Factors influencing childhood obesity in the African American and Hispanic population

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Dedication

I dedicate this work to my mother, Gertrude Chris-Ukah, for her continued love and support in all my endeavors. I also thank the rest of my family and my fiancé, for their encouragement throughout my education.

Acknowledgement

I express my gratitude to the Department Chair for the Physician Assistant program, my advisor, Dr. Patricia Hogue, PhD, PA-C, for all of her contribution towards this project. I am also very grateful to the UT-PA faculty for their encouragement and contribution to my education.

Table of Contents

List of Figures

Chapter 1: Introduction

Background and significance of the project.

Childhood obesity is a significant public health concern. In the United States, approximately 17% or 12.7 million children and adolescents aged 2-19 are obese (Ogden, Carroll, Kit, & Flegal, 2014). Unfortunately, obesity affects African American and Hispanic children disproportionately. The most recent CDC data states that obesity prevalence among children and adolescents were higher among Hispanics (22.4%) and non-Hispanic blacks (20.2%) compared to non-Hispanic whites (14.1%). This remains in adulthood, with 47.8% of non-Hispanic blacks and Hispanics (42.5%) compared to 32.6% in non-Hispanic whites (Carroll et al., 2014). Consequences of childhood obesity include early incidence of metabolic syndrome, early puberty and menarche in girls (Biro, & Wien, 2010). As the prevalence of childhood obesity continues to rise in the African American and Hispanic population, the need to investigate factors influencing this disparity is paramount. The knowledge of factors influencing childhood obesity in ethnic minorities will guide intervention strategies, and treatment plans for health care providers.

Problem statement:

Consequences of childhood obesity include early incidence of metabolic syndrome, early puberty and menarche in girls (Biro, & Wien, 2010). Subsequently, long term impacts of obesity include hypercholesterolemia, hypertension, type 2 diabetes, stroke etc. (USDHHS, 2007). As the prevalence of childhood obesity continues to rise in the aforementioned populations, the need to investigate factors influencing this disparity is paramount. Knowledge of factors influencing childhood obesity in ethnic minorities will guide intervention strategies, and treatment plans for healthcare providers.

Purpose:

The goal of this project is to identify factors influencing childhood obesity in African American and Hispanic population, in order to guide intervention strategies and treatment plans for health care providers.

Research Question:

What are the factors influencing childhood obesity in African American and Hispanic population?

Definitions:

Body Mass Index (BMI): measure used to determine overweight and obesity. BMI is calculated by dividing a person's weight in kilograms by the square of height in meters. For children and teens, BMI is age- and sex-specific and is often referred to as BMI-for-age.

http://www.cdc.gov/obesity/childhood/defining.html

Overweight: defined as a BMI at or above the 85th percentile and below the 95th percentile for children and teens of the same age and sex.

http://www.cdc.gov/obesity/childhood/defining.html

Obesity: defined as a BMI at or above the 95th percentile for children and teens of the same age and sex.

http://www.cdc.gov/obesity/childhood/defining.html

Centers for disease Control and Prevention (CDC): responsible for detecting, and responding to emerging health threats, as well as promoting healthy and safe behaviors, communities and environment. at nutritional risk.

http://www.cdc.gov/about/organization/mission.htm

U.S. Department of Health & Human Services (USDHHS): enhances and protects the health and well-being of all Americans.

http://www.hhs.gov/about/index.html

WIC: Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) provides Federal grants to States for supplemental foods, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children up to age five who are found to be at nutritional risk.

http://www.fns.usda.gov/wic/women-infants-and-children-wic

Literature review:

In this review, our intent is to identify factors associated with childhood obesity in Hispanics and African Americans. The aim of this research is to help health care providers understand the factors that contribute to the weight disparity seen in African American and Hispanic children. We hope to achieve this aim by reviewing literature on childhood obesity, and quantifying factors implicated in the increasing rates of obesity among the African American and Hispanic population in order to address the obesity disparity accordingly. Identifying these factors will guide health care providers implement better intervention strategies and treatment plans for this population. We hope to achieve this goal by reviewing literature on factors influencing childhood obesity, and intervention strategies for minorities. We will also include a discussion of results, limitations, and recommendations for future research section in this literature review.

Methodology:

Search terms.

Childhood Obesity, Pediatric Obesity, Childhood obesity in African Americans, Childhood Obesity in Hispanics, Maternal feeding style, childhood obesity interventions, obesity and socio-economic status, parental perception of obesity, maternal breastfeeding & childhood obesity, parental depression & obesity in ethnic minorities.

Databases.

PubMed, Center for Disease Control and Prevention (CDC), U.S. Department of Health & Human Services (USDHHS).

Inclusion and exclusion criteria for articles.

I plan to use articles that identified factors associated with childhood obesity in Hispanics and Non-Hispanic blacks within the years of 2000-2016. Systematic and meta-analysis articles will be included in the review. All research articles that were published before 2000 or were not published in English will be excluded. All of the data will be collected from the United States.

Chapter 2- Literature review

Introduction:

Obesity in African American and Hispanic population.

In the United States, approximately 17% or 12.7 million children and adolescents aged 2-19 are obese (Ogden, Carroll, Kit, & Flegal, 2014). Unfortunately, obesity affects African American and Hispanic children disproportionately. In a 1116 mother-child pairs sample, Taveras, Gillman Kleinman, Rich-Edwards, and Rifas-Shiman (2013) found that black (0.48 [95% CI, 0.31 to 0.64]) and Hispanic (0.43 [95% CI, 0.12 to 0.74]) children had higher BMI z scores, waist circumference, as well as total fat mass index and prevalence of obesity than the white children. Researchers have identified a number of factors that have likely contributed to this increase in childhood obesity in racial/ethnic minorities such as non-exclusive breastfeeding (Gross et al., 2014), short duration of breastfeeding (Hess et al., 2015; Verstraete et al., 2013; Hansstein et al., 2016), maternal feeding style (Vollmer et al., 2012; Power et al., 2015; Morrison et al., 2013), parent perception of body weight (Intagliata et al., 2008; Alexander et al., 2014) and socioeconomic status (Taveras et al., 2013).

