such as perceived barriers to action, self-efficacy, cues to action, and perceived threat emerged from the themes. SSB are widely available, affordable and palatable. Healthcare providers seldom discuss children's SSB intake specifically at well visits. SSB are frequently marketed and labeled as "healthy." SSB are a significant source of empty calories and added sugars. Helping parents limit SSB may reduce child overweight and obesity and minimize lifelong chronic disease risks. Heathcare providers, health campaigns and nutrition assistance programs may collaborate to help parents limit SSB intake in young children.

Keywords: child obesity, sugar-sweetened beverages, nutrition in young children, parenting and nutrition

INTRODUCTION

Childhood obesity continues to be a major national public health concern (Ogden et al., 2014; Salahuddin et al., 2017) which disproportionally affects low-income (Frederick et al., 2014), Black, and Hispanic children (Ogden et al., 2014; Ogden et al., 2016). It is a multifactorial condition with a variety of contributing factors including genetics, physical activity levels, social and eating environments, parental influence and diet (Lytle, 2009). Children are considered overweight if their BMI is between the 85th and 95th percentiles for their age and gender, and obese if their BMI exceeds the 95th percentile for age and gender (CDC, 2018).

Diets high in added sugars, those not naturally occurring in foods but rather added during processing, increases the risk for developing obesity, cardiovascular disease, hypertension, obesity-related cancers and dental caries (Hu & Malik, 2010; Vos et al., 2017). Several studies indicate correlations between sugar intake and increased weight gain (DeBoer et al., 2013; Shefferly et al., 2016; Skinner et al., 2018; Skinner & Skelton, 2014). Estimates from the National Health and Nutrition Examination Study (NHANES) indicate American children and adolescents consumed an average of 80 grams of added sugar per day (Vos et al., 2017). Half of those, 143 calories per day, or about 7.3% of total daily energy intake, came from sugar-sweetened beverages (SSB), a category including soft drinks, fruit juices, sweetened tea and coffee beverages, sports drinks, energy drinks and flavored milks (Rosinger et al., 2017). The Dietary Guidelines for Americans (DGA) recommend that individuals limit intake of added sugars to less than 10% of daily calories and thus SSB typically account for much of this allotment (Powell et al., 2016). In addition, SSB are often consumed with nutrient-poor, high-calorie, processed foods which also contribute to poor health outcomes (Charvet & Huffman, 2019).

Even the youngest children are routinely exposed to SSB. According to the 2016 Feeding Infants and Toddlers Study (FITS), children of all ages consume SSB, and intake increases with age (Kay et al., 2018). The FITS study reported that, 0.9% of infants age zero to six months, 8.5% of infants six – 12 months, 29.1% of toddlers 12 – 24 months, and 45.5% of toddlers age two – four years consumed SSB (Kay et al., 2018). Other research suggests that the numbers may be higher. One national study indicated that 44 % of toddlers ages 1.5 to two years of age consumed at least one SSB daily (Fox et al., 2013) and by age five the percentage increased to 70% (Yang et al., 2020).

Children's acclimation to and consumption of SSB in early childhood is concerning because many lifelong tastes and preferences are formed during this period (Birch, 1990). A significant body of literature suggests that the timing of SSB introduction may contribute to the risk of childhood obesity (Pan et al., 2014). Pan and colleagues (2014) examined the effects of SSB introduction during infancy (up to 12 months) and observed that the obesity prevalence among children who consumed SSB during infancy was double the prevalence of non-SSB consuming children at six years of age. The literature on SSB intake in toddlers yielded associations between SSB intake and overweight/obesity, insulin resistance, and dental caries (Bleich & Vercammen, 2018). In a study that compared toddlers who did not consume SSB with toddlers who consumed two or more SSB per day, zero consumption of SSB appeared to be protective against obesity (Davis et al., 2014). In addition, three longitudinal studies (DeBoer et al., 2013; Dubois et al., 2007; Lim et al., 2009) and one retrospective study (Welsh et al., 2005) found that high SSB intake was associated with a higher BMI-z score (DeBoer et al., 2013) and increased risk of overweight (Dubois et al., 2007) and obesity in children between the ages of five and seven (Lim et al., 2009).

Despite public health efforts to curb SSB intake in children, consumption remains at higher than recommended levels. A population of particular concern are preschool-aged children (ages two to five), since they are at a life stage at which they are newly exposed to SSB not only through primary caregivers, but also through the influence of peers, teachers and non-primary caregivers (Anderson & Whitaker, 2009). The Healthy Eating Research (HER) group, composed of experts from the Academy of Nutrition and Dietetics (AND), the American Academy of Pediatric Dentistry (AAPD), the American Academy of Pediatrics (AAP), and the American Heart Association (AHA) was funded by the Robert Wood Johnson Foundation (RWJF) to develop recommendations on children's SSB intake. Preschool-age consumers were highlighted in the HER report and received their own set of recommendations that are in accordance with the 2015 Dietary Guidelines and the American Academy of Pediatrics' revised SSB recommendations (Fox et al., 2013). The following are the HER recommendations for preschool-age children:

- All children from birth to age five should consume no flavored milks, toddler milks,

caffeinated beverages, sports drinks or non-100% fruit juice.

- 100% juice, although healthier than artificially sweetened fruit drinks, is still a major source of calories in young children's diets and is inferior to eating fruit itself, which offers other valuable nutrients such as fiber.
    - Therefore, children ages two to three should be limited to four ounces (1/2 cup) of 100% juice per day.
    - Children ages four to five should be limited to between four and six ounces of 100% juice per day.

