

AN EXAMINATION OF SUGAR SWEETENED BEVERAGE CONSUMPTION AMONG
YOUNG CHILDREN IN EASTERN NORTH CAROLINA: A PROGRAM EVALUATION

By

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A Senior Honors Project Presented to the

Honors College

East Carolina University

In Partial Fulfillment of the

Requirements for

Graduation with Honors

by

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May 2019

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Abstract

The prevalence of obesity and dental caries among children is associated with early and frequent consumption of sugar sweetened beverages (SSB). Therefore, practicing healthy eating habits early in childhood is critical. Major health disparities exist between children in rural and urban areas, especially among ethnic minority populations. The purpose of this study was to examine the consumption of SSB among children living in rural eastern North Carolina in relation to body mass index and dental caries.

This program evaluation was conducted in the WIC program of a rural health department in eastern North Carolina, in collaboration with a Public Health Nurse and bilingual WIC nutritionist. Data was collected from the mothers of 31 children: White (n=10); Latino (n=14), and African American (n=7), between ages 2 to 5 years. There was an overconsumption of SSB by 27 children (87%). Latino children had the highest rate of obesity (56%). Overall, most children consumed SSB daily and serving sizes were larger than recommended. In the subsample of children ages 2 to 3 years, 29% were overweight/obese.

With the overconsumption of SSB, early onset of overweight and obesity was noted. This study highlighted the need to focus interventions on early childhood consumption of SSB in the Latino community. Targeted initiatives by nurses and nutritionists are needed to reach this demographic with culturally relevant health information, perhaps through lay health advisor training program. Further investigation into false advertising of SSB should be considered a priority in rural communities. Research using photovoice may be one way to engage Latino mothers in addressing false advertising.

Introduction

In North Carolina, 47.4% of children younger than five are Latino and non-Latino African American (Annie E. Casey Foundation, 2017). In 2017, statistics revealed 19% of these children are of immigrant families and 21% were living at or below the poverty level (Annie E. Casey Foundation, 2017). Consumption of sugar-sweetened beverages (SSB) is higher in rural areas due to the availability and affordability of these products, influencing the purchasing power of low-income families (Annie E. Casey Foundation, 2017). According to the American Academy of Pediatrics, the rate of childhood obesity has doubled in the last 25 years. One of the major risk factors associated with childhood obesity is the consumption of SSB (Ordway et al., 2018). Investigators are finding that that dental caries are reoccurring in younger children, which may also be attributable to the consumption of SSB (Creske, Modeste, Hopp, Rajaram & Court, 2013).

Understanding how the social determinants of health contribute to health disparities and poor health outcomes are priority research areas for nursing science (Eckardt et al., 2017). As the largest health professional resource, nurses need to address the health outcomes of ethnic and racial minority children, especially since unchecked preventable conditions lead to life-long chronic illness.

Review of Literature

This literature review examined information regarding SSB consumption among ethnic and racial minority children in rural regions of the United States, and health issues such as childhood obesity and dental caries. Sources were identified between 2013 to 2018 from three databases: CINAHL, PubMed, and ProQuest. The search terms utilized were sugar-sweetened beverages, rural, child nutrition, supplementary feeding, obesity, and dental caries. Articles were organized

in three categories, social determinants of health, advertisements and SSB, and cultural beliefs about nutrition.

Social Determinants of Health

This category includes literature on health disparities between rural and urban populations, lack of nutritional education, and lack of access to healthcare. Researchers have concluded that poverty strongly correlates with childhood obesity, which currently accounts for 17% of children living in the United States (Polk, Thornton, Caulfield & Muñoz, 2015; Johnson & Johnson, 2015). In a meta-analysis, rural children were found to have more physical activity than their urban counterparts; yet, the obesity rates of rural children were higher, revealing nutrition deficits in this population (Johnson & Johnson, 2015).

Ordway and others (2018) also found that young mothers with a high school education or less were more likely to have an overweight or obese child. Another study recognized that many mothers with limited education had little understanding of healthy and unhealthy foods (Connor, Layne & Hilb, 2014). This knowledge deficit includes nutritional value and recommended serving sizes of foods and beverages. In North Carolina specifically, 44% of Latino children and 11% of non-Latino African American children were raised in families where neither parent had a high school diploma (Annie E. Casey Foundation, 2017).

Parenting style is another factor that contributes to a child's nutrition. Parents are the decision makers of their children's dietary practices. Parents purchase food and model eating habits for their children (Arredondo et al., 2018). Parental behavior is essential in understanding reasoning behind SSB consumption in children. In a study that evaluated permissive parenting, investigators found that permissive parenting was linked to overconsumption of SSB (Arredondo et al., 2018).