Review of the Literature:

Breastfeeding and obesity

Several studies have shown that maternal breastfeeding contribute to several positive health outcomes including a decline in childhood obesity (Hess et al., 2015; Verstraete et al., 2013; Hansstein et al., 2016). In the United States, African Americans have lower breastfeeding rates and higher obesity rates than other ethnicities (Hess, Ofei, & Mincher, 2015). The percentage of African American infants breastfed has increased from 47.4% in 2000 to 58.9% in

2008, however, this number is still lower than Mexican Americans (80%) and non-Hispanic whites at 75.2% (CDC, 2013). Consequently, the odds of becoming obese is higher in Hispanics and African American population compared to whites (Hansstein et al., 2016). According to Hess et al., a systematic review of 12 studies suggested that breastfeeding is a protective factor against childhood obesity. Specifically, the authors found that duration was the most important factor in determining the impact on obesity; children have greater chances of having normal BMI throughout childhood if they were breastfed for longer (Hess et al., 2015; Verstraete et al., 2013).

Additionally, a study with 2295 low income, primarily Hispanic children (2-4 years) from Los Angeles County Women, Infants, and Children (WIC) programs revealed that breastfeeding for ≥12 months was linked to a 45% reduction in obesity prevalence (2008) and a 47% reduction ($P = 0.004$) in the 2011 data compared to no breastfeeding (Davis, Koleilat, Shearrer, & Whaley, 2014). For this study, interviews were collected by Field Research Corporation over the phone. The interviews were an average of 20-25 minutes. Some of the survey questions include: "Have you ever breast-fed____? How old was ____ the first time he/she was given formula?" They found that the median duration of breastfeeding in this sample size was 6 months, with an interquartile range of 10; however, over one-third were breastfed 12 months or longer. Chi-square tests revealed that children who were breast-fed for 12 months and longer, drank less fruit drinks ($P = 0.02$) and diet sodas ($P =0.007$), compared to those who weren't breastfed. Breast-fed children also drank more milk servings ($P =0.01$) per day compared to those with no breast-feeding. With regards sugar sweetened beverages (SSB), binary regression showed a 28% reduction in obesity prevalence ($P =0.03$) in no SSB intake compared to 2+ SSB servings per day. Likewise, no soda intake compared to 2+ soda servings per day was linked to a 62%

decrease in obesity prevalence. Overall, an additive effect of no SSB and breastfeeding longer than 12 months was linked to a 65% reduction in obesity prevalence.

Gross, Mendelsohn, Fierman, Hauser and Messito (2014) aimed to identify maternal-infant feeding behaviors that may contribute to childhood obesity disparities in a low risk group of high income white mothers (n = 208) and high risk group of low income Hispanic mothers (n = 204). The infants included in this study were between 2 weeks and 6 months of age. Data for the low risk group was collected from July 2008 to October 2008, at an urban private pediatric practice, which serves predominantly high income white families. Meanwhile, data for the high risk group was collected from February 2009 to October 2009, and from January 2010 to August 2010 from mothers enrolled in a WIC center which serves predominantly low income Hispanic families. Maternal breastfeeding responses was classified as "1) exclusive breastfeeding 2) partial breastfeeding (both milk and formula) 3) no breastfeeding (formula only)". Infants weight was measured to confirm disparities at the onset of the study. Results showed that mothers in the high risk group (primarily Hispanic) were less likely to exclusively breastfeed; 95% confidence interval (CI), 0.22-0.83). Specifically, only 40 mothers from the high risk group reported exclusively breastfeeding their infants (Table 1). Mothers in the high risk group (n = 132) were more likely to partially breastfeed; 95% CI, 1.22-4.03). Mothers in the high risk group were also more likely to introduce juice early and add cereal to the bottle. On the contrary, the low risk group (primarily white mothers) were more likely to exclusively breastfeed (n = 97), and less likely to engage in early juice introduction and add cereal to the bottle compared to the high risk group. Consequently, results showed infants from the high-risk group were more likely to have higher weight-for-length z scores and weight-for-length percentile greater than the 85% percentile compared to the low-risk group. The findings from this research mirrors Davis et al.,

(2014) finding that children who were exclusively breastfed, were less likely to consume sugar-sweetened beverages and also less likely to be overweight/obese.

Likewise, Verstraete et al., investigated the association between obesity and breastfeeding in a study of recently immigrated Latina women (n=196) in the San Francisco Bay Area. Results showed that breast feeding for longer than 12 months is a protective factor against obesity. Conversely, no association was shown between breastfeeding for <6 months and development of obesity at 3-year visit in both univariate and multivariate models. Additionally, at 1 year of age, the authors found that there were more breastfed non-obese children (42.4%, p=0.02) than breastfed obese children (22.7%). At 3 years of age, 28% of children were obese and 14% overweight; however, no statistical difference exists between groups. Subsequently at 4 years of age, 24.9% were obese, and 22.5% overweight. Specifically, the authors found that a significantly higher percentage of the obese 4-year-old children weren't breastfed longer than 12 months (Verstraete et al., 2013). Thus demonstrating the protective factor of prolonged breastfeeding in early childhood.

Similarly, Hansstein (2016) designed a cross sectional study from the 2003 National Survey of Children's Health (NSCH) to investigate how length of breastfeeding affect the likelihood of overweight and obesity in children. The children included in the study were between ages 3 and 5, 16.23% were Hispanic, and 9.66% were African-Americans. The study measured length of breastfeeding using a continuous variable. The variable was divided into four sections: less than 3 months, between 3 and 6 months, 6 to 12 months, and > 12 months. Results showed that Hispanic and African American children were more likely to be obese compared to non-Hispanic whites (.305, p=.010, and .616, p<.010). Overall, breastfed children were less likely to be overweight and obese (-.235, p=.002). Most important, children who were breastfed

for < 3months were more likely to be obese by 4.8% ($p < 0.001$) compared to those breastfed for longer periods; thus demonstrating the protective factor of prolonged breastfeeding against childhood obesity.