Since today, when at least two-thirds of children ages two to five attend preschool or childcare and may consume the majority of their weekday calories in these venues, childcare must join the home environment in overweight/obesity prevention approaches (U.S. Department of Education, 2015). In 2010, the government program that funds meals for childcare, the Child and Adult Care Food Program (CACFP), was mandated by new regulations to lower the quantity of SSB served (2015). Although federally funded preschools such as Head Start mainly serve healthful meals and beverages, educating children about SSB and having teachers model healthful choices are also recognized as important, impactful ways to instill healthy choices (Cooper & Contento, 2019). Still, primary caregivers remain the most important influence on children's dietary intake. A large longitudinal study on children's SSB consumption found that the children in the top quartile for SSB consumption drank most of their SSB servings at home (Vinke et al., 2020). Prior research suggests that many factors influence parents' reasons and motivations for allowing SSB for their young children (Beck et al., 2014), including: availability, affordability, and children's and parents' preferences for and cultural acceptability of SSB (Muth et al., 2019). The body of literature on parental perceptions of serving SSB to young children is limited, yet the few existing studies present some consistent data on the factors that influence this behavior.

Demographic Factors

Children from families with lower incomes (Grimes et al., 2013) or from racial and ethnic minority populations are more likely to consume SSB (Kit et al., 2013) as compared to higher-income, non-minority peers (Han & Powell, 2013). In fact, a study using nationally representative data found that children from lower income families that had a 29% increased rate of soda consumption as compared with their higher income peers (2013). They were also more likely to be overweight or obese (Ogden et al., 2016). The extant literature indicates that some low-income families may purchase processed, high-sugar foods and beverages due to low price, high availability and resource constraints influencing food purchases. In addition, financial-related stress may lead lower-income families to purchase products that are low-cost, but highly palatable and offer immediate satisfaction (Papoutsi et al, 2019).

Cultural, Familial Factors

Other familial factors, such as ethnicity and culture, may also play roles in parents' beverage purchases. Research suggests that some parents do not connect SSB consumption with adverse health outcomes, including excess weight, and others do not perceive excess weight itself as a problem. In a number of studies of Hispanic and lower-income populations, parents underestimated their children's weight and selected silhouettes of overweight children as being at a healthy or normal weight (Northrup & Smaldone, 2017; Foster & Hale, 2015; Pasch et al., 2016.) Also related to culture is the phenomenon of dietary change with acculturation. Decades ago many Mexican and other Latin-American immigrants were exposed to wide accessibility of fast food and soft drinks for the first time when they arrived in the U.S. (Martinez, 2013). Today, with transnational corporations marketing and selling these products worldwide in "a McDonaldization" of the global diet, immigrants often arrive familiar with and accustomed to consuming them (2013). Wide availability, low price and an atmosphere of ubiquitous fast and processed food tends to raise immigrants' intake (2013). However, with Hispanic individuals having higher risks for diet-related conditions such as type 2 diabetes, limiting these beverages may present an important public health opportunity to lower disease risk (Department of Health and Human Services, 2020).

Educational Level

Parents' educational level has been negatively associated with children's sugary beverage consumption (Lopez, 2012.) Munsell and colleagues reported a lack of knowledge among low-income parents about what beverages are "healthy" versus "unhealthy." They found that out of 982 parents surveyed, 46% of whom were non-white or Hispanic and 70% of whom had some college education, many believed that SSB (flavored waters and fruit and sports drinks) were

healthy options for children (Munsell et al., 2016). They also found that, despite the majority of participants having some higher education, 82% of the parents served their young children some type(s) of sugar-sweetened beverages (2016). A study of mothers of two- to three-year old children in a low-income, high-risk population found that during a feeding simulation exercise (FSE) mothers selected SSB over healthier choices such as skim milk, 1% milk, 100% juice and water (Northrup & Smaldone, 2017). Capri Sun and soft drinks (sodas), both SSB, were selected for children by 40% of the mothers when given a range of beverage choices (2017). In contrast, a 2018 study involving mostly lower-income families (93% of whom were Black or Hispanic) found that all parents recognized the difference between 100% fruit juice and sugary fruit drinks (Charvet & Huffman, 2019). Thus, education is likely important, but just one variable in a complex set of factors that determine parents' decisions and behaviors around SSB.

Nutrition Education

A lack of nutrition education offered by the U.S. primary and secondary education system, healthcare providers and government food assistance programs may also contribute to parents' SSB purchases. Nutrition education is seldom offered for more than a few hours of the 12 years individuals spend in the U.S. school system (Perera et al., 2015). This is compounded by non-science-based communications about diet and health in the popular media (2015). Furthermore, few physicians receive the 20 hours of nutrition education recommended for medical school students (Devries et al., 2015). There is also a lack of discussion about diet and health between patients and health care providers concerning the health risks of excess weight and the foods/beverages that are likely to contribute to those risks (Skerrett & Willett, 2010). In a recent study, women participating in the Women Infants and Children (WIC) program, which provides grocery vouchers to low-income and pregnant women and their children age five years and under, mothers with overweight or obese children reported significantly greater SSB intake as compared to non-WIC participants with overweight or obese children (Charvet & Huffman, 2019). WIC participants have also reported confusion over the healthfulness of SSB due to WIC's provision of vouchers for 100% juice (Beck et al, 2014). Mothers reported that they were not fully aware of the differences between 100% juice and fruit drinks given that many SSB are marketed and carry labels that suggest healthfulness (2014).