With educational limitations in nutrition knowledge occurring in underserved populations, many families depend on health care providers to learn how to best care for their children. Access to health care is a vital component in providing opportunities for health education. Mothers living in low-income rural areas may not have access to affordable health care for themselves, creating another issue of accessible healthcare for their children (Polk et al., 2015). In a study examining 153 Latino women regarding feeding practices for their children, many low-income Latino mothers reported food insecurity, unsure of the next meal they could provide for their families (Watt, Appel, Roberts, Flores & Morris, 2013). Food insecurity has been correlated with an increase in SSB, increasing the risk of dental caries (Chi et al., 2014).

Advertising and SSB

This section includes literature regarding advertisements related to consumption of SSB and health outcomes, specifically childhood obesity and dental caries. In one study conducted to determine risk factors of obesity in families, the low-income Latino population had the greatest problems with access to affordable and quality foods and beverages (Watt et al., 2013). The term “food deserts” in this study was defined as areas with low amounts of fresh produce and large numbers of fast food restaurants (Watt et al., 2013, p. 514). Another study discussed these food deserts, explaining that the only available food options in convenience stores include packaged and processed foods (Chi et al., 2014). Within these food deserts it is important to understand the issue of false advertisement. Some families may buy SSB that incorporate images of fruit on the packaging if there is limited availability of fresh fruit, as in food deserts. In a systematic review of studies (N=46) that focused on the health of migrant farm workers, investigators determined that in communities where migrant farm workers reside, healthy foods are overpriced and

inconveniently located (Connor et al., 2014). These obstacles make it difficult to purchase healthy foods and in turn, fast-food and SSB become convenient options.

With the high rates of SSB consumption in rural communities, understanding the influence of advertising is important. Investigators found that low income individuals living in rural communities were more likely to observe advertisements for food with higher calorie content and lower nutritional value (Chen, Porter, Estabrooks & Zoellner, 2017). A study conducted in Guatemala City, focused on the false endorsement of 86 different SSB to evaluate claims of nutritious value on the label (Perry, Chacon & Barnova, 2017). Investigators concluded that the beverages were high in sugar and fat, with less nutritional value than advertised (Perry et al., 2017). False advertising, such as images of fruits on the label, confuses consumers about the real nutritional value of these beverages which may lead to misunderstanding of nutritional value and over-consumption of a product thought to be healthy (Perry et al., 2017). Learning how rural communities interpret these advertisements plays a large role in creating interventions towards improving the nutritional health of this population (Chen et al., 2017).

Cultural Beliefs about Nutrition

Beliefs about nutrition and overall health differ based on population demographics, further contributing to disparities (Highland et al., 2016). In one study evaluating Latina and non-Latina women's perspectives of health, investigators found that Latina mothers viewed healthy behaviors as a hindrance rather than rewarding these behaviors (Highland et al., 2016). Further, some populations who immigrate consume SSB based on established habits in their home country (Colón-Ramon et al., 2017). These "pre-migration habits" are difficult to change, especially with the increased availability of SSB in rural regions of the US where immigrants tend to reside and work (Colón-Ramon et al., 2017).

Cultural beliefs influence the foods and beverages families give their children. The incorporation of fortified milk products and sweetened beverages, like *atol*, are traditional beverages for Latino children (Davis, Fischer, Rohloff & Heimbürger, 2014). Latino adults in rural communities are unsure about the nutritional value of certain beverages and maintain strong beliefs regarding the nutritional value of drinks such as *agua fresca*, *atol*, and sports drinks (Chen et al., 2017). One study involving Latino mothers in Northern California assessed mothers' views on the consumption of water, milk, juice, and traditional beverages like *agua fresca* (Beck, Takayama, Halpern-Felsher, Badiner & Barker, 2014). Investigators found that many mothers believe water and milk are healthy, and sweetened beverages are unhealthy. However, *agua fresca*, an SSB containing significant amounts of sugar, was considered healthy since it was made in the home (Beck et al., 2014).

Another cultural belief affecting beverage consumption is the perception of drinking water. Many families chose to give children SSB, including carbonated beverages and sports drinks, because they believed tap water was unsafe to drink (Onufrak et al., 2014). According to the participants (N=1,044), approximately 20% did not think their tap water was safe (Onufrak et al., 2014). Tap water safety was believed to be compromised in much of the Latin American immigrant population, and this belief originates from poor drinking water in the home country, as opposed to the non-Latino Black population who had prior beliefs of school water being unclean (Onufrak et al., 2014). Participants in yet another study found that tap water was considered dirty and distasteful (Colón-Ramon et al., 2017). There were also knowledge deficits regarding the source of the water with some mothers believing it was from the toilet (Colón-Ramon et al., 2017). The distrust among the public of their drinking water safety has a large influence on the consumption of SSB.