Kitsantas, Gaffen and Cornices (2012) sought to investigate the differences in breastfeeding initiation rates and duration amongst low and middle SES African American, Hispanic and Non-Hispanic whites. Data was collected from the Early Childhood Longitudinal Study-Birth Cohort (ECLS-B) which is a representative study that follows 10,700 children from 2001 (birth) through kindergarten. A sample size of 6000 children, aged 6 to 22 months was selected for this study. Pre-pregnancy weight was self-reported while pre-pregnancy BMI was classified into four categories: underweight (19.8 kg/m2), normal (19.8-26.0 kg/m2), overweight (> 26.0-29.0 kg/m2) and obese (>29 kg/m2) (Kitsantas et al., 2012). Initiation of breastfeeding was assessed based on responses to questions. Breast-feeding duration was classified into: >/ 2 months vs. <2 months, and >/4 months vs. <4 months. Potential cofounders such as mother's age, parity, smoking during pregnancy, gestational age and birth weight were also considered. Amongst mothers with normal BMI, results showed that Hispanic women were more likely to initiate breastfeeding regardless of SES (74%; low SES and 75%; middle SES respectively) compared to African American (39.5%; low SES and 53.8%; middle SES) and Non-Hispanic whites (49.1%; low SES and 70.7%; middle SES). Similarly, a higher proportion of African American women never breastfed their children (60.5%; low SES and 46.2% middle SES) compared to their Hispanic (25.9%; low SES and 24.1% middle SES) and non-Hispanic white counterparts (50.9%; low SES and 29.3% middle SES). This is consistent with the current statistics on African American women and breastfeeding (CDC, 2013). With respect to breastfeeding duration, among those who initiated breastfeeding, they found that a

disproportionately high proportion ($p < 0.001$) of African American and Hispanic women of low SES were breastfeeding >/2 months (62.3% and 51.7% respectively), and >/ 4months (23.0% and 26.0% respectively) compared to their Non-Hispanic white low SES counterparts (Table 1). This, however, was untrue about Hispanic women of middle SES. African African women of middle SES who initiated breastfeeding, was more likely to continue breastfeeding >/2 months (67.5%) and >/ 4 months (37.3%) compared to their Hispanic and non-Hispanic white counterparts (Table 2). With respect to breastfeeding patterns in overweight/obese women, African American women were again less likely to initiate breastfeeding regardless of SES (66%; low SES and 50%; middle SES) compared to Hispanic women (24.8%; low SES and 30.4%; middle SES) and non-Hispanic white women (50.5%; low SES and 34.9% middle SES). Analogous to the normal BMI Hispanic women, overweight Hispanic women ($p<0.001$) were more likely to initiate breastfeeding regardless of low and middle SES (75.2% and 69.6% respectively) compared to their non-Hispanic white and African American counterparts. With respect to breastfeeding duration, no significant differences were found among African American, non-Hispanic whites and Hispanic women of low and middle SES, although the proportion (not statistically significant) of Hispanic middle SES women breastfeeding for >/ 4 months was lower compared to African American and non-Hispanic white population (30%) (Table 2).

Maternal Feeding Style

Several feeding practices influence child satiety and obesity (Vollmer et al., 2012; Brown et al., 2013); therefore, a significant amount of studies have been conducted to investigate the relationship between maternal feeding style and childhood obesity.

African American parents place higher demands on children for type and amount of food eaten compared to parents of other races/ethnicities (Ventura et al., 2009). In a study sample of 32 parents of 2 to 6-year-old children in low income communities in Philadelphia, results showed a variety in parenting feeding practices amongst low income minorities. Majority of the participants were African American (53%). Other participants include: East Asian (28%), Hispanic (n= 3), non-Hispanic whites (n=3). Parents of 2 to 6-year-old children were asked to recount both their own and their children's actions during several types of feeding situations: 1) when the child was reluctant to eat familiar food items 2) child's actions when presented with novel food items 3) child's behavior when discouraged from eating undesirable food items (Ventura et al., 2009). The Feeding Demands Questionnaire (FEEDS) was used to measure parents' beliefs about feeding interactions and child compliance. Results showed African American parents scored high on type and amount demandingness (M = 20.0, 20.7 respectively) compared to East Asian parents and parents of other races/ethnicities. The Caregiver Feeding Styles Questionnaire (CFSQ) was also used to classify parents into four feeding styles: authoritative (high demandingness and responsiveness), authoritarian (high demandingness, low responsiveness), indulgent (low demandingness, high responsiveness) and uninvolved (low demandingness and responsiveness). 9% (n=3) of parents were classified as authoritative, 34% (n =11) as authoritarian, 41% (n= 13) as indulgent, and 16% (n=5) as uninvolved. Results showed a significant association between feeding styles and race/ethnicities (P =0 .05). East Asian parents were more likely to be indulgent (n = 5 out of 9) compared to African American parents (n= 8 out of 17). 7 African American parents were classified as authoritative or authoritarian compared to 4 East Asian parents (Note: both authoritative and authoritarian were combined for analysis, as they are characterized by high demandingness). The authors also found that African American

parents were more likely to use parent-focused decision-making processes, while East Asian parents used child-focused decision-making processes; hence, the indulgent feeding style noted in the East Asian participants.

Vollmer at al., 2012 also observed a difference in feeding practices amongst ethnic/racial groups. A study conducted to explore how low income mothers perceive and implement childhood obesity prevention messages showed a variance amongst ethnic/racial groups (Vollmer et al., 2012). A convenience sample of white, black and Hispanic low-income mothers (n=30) were recruited from Indiana and interviewed regarding eight childhood obesity prevention messages. The mothers completed the Caregiver Feeding Styles Questionnaire (CFSQ) which classifies parents into one of four feeding styles: authoritarian, authoritative, indulgent and uninvolved. Results show that the most common feeding styles amongst the sample were authoritarian (33%) and indulgent (30%), while authoritative feeding style (17%) was the least common. This percentage is similar to Ventura et al., 2009 where 9% parents were classified as authoritative, 34% as authoritarian, 41% as indulgent, and 16% as uninvolved. Results show that white mothers were more concerned with portion control compared to Hispanic and black mothers because they believed that their children would overeat if meal sizes weren't rationed. This is contrary to the prior study that suggests that African American mothers place higher demands on amount of food (Ventura et al., 2009).