Marketing and Pester-Power

Because parents across educational levels seem to purchase and permit SSB, researchers have studied additional influences on purchasing, including the mass marketing of SSB to children and parents. The University of Connecticut's Rudd Center for Obesity, the Robert Wood Johnson Foundation, the Public Health Advocacy Institute and other health authorities have funded research, recommendations, public health campaigns and have advocated for public policies that aim to lower SSB intake. Despite a large body of research that points to SSB as harmful to children's health, U.S. food and beverage industry labeling regulations permit the labeling of products that contain mainly sugar and artificial coloring as "natural" or containing "real fruit" even if only a small proportion of their ingredients meet these descriptions (UConn Rudd Center, 2019).

In a study by Beck and colleagues, in which parents were interviewed about serving SSB, parents expressed that such sensationalized labels conveyed the message that these beverages were healthful (Beck et al., 2014). Some product labels may also deceptively and inaccurately tout or exaggerate nutritional (e.g. added Vitamin C), taste (e.g. tangy, crisp, thirst quenching) or lifestyle benefits (e.g. fun, friendship, success at sports, glamor) of SSB, further complicating parents' and children's perceptions (UConn Rudd Center, 2019). Likely due to marketing creating a positive aura around certain products, Munsell and colleagues found that parents rated specific brands as healthier than other products in the same category that contained the same amount of added sugar (Munsell et al., 2016). For example, Sprite and Gatorade were considered more healthful than soda and sports drinks, although they were both SSB. Other parents selected Vitamin Water, Sunny D, Red Bull, Capri Sun Roarin' Waters and Snapple as healthful, stating that they offer superior nutrition as compared to other similar beverages, although this is not the case (2016).

Yang and colleagues asserted in their study of SSB consumption by two-year olds that access to and consumption of SSB is mainly determined by parents' choices, with children shaping the household's preferences when influenced by commercial marketing. (Yang et al., 2020). The Rudd Center, the Robert Wood Johnson Foundation and other authorities have determined that marketing of "junk" foods and beverages to children has a powerful influence over parents' purchasing decisions (UConn Rudd Center, 2019). A term that product marketers refer to as "pester power," defined by the Public Health Advocacy

Institute as "marketing that enlists young children as third parties to influence parents to purchase unhealthy food and beverage products" seems to help close the sale of SSB among parents who may normally resist purchasing these products (Public Health Advocacy Institute, 2017).

Pester-power marketing is engineered to break down parents' resistance to purchasing unhealthy products through multiple requests and via the threat of public embarrassment and discomfort (Vinnakota & Mohan, 2020). Initial product requests may occur at home, and the actual purchase influence attempt normally takes place in a public place such as a supermarket, restaurant or other establishment where the child may pester the parent. Studies of parent - child shopping interactions suggested that tantrums and conflict arose 65% of the time when parents denied a child's request (Public Health Advocacy Institute, 2017). The ethics and workings of pester power have been questioned and criticized by public health advocates (2017).

Although prior research suggested that until age eight, children are not developmentally capable of understanding the persuasive messaging of advertising, this has been challenged (Story & French, 2004). Cromwell discovered that brand awareness was solidified in children as early as three to six years old. McAlister and Cromwell found that children shown logos and characters remembered fast-food and other brand names and were even able to make arguments comparing brands such as McDonald's versus Burger King (McAlister & Cromwell, 2010). This is important to consider in light of research by Wilcox and colleagues who found that U.S. children are exposed to approximately 40,000 television commercials per year and approximately 80% of these commercials target child consumers specifically (Wilcox et al., 2004).

Study Framework

Given the factors and various levels influence on food and beverage purchasing and consumption behaviors, the present study is framed by the Social Ecological Model (SEM) (Glanz et al., 2008). The SEM highlights the various levels of influence upon behavior (individual, interpersonal, organizational, community and public policy) and acknowledges that behaviors both shape and are shaped by social environments. The principles of SEM are also consistent with Social Cognitive Theory (Bandura, 1989), which suggests that creating environments conducive to change is important to facilitate adoption of more healthful behaviors.

Guiding Questions and Purpose

The guiding questions for the study included: What are the perceptions of low-income parents with regard to serving SSB to their young children? Why do some parents limit SSB and others do not? What is missing in the socioeconomic, cultural, educational, demographic or public policy landscape that would help parents recognize the health harms of SSB and act to reduce their children's intake?

The purpose of this study was to examine low-income parents' SSB purchasing decisions to help contribute to the body of knowledge on potential ways to lower SSB intake in young children. The study also aimed to inductively gather parents' perspectives and construct useful categories, themes and potentially, a theoretical framework, to assist healthcare practitioners, public policy advocates and community stakeholders in helping parents limit SSB. To date, SSB intake in young children remains a health threat, despite public health, community and health care providers' efforts to promote children's intake of only water, 100% fruit juice, milk and unsweetened beverages.

Since the majority of qualitative studies on this topic have involved researchers from a single profession or discipline and yet this problem spans fields from nutrition education to marketing, our approach was to use an interprofessional team to interview participants and interpret findings. The first researcher was a pediatric nurse practitioner with over 20 years of experience working with clients at the research site and as a volunteer in the surrounding community. This helped to build trust and openness with participants and the center's pediatricians and staff. The second was a registered dietitian nutritionist (RDN) with experience working in Latin-America and with Latin-American immigrants to the U.S., which provided cultural competence and food knowledge. The third team member was a master's in nutrition and dietetics student with a marketing and advertising background. This interprofessional approach was designed to elicit a broader range of information from participants and to interpret the data incorporating our different realms of experience.

METHODS

Protection of Human Subjects

Prior to the initiation of this study, the research proposal, including the recruitment flyer, study instruments, and patient consent forms were approved by Pace University's Institutional Review Board (Project number 1195036-5.) All participants were read a consent agreement, given the agreement to peruse and asked to sign to indicate their consent to participate.