The literature on childhood obesity suggests disparities are greater among rural populations, ethnic and racial minorities, and persons living in poverty. Many low-income families with young children up to the age of five are eligible for the Supplemental Food Program for Women, Infants, and Children (WIC). The purpose of this program evaluation was to examine and describe the SSB consumption of children enrolled in the WIC program in a rural, low income community in eastern North Carolina. This study is based on a previous assessment of cultural feeding practices of Latino infants in one rural, low income community (Galloway & Larson, 2018). We sought to answer two questions: 1) What are the characteristics of children enrolled in the WIC program in one rural, low income community? and 2) What is the consumption of SSB in this population?

Methods

Design

A program evaluation was conducted from January to February 2019 in a WIC program located in a county health department eastern North Carolina. IRB approval was received for an exempt study. A letter of support from the Nursing Director in the health department was provided. An informational flyer was created to inform families of the study.

Sample

The sample included 31 children enrolled in the WIC program of a nearby rural community. The purposive sampling criteria included the following: mothers with children between the ages of two to five years who spoke English or Spanish. An equal representation of various racial groups, including White, African American and Latino was sought. The exclusion criteria included children less than two or greater than five years of age. A bilingual interpreter was available as needed for Spanish speaking participants.

Data Collection

The data collection method was a retrospective record review of the WIC program records. From the WIC records, the following indicators were assessed of each child: height/weight and BMI, gender, age (years), race, consumption of SSB, dental visits, dental caries, and water consumption. The mothers were asked about their most recent level of education completed.

Results

The children represented the major ethnic/racial groups in this county: 32% White (n=10), 23% Black (n=7) and 45% Latino (n=14). Most of the children (65%) were ages 2-3 years old. We had a good representation of both males (58%) and females (42%). Out of the 31 children, 68% were a healthy weight for their age and had a normal BMI. While 3% were underweight, 29% were overweight or obese. Latino children had the highest rate of obesity (56%). Education level of the mothers varied from no formal education to college education, however, 35% of the mothers had not completed high school. Regarding dental health, most of these children (74%) had visited the dentist. Of the children who saw a dentist, 17% (n=4) had dental caries.

The consumption of SSB was common among all of 31 children. Most participants consumed both 100% fruit juices (87%) and other SSB (84%). Other SSB included soda, sweet tea, Gatorade, Caprisun, Nesquik, and *atol*. A serving size of juice is 4 – 6 ounces/day for children ages 2 -5 years old and 87% consumed above this amount. Most children drank more than one type of SSB per day. Only 13% (n=4) drank the normal serving size of juice. Water consumption was mostly bottled water and almost every child consumed an adequate amount daily.

Discussion

This program evaluation described the SSB consumption in a sample of children in rural North Carolina. The findings concur with the literature on this topic, and highlights health concerns of a very young population. With the overconsumption of SSB, early onset of overweight and obesity was noted. This should be a concern for health professionals in rural areas caring for families of low socio-economic status. Dental health was a priority for these children living in this community, which differed from current literature. This health department had a mobile dental clinic which allowed families affordable access to dental care.

One significant finding was that many parents paid for SSB when 100% juice is provided to the families for free with their WIC benefits. This was an interesting finding as cost was a deterring factor of families purchasing SSB according to the literature, and this brings in to question the issue of a permissive parenting style. In addition, these small children drank more than 6 oz of juice per day, which outlines the need for teaching about portion size. Maternal education level varied, however, the fact that most mothers had limited formal education brings in the issue of health literacy. Numerous pamphlets are available in the WIC clinic on childhood nutrition, but written information may not be comprehended fully. There is also a need for more education regarding nutrition labels, serving sizes, and the lack of nutritional value of SSB.

Health disparities were a prominent concern based on this study and this goes along with current research. Latino children were more likely to have a higher BMI at a very young age, compared to the other racial groups in this study. Targeted initiatives are needed to reach this demographic with culturally relevant health information, perhaps through lay health advisors.

Limitations of the study include a small sample and single study location. Still, this retrospective record review highlighted the need to focus interventions on early childhood consumption of SSB in the Latino community.

Implication for Research and Practice

Further investigation into false advertising of SSB should be considered a priority in rural communities. Informational flyers should be created to explain the sugar content and health outcomes of SSB. By using creative images in informational materials, parents can gain a better understanding of nutrition and health. Colorful teaching materials depicting adequate daily serving size also needs to be designed and disseminated. Through the incorporation of a teach back method nurses and nutritionists can better determine knowledge deficit and appropriately intervene. Research using photovoice has been one way to engage mothers in addressing false advertising of SSB in local food stores (Colon-Ramos et al., 2017).

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