Most mothers encouraged eating although the children indicated there were satisfied (Power et al., 2015). This study was conducted to observe feeding practices in low income mothers. The study design is a 2 X 2 X 2 design: mothers were either African American or Latina, gender, child weight status. Eighty low income mothers and their preschool children were videotaped while eating dinner at home. One camera was directed towards the mother, and the

other at the child. Two live coders were recording each dinner session. Maternal behaviors were observed and assessed for responsive feeding practices such as discussion of foods and their characteristics, instruction in independent eating skills, acknowledgement of internal hunger and fullness cues, enthusiastic modelling, intrusive strategies (e.g., unelaborated commands, forced eating, spoon feeding). Results show that the most commonly engaged feeding behavior was "encourage eating" and "table manners". The Latina mothers were more likely to "encourage eating" while the African American mothers scored higher on "eat all food", "discourage eating", and "table manners". With regards to gender, (Power et al., 2015) found that mothers used more unelaborate commands such as "Be careful- don't spill your milk" with their boys (M = .61, SD =.18) than their girls (M =.47, SD = .16), and more questions/suggestions with their girls (M =.30, SD =.17) than their boys (M=.20, SD =.14). In addition, mothers of healthy weight children scored higher on "encourage eating" (M= .48, SD =.19) compared to mothers of overweight/obese children (M = .37, SD =.17). In contrast, mothers of overweight/obese children scored higher on "discourage eating" (M =.12, SD =.14) than mothers of healthy weight children (M =.06, SD =.06). The authors credit the lack of food security as one of the main reasons why low income mothers encourage their children to eat, even if the child has achieved satiety. Secondly, mothers feel like they are in a better position to dictate when and how much their children should eat. Lastly, the authors assume that low-income mothers may encourage their children to eat more when they can in order to avoid feeding a hungry child later.

Likewise, Gross et al., 2014 sought to identify maternal-infant feeding behaviors that may contribute to childhood obesity disparities in a low risk group of high income white mothers (n = 208) and high risk group of low income Hispanic mothers (n = 204). The infants included in this study were between 2 weeks and 6 months of age. In addition to the aforementioned

breastfeeding practices, the researchers also wanted to compare controlling feeding styles and beliefs about hunger and satiety in this population. This study assessed two maternal feeding styles: 1) restrictive 2) pressuring. The authors describe restrictive feeding as "parent tries to limit intake even if the child is hungry" while pressuring feeding style was described as "parent encourages intake even if the child is full". The authors further explained they focused on both feeding practices as both styles may lead to an increase in caloric intake and weight gain as a result of a decline in internal feeding cues. Both feeding practices and maternal beliefs about infant hunger and satiety were assessed using Child Feeding Questionnaire (CFQ) and Infant Feeding Questionnaire (IFQ) respectively. The authors found that the high risk group (low-income Hispanic mothers) was more likely to engage in restrictive and pressuring feeding style compared to the low risk group (high-income white mothers) (Table 4). In addition, the high risk group were more likely to believe in their ability to recognize infant hunger and satiety. The high risk group also scored higher on "Mom knows when baby is hungry and full" compared to the low risk group, which scored higher on "Baby knows when he or she is hungry and full". The results of this study is consistent with the beliefs held by low-income mothers with overweight children (Power et al., 2015). In Power et al., mothers of overweight/obese children scored higher on "discourage eating" (M =.12, SD =.14) which is comparable to restrictive feeding in this study. Both feeding styles have been shown to increase caloric intake by decreasing internal feeding cues (Gross et al., 2014).

Several studies have also investigated the relationship between parenting behaviors and childhood weight status (Power et al., 2015, Gross et al., 2014). In this cross-sectional study including ninety-nine parent-child dyads living in under-resourced local areas, Hennessy et al., 2010 sought to evaluate the association between parenting style, feeding style and feeding

practices on child weight status. This sample included 29% non-Hispanic white, 49% African American, and 22% Hispanic in rural areas of the Mississippi River Delta, Southeast, Appalachia, and Central valley regions of the US in the spring of 2017. The children were 9.0 (±1.5) years, mean BMI score was 1.2 (±0.9) with 60% classified as either overweight or obese. The parents were 24% overweight, 33% obese and 19% extremely obese. The authors used three existing questionnaires: Parenting Dimensions Inventory-Short Form (PDI-S), Caregiver's Feeding Styles Questionnaire (CFSQ) and Child Feeding Questionnaire (CFQ) to access the influence of feeding behaviors on childhood weight. According to the CFSQ, indulgent feeding style was the most common feeding style while uninvolved was the most common feeding style according to PDI-S. Specifically, while controlling for covariates, the authors found that an indulgent feeding style was positively associated with higher child weight. This is expected as indulgent feeding style involves low demandingness, and high responsiveness.

Perception of Body Weight

Numerous studies have shown a difference in perceptions of body weight among African Americans, Hispanics and non-Hispanic whites. A study conducted among Latino preadolescent children (ages 8-11 years), along with their parents (N=123 dyads) showed that Latino parents with higher education perceive their child's body size more accurately than less educated parents (Intagliata, Ip, Edward, Gesell, & Barkin, 2008). Similarly, a study conducted among African American caregivers in a rural Georgia community, revealed a perception and weight status disconnect (Alexander, Alfonso, & Hansen, 2014). A convenience sample of caregivers, ranging from ages 22-65 completed a paper-based survey (n=135), and a face to face interview (n= 12) to explore perceptions of obesity risk factors, weight status and built environmental features. A

substantial number of children were obese. However, 58% disagreed that their child was overweight, and 75% disagreed that their child was obese. Parents often visualized an obese individual as being larger than their child. In addition, parents gauged normal weight status by comparing their children to others (Alexander et al., 2014). Conversely, a prospective study conducted in the Appalachian community in West Virginia from 2005-2009, screening children in kindergarten, 2nd, and 5th grade, revealed that parental perception of child's weight is often accurate compared to child's actual BMI (Cochran, Neal, Cottrell, & Ice, 2012). This is a direct contrast to previous studies mentioned. Cochran et al. states that higher educational status in this sample may have influenced the outcome of this study. "Parents/caregivers are essential for preventing childhood obesity because they influence the child's life-style habits, and are more influential than the school and community" (Alexander et al., 2014). Therefore, it is important that parents/caregivers are educated on how to recognize, and combat obesity.