Participant Recruitment

Participants were recruited from the pediatric department check-in and waiting room at a federally qualified health center serving low-income individuals and families in an urban New York State community. Participant inclusion criteria included: income qualifications for family and pediatric services at the clinic (all participants met the criteria for care at the center: low-income, uninsured or limited access to health care); being a primary caregiver of at least one child between ages two and five (all participant interviews focused on children in this age range even when participants had children of other ages); and self-reported as proficient in English. Exclusion criteria included: non-primary caregivers accompanying preschool-age children and individuals who reported themselves not proficient in English.

Data Collection

Individuals who consented to participate received a written and verbal explanation of the study's procedures and were asked to sign the IRB-approved consent form. Data collection occurred in a private office using an audio tape and research notes. The research team included a nurse practitioner, a registered dietitian-nutritionist and a nutrition and dietetics graduate assistant who was trained on the interview procedures.

Interviews with parents were conducted using a semi-structured interview guide. Interview questions were formulated as open-ended to allow for follow-up on specific individual, interpersonal, community, and organization level influences on SSB purchasing decisions. Researchers repeated answers back to participants in order to confirm the meaning of statements. Interviews concluded with a review of interview notes and discussion by the research team. Major points, emerging patterns (when compared with previous interviews), and newly emerging ideas were discussed. One interview was conducted with each participant. All interviews except one, at the participant's request, were audio taped. Interviews lasted approximately 30-45 minutes. During interviews, childcare was provided, and a $40 gift card was given to participants the end of the interview to thank them for their time as per the research precedents of Pace University.

Data Analysis

This study was undertaken and data were reported in accordance with current qualitative research quality standards and practices (Tong et al., 2007; O'Brien et al., 2014). An inductive content analysis was undertaken by the authors to identify themes and summarize interview content based on the qualitative research phases outlined by Braun & Clarke (2006). The authors did not deduce themes based on the perspectives covered in prior literature, but rather inductively used information gathered in the interviews to construct themes.

The data gathered from participants were analyzed by the researchers manually, with each researcher working independently to code the transcribed interviews, noting words, concepts and phrases that were stated more than once. Initial coding of emergent themes was performed to identify strong features and patterns in the data in a systematic fashion across the entire data set. Data were then collated into each code. Collated codes were separated into potential themes and the content of these was further analyzed. A thematic "map" was created to describe the themes and their relation to one another and the whole body of data. The final analysis was selecting vivid, compelling extracts that could help tell the story behind the themes and provide the verbiage and original viewpoints of individual participants. The researchers again discussed which concepts could be combined or separated and any additional patterns in the data. Direct quotes that exemplified the major themes were copied from interview transcripts and confirmed by the team as relevant and accurate/representative of the themes. The themes were presented at two academic conferences and feedback from other scholars informed the final reporting of the study. Methodological rigor was maintained with reliability and validity checks. Criteria used to ensure rigor included credibility, transferability, dependability, confirmability and authenticity (Speziale et al., 2011; Lamont & White, 2008; Guba & Lincoln, 1985). Transferability was achieved by thoroughly describing the sample, setting, and data in the report. Dependability, or auditability, was achieved by consultation with other doctoral-level qualitative researchers at X University and scholars at both nutrition and nursing academic conferences. Confirmability and authenticity were achieved with analysis and interpretation of data with key informants such as pediatricians and patient care staff who were familiar with the patients.

Once themes were identified the researchers observed and observed a grouping of parents according to their responses to key questions, aligning pertinent determinants of health that could be useful in practice and policy for reducing SSB intake in young children.

RESULTS

Interviews were conducted with 17 parents/caregivers (15 females and 2 males). Four participants identified as Hispanic; six identified as Black/African American; and seven identified as White/Non-Hispanic. All participants lived in the area surrounding the health center. About half of the participants were also clients of the WIC Program.

***Table 1**: Participant Demographics*

Participants (n=17)	**White Non-Hispanic**	**Hispanic**	**Black**	**Other Mixed-Race**
Female	6	3	5	0
Male	1	1	1	0
Total	7	4	6	0