Research has shown that perception of weight affects people's attitude towards weight loss and physical activity (Boyington et al., (2008). In this convenience sample of 12 overweight African American girls, aged 12 to 18 years, Boyington et al. (2008) sought to explore an association between body weight, cultural attitudes and perceptions. The 12 mother-daughter dyads were recruited from a hospital diabetes prevention program in North Carolina from October 2005 through July 2006. The researchers examined six key areas: 1) definition of personal health 2) dietary and physical activity habits 3) perceptions of personal health and body 4) important figures and role models 5) social support 6) culture and environmental factors (Boyington et al., 2008). The mother and daughter dyads were interviewed separately. Results showed that body weight was determined by the individual and immediate family and social circle. The African American teenagers examined didn't perceive body weight as an objective

measure; they had no knowledge of ideal body weight based on BMI. They believed that a healthy body weight was one with which they were satisfied with. One of the teenagers stated "I think being comfortable is just healthy. Being comfortable with your weight". Majority of the participants admitted to being overweight as children, and interestingly, didn't want to be "skinny". Results showed that the African American teenagers had a preference for a "larger body size, especially in the breasts and buttocks area" (Boyington et al., 2008). One of the girls stated her "skinny" friend was dissatisfied with her body and voiced concerns such as "I wish I had a big butt" and "would also wear jeans to make her butt appear big". Since large breasts and buttocks were rated high on physical attractiveness, these overweight girls were satisfied with their weight as they do not lack those attributes. Similar to Alexander et al. (2014), the relatives of this sample of 12 African American girls also compared their weight to others. In response to an interviewer's question, one participant responded "My family, they compare me to my other cousin. That she's got like a perfect body, and they compare me to her. They say "one day I'm gonna look like her", and then my momma be like, "No, she's gonna look like her sister". Again, reinforcing the lack of objective measure for body weight in this sample of low-income African American population. Furthermore, these teenagers had celebrities that they considered role models. One participant mentioned "Nicky Parker - She funny and she don't care what nobody say… She got a husband in real life. It proves that you can be big and have nice people, nice things". Nicky Parker (Mo'Nique) is an overweight television actress who takes pride in her weight. These African American teenagers admire Nicky Parker because they perceive her to be confident and successful albeit overweight. Toni Braxton and Oprah Winfrey were amongst the African American female role models discussed. In contrast, these teenagers didn't consider the aforementioned admirable as they possess "assets such as chefs and personal trainers" that are

not accessible to the girls. With respect to physical activity, the girls attributed lack of safety in the neighborhood environment as a factor that negatively influenced physical activity. The impact of neighborhood safety on physical activity is a reoccurring theme in low-income minorities (Jin et al., 2015, O'Connor et al., 2014).

Childhood Obesity and Home Food Environment

One aspect of socioeconomic status that is pivotal to childhood obesity is home food environment. Santiago-Torres, Adams, Carrel, LaRowe and Schoeller (2014) found that children who had sugar-sweetened beverages (SSB) available at home were more likely to have a lower healthy eating index (HEI) compared to children who weren't exposed to SSB. The total HEI score ranges from 0-100, with a higher score indicating a better quality diet. The present study was conducted to evaluate the association between home food environment and Hispanic children's diet quality. A total of 187 Hispanic children, 11.9 (±1.4) years old were enrolled in the study. 47% of the children were normal weight, 25% were overweight and 28% were obese. Results showed an inverse relationship between SSBs (soda and fruit drinks) and HEI. The children who had soda and fruit drinks readily available at home had a lower HEI (HEI: 60.9 vs. 57.7 and 61.1 vs. 58.1; $p<0.05$). In addition, children who had snacks available at home had slightly lower HEI compared to the kids who did not have snacks at home. Also, parents who reported a higher intake of fruits and vegetables were more likely to have children with high HEI ($p = 0.03$ and 0.02 respectively). Results also showed that eating family meals while watching television is inversely related to children's HEI ($p = 0.04$), which is consistent with studies that demonstrate an association between weight and eating while watching television.

Similarly, a study conducted by Taveras et al., (2013) including 1116 mother-child pairs (6.3% white, 17% black, and 4% Hispanic) to investigate the extent to which ethnic disparities observed in overweight can be explained by early childhood factors such as sugar sweetened beverages or fast food, found that eliminating such early childhood factors could potentially bridge the ethnic disparities in childhood obesity. After adjustment for early childhood risk factors (sugar sweetened beverages or fast food), there was only a minimal difference in the BMI z scores between the white, black, and Hispanic children (Taveras et al., 2014).

To demonstrate an association between sugar-sweetened beverages (SSB) and obesity, Lim et al. (2009) conducted a 2-year longitudinal study including 365 low-income African American preschool children aged 3-5 years. The children were examined at a Dental Health Clinic in Detroit in 2002-2003, and again in 2004-2005. The initial prevalence of overweight and obesity was 12.9% and 10.3%, respectively. Mean consumption of soda (oz./day) was 6.1, 13.0 for fruit drinks and 19.2 for all sugar-sweetened beverages at baseline. After two years, the authors found that mean consumption of fruit drinks and all sugar-sweetened beverages increased from baseline. At follow-up, mean consumption of fruit drinks was 16.5 and 21.6 for all sugar-sweetened beverages. In contrast, mean soda intake slightly declined from 6.1 to 5.2. This decline in soda intake, led the authors to conclude that the increase in consumption of all sugar-sweetened at follow-up, might be a result of an increase intake of fruit drinks. Results also showed an increase in prevalence of overweight from 12.9% to 18.7%, and obesity from 10.3% to 20.4%. The incidences of overweight and obesity were 26.3% and 13.4%, respectively. After adjusting for sociodemographic characteristics, dietary intake and caregiver's BMI, the odds of becoming overweight increased by 1.04 (1.01-1.07) per ounce of fruit drink intake per day and also 1.04 (1.01-1.06) per ounce of all sugar-sweetened beverage consumed in a day.

Influence of neighborhood characteristics on childhood obesity

Chaparro et al. (2014) conducted a study to understand the longitudinal association between neighborhood environment and adiposity in low-income preschool aged children in Los Angeles County. The proportionate sample of boys and girls were predominantly Hispanic. The study sample included 32,172 low income preschool aged children between the ages of 2 and 5 in a federal nutrition assistance program (WIC). Women, Infants and Children (WIC) is a federal food assistance program that provides nutrition education to low-income pregnant and postpartum women and children up to 5 years old. Chaparro, Whaley, Crespi, Koleilat, Nobari, Seto and Wang examined how spatial densities of healthy and unhealthy food outlets in the Children's neighborhood affected their weight. They obtained food environment information from business listings in the National Establishment Time-Series (NETS), which included census tracts (CT) where the businesses were located. To account for people who travelled outside their CT to purchase food, the researchers created a 0.5 and 1.0 mile buffers around the boundaries of each CT. Fast food outlets, liquor stores, and chain convenience stores were considered to be unhealthy because they carry non-perishable processed food while supermarkets, fruit and vegetable markets were considered healthy food outlets because they carry perishable food items, e.g. fruits and vegetables. This study design controlled for neighborhood-level income and education, family income, maternal education, and child's gender and race/ethnicity. The median neighborhood income averaged $50,326, and the average family size was 4 with a mean monthly income of $1,406. The obesity prevalence at baseline was 17%. Results showed that the CTs where the WIC families lived were dominated by fast food outlets (2762) while fruits and vegetable markets were the least common food outlets (370). On average, WIC families lived in neighborhoods with 7.5 unhealthy and 1.2 healthy food outlets per square mile. Associations

between food environment and adiposity emerged when they used a broader definition of neighborhood (CT plus 0.5 or 1-mile buffer). Researchers found a non-linear association between density of healthy food outlets and mean weight-for-height-z score at 3 years old. There was a positive association between food environment and adiposity at higher density of healthy food outlets, but a negative association at lower density of healthy food outlets.

Likewise, Burdette and Whitaker (2003) investigated the relationship between overweight in low income preschool children and three environmental factors: 1) proximity to playgrounds 2) proximity to fast food restaurants 3) neighborhood safety. The authors hypothesized that children who lived closer to fast food restaurants, farther from playgrounds and in unsafe neighborhoods were more likely to be overweight. This study was a cross-sectional study of low income children, aged 3 to 4 years old who were enrolled in a WIC program and living in Cincinnati, OH. Ohio has the sixth largest WIC enrollment among the 50 states (Burdette and Whitaker, 2003). The final study sample consisted of 7,020 children; 9.2% overweight (study uses BMI >95% as overweight), 76% black, and 23% white. The distance between each child's residence and the nearest fast food restaurant and playground was determined using Geographic Information Systems (GIS). Fast food restaurants were defined as "1) eating establishments that had franchises nationwide and in multiple states, 2) had more than one franchise in Cincinnati, 3) served complete meals ordered without the assistance of waiters or waitresses, 4) provided facilities for customers to consume meals on site" (Burdette and Whitaker, 2003). Neighborhood safety was measured using "1) number of serious crimes-murder, rape, aggravated assault etc. 2) number of emergency (911) police calls". Results showed that 4% of the children lived in neighborhoods that had no public playgrounds, and 44% of the children lived in neighborhoods without fast food restaurants. The average distance from

each child's residence to the nearest fast food and playground was 0.70 (+-0.38) and 0.31 (+-0.22), respectively. They also found that the median (range) neighborhood crime rate and 911 call rate were 60 (25-567) and 669 (268-3838), respectively (Burdette and Whitaker, 2003). The authors found there was no statistical significant correlation between child weight status and proximity to fast food restaurants or playgrounds, and neighborhood crime rate. This is consistent with Chaparro et al., (2014), who didn't find any association between neighborhood food environment and childhood adiposity until they used a broader definition of neighborhood (CT plus 0.5 or 1-mile buffer). Interestingly, the authors reported no difference in the percentage of overweight and non-overweight children living in neighborhoods without playgrounds (3.3% vs. 4.1%) nor in the percentage of those residing in neighborhoods without fast food restaurants (44.0% vs. 44.5%).

It is important to note that the authors of this article recognized a potential limitation in this study: "use of police crime statistics rather than parental reports of neighborhood safety" (Burdette and Whitaker, 2003). Furthermore, they hypothesized that parents' perception of neighborhood characteristics play a role in determining their willingness to allow the children to play outside. This is significant because O'Connor et al. (2014) found that parental perception of neighborhood safety, and not objective measure, determine willingness to permit outside physical activity.