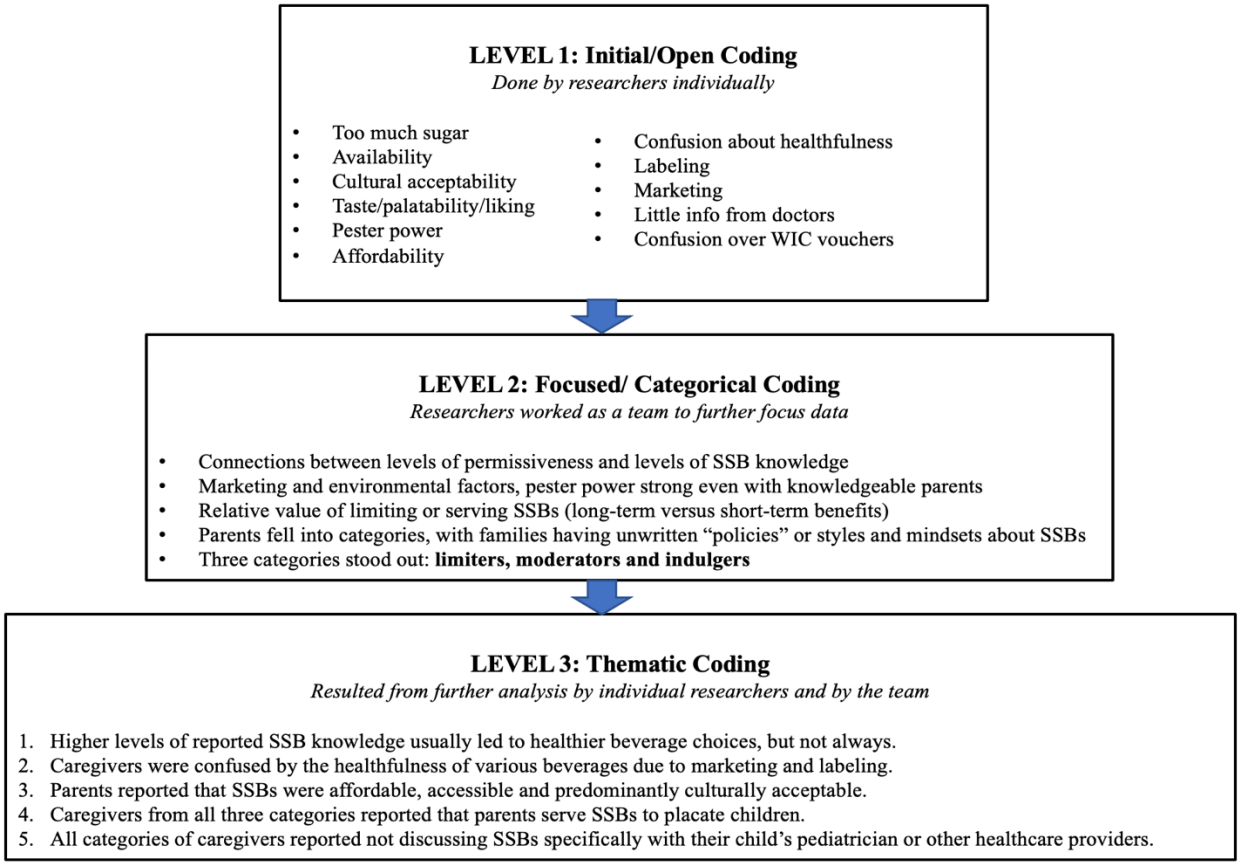
General Findings

Most participants exhibited a basic belief that SSB, especially soft drinks, were generally not healthful choices, particularly compared to milk and water. Most participants identified sugar as the main harmful ingredient in SSB. Participant levels of SSB knowledge varied widely. Most parents recognized that soft drinks were not healthful, but fewer recognized the difference between 100% fruit juice and fruit drinks (that contain little real fruit and mostly sugar). All participants reported that they believed the main reason children like and request SSB was liking/palatability. Most parents, whether or not they served SSB, reported that they believed their top motivation for serving SSB was to keep children happy and quiet. Questions probing into this aspect prompted some parents to describe their children's influences on their purchases, such as children becoming upset about not getting a juice drink they desired and parents allowing soda when eating at restaurants or social gatherings. A number of participants mentioned that their children drank SSB when eating out, especially at fast food restaurants, which many did at least once or twice per week.

Information also emerged regarding higher levels of influence, such as community and public policy effects on SSB decision-making. For example, some participants mentioned that the healthiest foods and beverages are expensive and less nutritious foods are cheap. Participants also noted the wide range of child-targeted advertising around SSB, the ubiquitous presence of SSB at social gatherings, and the occasionally lower prices of SSB relative to healthier choices. Some participants commented on the wide availability of SSB in their local neighborhoods and the ease of purchasing SSB. One parent noted that in her community of immigrants to the U.S., it was socially desirable to bring soda to parties so as to "not arrive empty-handed," and since soda was affordable and always enjoyed.

Some participants distinguished their experiences with SSB in their home countries from those in the U.S. One participant noted that in her home country of Ecuador juices normally consumed are freshly squeezed and commercially made juices are much less frequently consumed. She also commented that when she recently went to Ecuador on vacation she found food and beverage labels very informative and easy to understand, clearly delineating calories, sugar content and a providing a government rating on the product's overall healthfulness. Another participant commented on the confusing nature of U.S. food and beverage labeling and how she tends to buy products that indicate "all natural" or "contains natural ingredients" because she trusts that this indicates high quality and nutritious.

Figure 1. *Data Analysis Process*



Major Themes

The data analysis (coding) and conference/consensus between researchers resulted in identifying the following common themes:

1. **Knowledge led to healthier choices.**

   "I just feel that more parents should be aware of [SSB]. They buy them because it is cost-effective, but we look at the big picture and the overall picture, pumping all of that sugar into that child, is it really, in the long run, it is not going to benefit the child. It is more damaging to the child and they do not look at it like that. When I was younger, I came up, my mom was—we love Kool-Aid. The red Kool-Aid. Not cherry-red…the red Kool-Aid with all the sugar you needed…That was diabetes waiting to happen…We loved it. Ice cold Kool-Aid, but it had no nutritional value at all. Do you understand what I am saying? It was like we thank you, but when I have my children and my grandchildren…It is a new day. We have got to make sure that we keep them as healthy as possible. It starts with us."

A number of parents expressed that soft drink intake should be limited for good health. Most caregivers in this category agreed that milk and water were better choices than soft drinks or fruit drinks. Some of these parents had family members who were obese or had type 2 diabetes and thus they asserted a personal motivation to help their children avoid these conditions. Some parents reported serving only milk and water to their children and never purchasing SSB, especially soft drinks. A few parents reported that their children actually preferred water or milk to SSB and did not drink juice at all. Other limiters reported never allowing their children to drink SSB, even if their children liked those beverages.