Physical activity can decrease the prevalence of obesity. As studies on environmental influence on physical activity and weight grows, associations between environment characteristics have been noted. A study conducted by Yichen Jin, and Jones-Smith (2015) to examine the association between family income and physical fitness level or prevalence of obesity in a sample of 8 racial/ethnic groups showed that children from low-income families

have higher obesity prevalence and lower physical fitness level. This study used data from the California Department of Education. The sample included 1.6 million children in California from 2010 through 2012. Children mean age was 13.0, mean BMI z-score was 0.63, and obesity prevalence was 20.3%. The physical fitness test assesses 6 fitness areas: "1) aerobic capacity 2) abdominal strength and endurance 3) upper body strength and endurance 4) body composition 5) trunk extensor strength and flexibility 6) flexibility" (Jin et al., 2015). Fitness score ranged from 0 (least healthy) to 6 (most healthy). Children's eligibility for the National School Lunch Program (NSLP) was used as an indicator for family income. 56% of the children in this study were classified as low income based on eligibility for NSLP. Majority of the African American (67%) and Hispanic children (75%) were considered low income based on their eligibility for NSLP. Non-Hispanic white children and Asians were highly represented in the higher income category. Results showed that low income children had lower fitness scores (coefficient = -.057; 95% [CI], -0.62 to -0.53). Lower income children also had a higher obesity prevalence (relative risk = 1.81; 95% (CI), 1.72-1.89). Lower income children also had a higher adjusted BMI z-score compared to higher income children. The authors provided possible explanations for the association observed between family income, prevalence of obesity and low physical fitness level. They proposed that "populations with low SES may be more likely to live in low SES communities". Thus, neighborhood safety is an important factor influencing physical fitness level in low income children. This is consistent with studies that have shown that parents are less likely to allow their children to play within the neighborhood if they perceive the neighborhood to be crime ridden and unsafe (Boyington et al., 2008, O'Connor et al., 2014). Second, the authors presume "low SES communities may have fewer physical activity facilities, particularly few free activity resources, than high SES communities, thus limiting access to opportunities for

physical activity". Lastly, the authors propose that life stressors and barriers to health may be the reason why less importance is placed on physical activity in low income families.

O'Connor et al. (2014) aimed to examine the contributions of sociodemographic, parent perceived environmental and objectively measured environmental factors on physical activity. The cross-sectional study sample included 240 Latino parents in Harris County, TX from July 2011 to March 2012. To objectively measure traffic characteristics, traffic risk indices were calculated based on traffic related injuries and motor vehicle miles traveled. Each block group within Harris county was classified as high crime/high traffic (n = 64), high crime/low traffic (n =22), low crime/high traffic (81) and low crime/low traffic (n = 73). Parent-perceived environmental variables consist of 1) perceived traffic safety 2) perceived stranger danger 3) availability of active play equipment 4) places for children's physical activity. Physical activity parenting practices were assessed using the Preschooler's Physical Activity Parenting Practices (PPAPP) instrument. The PPAPP consists of 1) parenting practices that encourage child physical activity 2) parenting practices that discourage child physical activity. Results showed that parents' perceived environmental attributes explained variability in responses on five out of seven parenting practices. Those five parenting practices include: engagement/structure (0.149, $p < .01$), registering child for sports/dance (0.085, $p < .05$), having outdoor toys available (0.117, $p < .01$), safety concerns (0.295, $p < .001$) and psychological control (0.079, $p < .05$) while objectively measured environmental attributes had minimal impact on parenting physical activity practices. Parents who perceived traffic hazards and stranger danger were more likely to have safety concerns ($p < .0$) and also discourage physical activity as expected. Parents were also more likely to register their children for sports or dance if they perceived the environment as having places for child's physical activity ($p < .05$). Parents were more likely to have outdoor toys

available for child when they perceived the environment to have available active play equipment ($p < .0$). Likewise, the availability of active play equipment was negatively associated with parents' safety concerns ($p < .0$). Interestingly, parents who perceive more physical and social disorder in their neighborhood were more likely to participate in structures that promote physical activity (Table 3). The authors propose those parents may "feel they need to take a more active, engaging role with their child in order to provide supervision for their child". In general, the authors of this article agree that parents were more likely to encourage or discourage physical activity based on their perception of the neighborhood characteristics.

Similarly, Lovasi et al. (2011) found an association between physical activity, neighborhood environment and adiposity. In a cohort of low income preschool children, ages 2-5 living in urban New York, the authors found that certain neighborhood characteristics such as park access and subway stop density was related to physical activity. This cohort was chosen from a Head Start Program, which is a preschool program for children of low income families. A total of 428 preschool children, 83% Hispanic, and 53% female participated in this study. 22% of the children were obese, and 21% overweight. The authors found that children residing in areas with low income, African American or foreign-born residents were more physically active, and had lower adiposity compared to their counterparts. This is contrary to existing literature on race and physical activity. Specifically, this positive association was statistically significant for foreign born residents. In addition, children who resided in areas with higher pedestrian-autho injury rate were less physically active and had greater skin fold thickness than children who resided in safer neighborhood. This finding supports studies which demonstrate that parents who perceive their neighborhoods to be unsafe are less likely to allow them to spend more time outside. Similarly, children who resided in neighborhoods with more park access had smaller

skinfolds than those residing in neighborhoods with less park access.

Long-term Implications of Childhood Obesity.

Obesity remains disproportionately high in the African American population; thus long term implications of obesity remain a public concern. Li et al. (2015) conducted a study of 1622 participants (aged 20-51 years) who had at least four BMI screens during childhood (aged 4-19). The average follow-up in this cohort was 20.9 years. Data was collected from the Bogalusa Heart Study (BHS), "a community-based Black-White Cohort study beginning in childhood" (Li et al., 2015). The authors found the prevalence of obesity was 29.2% at the time of the last study. Results showed that African Americans had a higher variability in BMI than non-Hispanic whites. Specifically, African American women had the greatest rate of change in BMI. More importantly, the authors found that one standard deviation increase in the rate of change in BMI during childhood was associated with 1.39 increase in adult BMI and 2.98cm increase in adult waist circumference. Interestingly, this association between greater variability of BMI during childhood and increased obesity in adulthood persisted after the authors adjusted for mean BMI during childhood.