2. **Caregivers were confused about the healthfulness of SSB.**

   "Sometimes I try to judge it by looking at whatever I am buying and comparing [products]. One has that much sugar, or this one has that much sugar. I try to get the things that have less sugar, which is sometimes hard, because they all have the same kind of sugar. Sometimes on the TV, sometimes they might have little commercials that might tell you a little bit about some products. That is good, or even looking at some of the flyers you might find some things, but not really…I think there should be more

advertisement on the things we eat that are more healthy and natural."

Some parents reported allowing SSB at home and when they dined out with their children. Some parents were likely to water down juice to make the beverage ½ juice, ½ water. Some reported that they served chocolate milk as an occasional treat, making the drink themselves with a modest amount of chocolate powder or syrup. Some of the parents who reported confusion about the difference between 100% fruit juice and fruit drinks also reported serving SSB frequently and in liberal amounts. They generally believed that "juice" was healthy and did not know the difference between 100% juice and fruit drinks. Some parents reported putting juice in a "sippy cup" or in a baby bottle, a practice not recommended by pediatric health experts. Of note, one parent reported her two-year old son consumed eight-ounce baby bottles filled with an SSB (Hawaiian Punch) about eight times per day on average. Eight ounces of Hawaiian Punch contains 60 calories and 15 grams of sugar. Eight servings, therefore, equals 480 calories and 120 grams of sugar per day. The average preschool-age child requires about 1,400 calories a day to meet energy needs. Thus, 480 calories add a significant number of calories (and much sugar) to the diet without adding fiber, vitamins, minerals and other nutrients necessary for optimal growth and development. All participants reported that various types of product marketing, including product labels, TV commercials, internet advertisements and point-of-purchase signage for SSB can lead to confusion about healthfulness.

3. **Parents reported that SSB were affordable, accessible and predominantly culturally acceptable.**

"Convenient, cheaper, and it is there all the time. It is just sitting out there, bottles, bottles, of soda and [the parent] does not feel like probably going down the aisle of juice and saying, let me get that [instead]."

"Well, they make it easier for us to buy [juice] you know. 'Cause if you're buying natural against Capri Sun or natural juice, Capri Sun's going to win because it's cheaper. So if they make everything the same price, then it wouldn't be so hard to make a good choice. That's all. For a lot of people, especially here, they don't make that much money and to buy organic or make things at home, to make [juice] at home is hard."

All of the participants reported that SSB were affordable beverages, noting that in some cases 'fruit drink' pouches are sometimes cheaper than bottled water. Many also noted that SSB are widely accessible and ubiquitous in supermarkets, bodegas, big box stores and most public places where food and beverages are sold. Most parents reported that their child was more likely to consume SSB when eating away from home, particularly at fast food restaurants, because sugary drinks are customarily served with kids' meals.

4. **Purchasing SSB (giving in to "pester power" placates children.**

"It tastes good…so they just run to it. It is like, oh, I have got to have that. The grape soda is so good, but it has all that dye and all that sugar. I think it is the sugar."

"They like [SSB] because they taste good. It is always like there are sweetened beverages around all the time. You can try to get your child to drink something, but if you have something that is maybe different than theirs, they come take a sip and then they like that. There are sweet drinks everywhere."

All caregivers reported that children know about SSB, see others enjoying them, and sometimes request them when out shopping for food. Caregivers who allowed SSB consumption said they did so because their children enjoy SSB and because it was easier to provide these drinks than hear their children "whine and complain". A number of participants mentioned Capri Sun as an affordable, reasonable choice for a child's beverage. Several parents said that even if they wished to limit their children's consumption of SSB, others would override their wishes and provide them to their children. A number of mothers reported feeling undermined by other family members, such as fathers or grandparents, who sometimes gave children SSB despite knowing that the child's mother discourages it.

5. **Participants received little or no information from their child's pediatrician or health care authorities on SSB specifically.**

"I don't get it because if juice is bad, then why does WIC give us vouchers for juice?"

All participants reported never discussing SSB consumption specifically with their child's health care provider. Some parents mentioned that their child's pediatrician had spoken with them and their child about healthy eating, particularly fruit and vegetable intake, but none had specifically addressed SSB consumption. Another finding was that some parents, who could not differentiate

between juice types, reported they believed "all juice" was healthy because the WIC Program provided vouchers for 100% juice.

Categories of SSB-Related Attitudes and Behaviors Among Caregivers

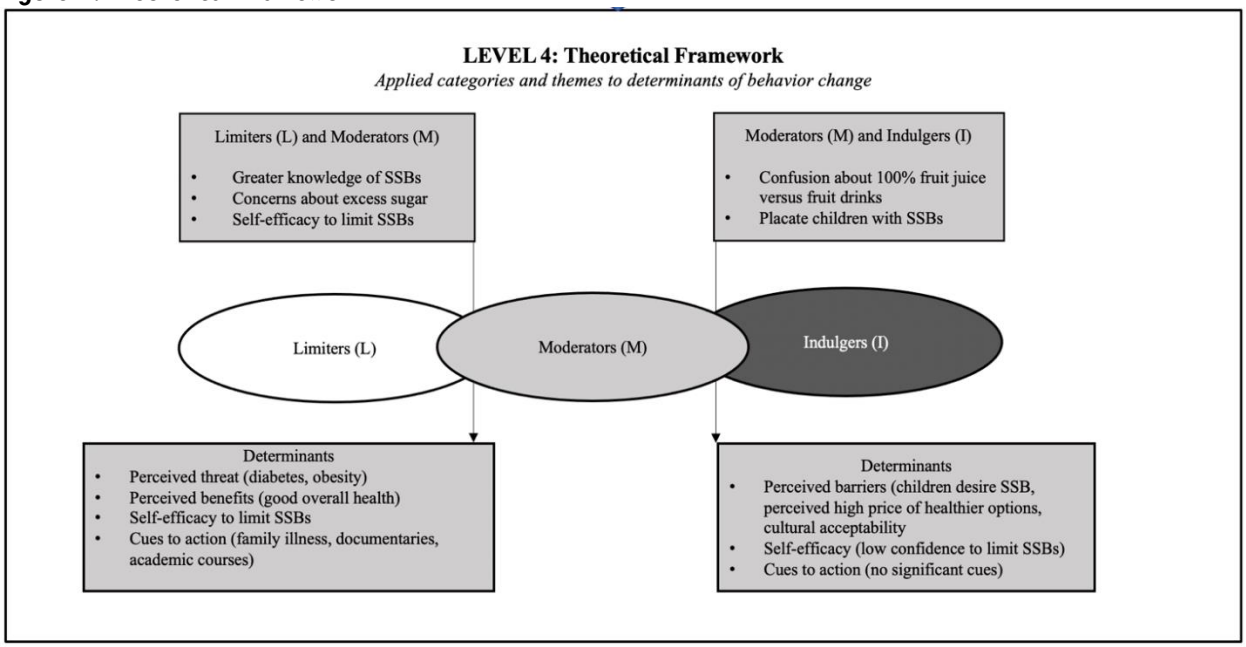
In our final analysis of the data, we observed a pattern of answers to three questions that we considered "key questions," as they elicited responses that were very specific and informative from all participants:

- *What types of beverages does your child consume at breakfast, lunch, dinner or with snacks?*
- *How often does your child drink 100% juice? [The same question was asked for juice drinks (non-100% juice), milk, soda (like Coke, Pepsi, Sprite, etc.), sports drinks (such as Gatorade), flavored milks or sweetened tea or coffee drinks?*
- *How do you make your decisions on what to serve or buy for your kid(s)?*

Caregivers were grouped as follows based on their answers to these key questions: Caregivers who reported never serving SSB, serving them less frequently than once a day and limiting portion size to the recommended levels or below were grouped as **"limiters"** (4 participants). Caregivers who indicated that they served SSB within or at the recommended serving size once a day or less frequently were grouped as **"moderators"** (7 participants). Caregivers who reported serving SSB more than once a day and in amounts in excess of those recommended were grouped as **"indulgers"** (6 participants).

Parents' reasoning behind serving SSB led to the construction of the framework (shown in Figure 2.) that aligns the groups with pertinent mediators of behavior change (perceived barriers and benefits to action, cues to action, self-efficacy, perceived threat). Some of these mediators have been posed in the prior literature as effective targets for individual, family and community interventions to limit SSB (Choy & Isong, 2017; Nezami, Lytle & Tate, 2016). (See Figure 2.)

Figure 2. *Theoretical Framework*



DISCUSSION

Although there is considerable research on the health harms of SSB, the decision-making processes about and the reasons caregivers permit, buy and serve these beverages are not well understood. Few studies have inductively, based on direct caregiver viewpoints and experiences, considered which determinants might be most effective to target in interventions to reduce young children's SSB intake. Yet fewer studies have employed interprofessional researchers who elicit and probe into a variety of influences—from the individual to the community levels of the social ecological model (SEM). Some prior studies involving populations similar to that in our study (Bany et al., 2013; Beck et al., 2014) have suggested that while some parents are knowledgeable about the health harms of SSB and limit children's intake of soft drinks and fruit drinks,

others lack the knowledge, motivation, skills and social/environmental supports to do so.

In some cases, the connection between the added sugars in SSB and the risks of overweight, obesity and chronic diseases such as type 2 diabetes are not recognized. Bany and colleagues (2013) found that some mothers who were aware of the effects of diet quality on the risk of type 2 diabetes and low immunity did not correlate sugar intake with children's weight. In our study, knowledge and recognition that added sugars can lead to diabetes and other conditions was a differentiator between the limiter and indulger groups. Some participants noted a perceived threat of chronic disease as a chief motivation for limiting SSB. Also similar to Beck and colleagues' findings (2014), some our participants who were also WIC clients thought that juice in general was healthful because WIC participants receive vouchers for juice. Gaps in knowledge about the health harms of SSB combined with a misperception of a child's weight may lead to a lack of necessity and urgency to limit SSB consumption.

Tipton (2014) posited that the Theory of Planned Behavior can be used to predict SSB purchasing intention, with attitudes and subjective norms being significant in the decision-making process. Our findings suggest that the intention to purchase or not purchase SSB, even among caregivers who enter a store **without** the intent to buy them, may change at the point of purchase due to the powerful forces of misleading packaging and "pester power." Thus, attention to the *when* as well as the *why* caregivers purchase SSB is warranted. Our combined interprofessional experience allowed us to probe into how and when parents responded to retail marketing techniques designed to attract them and mentally legitimize their purchases. Relatedly, many of our participants reported they were more likely to allow their children to consume SSB when eating at fast food restaurants, where soft drinks or fruit drinks, rather than water or milk, are customarily paired with kids' meals.

Our qualitative approach to this topic led to a thematic analysis used to gather data across research questions, which, as Braun and Clarke (2006) assert, enhances analysis, organization, description and reporting of themes found within data. It also allowed for the "theoretical freedom" to provide a highly flexible approach to questions to accommodate a rich and detailed, yet complex account of the data (2006). Although the study was broadly framed by SEM, given the known, disparate influences on SSB decision-making, our findings pointed to some behavior change mediators and concepts within other existing theories. The first was Hughes' (2005) feeding style framework, whereby parents are classified into "feeding styles," according to their degree of demandingness that their children eat healthfully and their responsiveness to children's needs, likes and dislikes. This theory was originally adopted from Darling and Steinberg's (1993) parenting style framework. It has been used in the nutrition education literature to describe both caregivers in the home and in childcare environments (Hughes, 2008; Cooper, 2020). The categories that emerged from our data mirrored aspects of the feeding style framework in that parents who were limiters responded to our questions with answers indicative of high demandingness (i.e., expectations for healthful eating) and high responsiveness, emblematic of the "authoritative" feeding style. Authoritative parenting and feeding have been designated as the most conducive to positive mental and physical health outcomes (Hughes, 2008). Recent research, however, has revealed that different feeding styles may be more conducive to healthy eating among certain populations. Authoritarian feeding seems to result in positive eating behaviors in Asian-American populations (Pai & Contento, 2014). and a newly identified feeding, "overprotective feeding," may rival authoritative parenting, given the unhealthful foods that pervade the modern food system (Van der Horst & Sledden, 2017). Parents in the moderating and indulging categories may be less demanding and more responsive than limiters. Again, the environmental, financial, geographic and cultural factors that influence SSB purchases also impact parents' ability or desire to limit SSB. This framework is useful for classification purposes and comparisons with studies that have explored feeding styles and associations with children's intake of less healthful foods and beverages.

The second theory that emerged to frame our findings at the level of the individual was Bandura's Social Cognitive Theory (SCT) (1989). The SCT mediators included attitudes, behaviors, outcome expectancies (positive and negative), barriers, self-efficacy and cues to action. In our study parents classified as SSB limiters tended to perceive that the benefit of keeping their children healthy outweighed the barriers to limiting SSB, even in the face of barriers such as pester power. They reported using firm rules about SSB. Some had taken courses on nutrition or had encountered cues to action such as literature, Internet or television messages about the harms of SSB. Others had a family member with diabetes, obesity or another weight-related condition and wanted to avoid this

fate for their child(ren) (perceived threat). Parents in the moderator group were less likely to describe enforcing clear rules, but rather trying to limit SSB when they thought children had had too much sugar or when healthier options were available. Like limiters, moderators were motivated by both positive and negative outcome expectancies, cues to action and perhaps to a lesser extent, self-efficacy. Increasing moderators' and ingulgers' self-efficacy and strengthening positive outcome expectancies may be suitable targets for SSB education but change at multiple levels of influence (as per the SEM) must accompany individual-level changes to support maintenance of healthier behaviors over the long term.

Strengths and Limitations

Our study had several strengths, including our interprofessional research team who possessed experience studying and working with SSB in various locales and in a number of capacities, cultural competence, and the opportunity to talk privately with parents in a trusting environment using open-ended questions that explored multi-level factors around providing SSB to young children. By way of limitations, participants' responses may have been influenced by an element of social desirability since interviews were conducted in the health clinic where their children received medical care. In addition, we relied on one-time parent self-reports about attitudes and practices around SSB and not a series of reports over time, nor did we employ observations or follow-up interviews to confirm intake reports or intake patterns over time.

CONCLUSIONS

The aims of this study were to explore parents' attitudes and practices around serving SSB to their two- to five-year-old children and identify emerging themes and categories. In our analysis we applied mediators from the SEM, the feeding style framework, and SCT that emerged from the data and may be used in future research, programs, campaigns or policies to reduce SSB intake in young children. Because SSB are widely available, affordable, palatable and socially acceptable, it will likely take multi-level approaches to reduce their consumption. Our data and findings from previous studies suggest a few concrete avenues towards this goal. Primary and secondary schools, health care providers, including pediatricians as well as government food assistance programs such as WIC and SNAP may provide increased SSB-specific education for parents, children and caregivers. At present, the American Academy of Pediatrics (AAP) recommends that physicians address dietary patterns generally, but given the high intake of SSB among children, more targeted education about the health harms of these beverages is in order. Current pediatric well visit protocols might be enhanced to include more SSB education for parents on how to identify SSB, how SSB are linked to weight and general health and how to read labels to select healthful beverages. Today, preventive care by registered dietitian nutritionists (RDNs) is not covered by most insurance plans, including Medicaid and Medicare. Dietary guidance for children at risk for overweight and obesity may have the potential to prevent these conditions and associated costly co-morbidities.

At present, the Child and Adult Care Food Program (CACFP), which funds meals at low-income preschools, allows home childcare providers (but not preschool centers) to serve SSB, but does not reimburse for the cost of these beverages. The Supplemental Nutrition Assistance Program (formerly the Food Stamp Program), which provides cash allotments for eligible families' food purchases, also allows purchases of SSB. Perhaps changes to these programs to disallow or limit SSB would help send a stronger health message. Several cities in the United States have imposed beverage taxes and social marketing campaigns to help raise awareness about the health harms of SSB (Teng et al., 2019). Some studies have reported positive results from using social media or text messages to communicate about SSB with parents (Swindle et al., 2018). Interventions that combine primary care and home interventions also may have promise (Stark et al., 2011). The problem of excessive SSB intake in young children is complex and successful solutions likely will necessitate many actors—parents/caregivers, teachers/childcare providers, health care providers, food assistance programs, community stakeholders and corporate leaders—working in concert. All actors must be willing to change the pattern of making SSB affordable, accessible and desirable to our youngest generation.

Conflicts of Interest: The authors declare no conflicts of interest.

Funding Sources: The authors did not receive grant funding for this project.

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