Numerous studies have demonstrated that childhood overweight and obesity can lead to chronic diseases in adulthood (USDHHS, 2007). To better understand the association between obesity and health outcomes among African Americans, Krishnamoorthy et al. (2016) conducted a retrospective study examining a community of 5292 African Americans participating in the Jackson Heart Study between September 2000 and January 2013. The study examined the association between body mass index (BMI), all-cause of mortality, heart failure prevalence, and hospitalization. The study hypothesized a positive correlation between higher BMI and greater

risks of mortality, prevalence of HF, and HF hospitalization. Participants were assessed 3 times during the study: examination 1 between September 2000 and March 2004 examination 2 between February 2009 and January 2013. BMI was assessed on a continuous scale per 1 point and categorically as follows: normal weight (<25 kg/m^2), overweight (25 to <30 kg/m^2), obese (30 to <35 kg/m^2), and morbidly obese (≥35 kg/m^2). Using a 2-tailed alpha level to establish statistical significance, results showed an increasing frequency of HF observed as BMI increased ($P < .001$). At examination 2, the number of participants who developed HF in each BMI category was as follows: 11 in the normal weight, 34 in the overweight, 41 in the obese, and 81 in the morbidly obese. At examination 3, the number of participants who developed HF in each BMI category was as follows: 12 normal weight participants, 43 participants in the overweight category, 61 in the obese category, and 98 in the morbidly obese. With regards to HF hospitalizations among weight categories, there was a significant difference (P = .008) with the highest rate in morbidly obese participants, and the lowest in the obese participants. Overall, there was a 5% increase in long term risk of HF prevalence with every 1 kg/m^2 increase in the BMI among obese and morbidly obese participants; and there was a 5% increase in risk for HF hospitalization with each 1-point increase in BMI >32 kg/m^2. Interestingly, increase in BMI was not associated with increased all-cause mortality. With regards to all-cause mortality, the authors observed increasing BMI associated with a 9% lower risk with each 1-point increase in BMI up to 27 kg/m^2.

Chapter 3 – Discussion/Conclusion

Research has shown that maternal breastfeeding, feeding style, perception of body weight, home food and neighborhood environment are important factors that contribute to the disparity in childhood obesity. We specifically focused on Hispanic and African American children because a disproportionate percent of this population are affected by obesity. Specifically, African Americans have lower breastfeeding rates and higher obesity rates than other ethnicities (Hess, Ofei, & Mincher, 2015). This literature review begins with maternal breastfeeding as a newborn completely relies on the mother to feed. The American Academy of Pediatrics (AAP) recommends exclusive breastfeeding for 6 months, but continued breastfeeding for at least 12 months, while the World Health Organization (WHO) recommends exclusive breastfeeding for 6 months, but continued breastfeeding for at least two years. This differences in recommended breastfeeding duration is important because the articles reviewed showed that duration indeed matters. Hansstein (2016) found that children who were breastfed for < 3months were more likely to be obese by 4.8% ($p < 0.001$) compared to those breastfed for longer periods. Verstraete et al. (2013) found that breastfeeding for longer than 12 months is a protective factor against obesity. Similarly, Davis et al. (2014) found that children breastfed for 12 months and longer were less likely to be obese. This reinforces the importance of focusing on breastfeeding duration as an important aspect of childhood obesity.

In addition to breastfeeding, availability of sugar-sweetened beverages (SSB) influence childhood obesity. Breastfeeding for longer periods of time and no sugar-sweetened beverage (SSB) lead to overall decline in obesity (Davis et al., 2014). There is an inverse relationship between SSBs (soda and fruit drinks) and Healthy eating index (HEI) (Torres et al., 2014). The

children who had soda and fruit drinks readily available at home had a lower HEI. (Torres et al., 2014). In addition to home food environment, neighborhood environment also impacts childhood obesity. Specifically, parental perception of neighborhood environment influences physical activity related parenting practices (O'Connor et al., 2014). Parents who perceive the neighborhood to be safe, have less safety concerns. Thus, more willing to allow their children play outside.

Maternal feeding style impacts satiety; certain feeding styles such as pressuring and restrictive may lead to a decline of internal feeding cues, thus increasing caloric intake and weight gain (Gross et al., 2014). African American parents place higher demands on children for type and amount of food eaten compared to parents of other races/ethnicities (Ventura et al., 2009). In contrast, feeding styles such as indulgent (low demandingness, high responsiveness) have been linked to an increase in child weight (Hennessy et al., 2010).

An understanding of perceptions of obesity among African Americans and Hispanics is essential in tailoring effective interventions. The articles discussed in this literature review demonstrated that African American adolescents and caregivers do not have an objective measure for body weight (Boyington et al., 2008). They often compare their children to friends and relatives, which leads to underestimating their children's actual weight (Alexander et al., 2015). In contrast, some studies found that caregivers have accurate obesity perceptions. Despite the differences in literature, the authors all agree that educating caregivers is pivotal in recognizing and combating obesity.

Research Question:

What are the factors influencing childhood obesity in African American and Hispanic population?

Based on the literature review, duration of breastfeeding, perception of weight, home food and parental perception of neighborhood environment are key determinants of childhood obesity.

Future Research and Limitations.

Future research is needed to examine how mental stress (e.g., postpartum depression and physical stress) influence breastfeeding initiation, duration, and maternal feeding style. Understanding how stress affect new mothers might enable healthcare professionals develop programs to encourage prolonged breastfeeding and better feeding practices. Although studies have shown that African American mothers score high on type and amount of food demandingness (Ventura et al., 2010), further research is needed to examine the long term implications of this feeding style in the African American population. It is noted that Hispanic and African American mothers do not exclusively breastfeed, and are more likely to introduce fruit drinks and cereal early, therefore studies investigating the motivation behind this feeding practice will be beneficial in decreasing childhood obesity in those populations (Gross et al., 2014). In addition, a longitudinal study is needed to investigate the longevity of the protective effect of breastfeeding.

Some limitations of this research include self-reported weight (Davis et al., 2014, Kitsantas et al., 2012, Hansstein 2016, Alexander et al., 2015) and using predominantly low income sample (Verstraete et al., 2014, Davis et al., 2014). Self reported BMI is problematic as this literature review has shown that African American caregivers underreport overweight and obesity. With regards to studies on maternal breastfeeding, pre-pregnancy BMI was not always accounted for (Hansstein 2016). This study also lacked the ability to monitor the protective

factor of prolonged breastfeeding beyond 4 years old. With regards to home food availability, two limitations noted in the studies are self reported data (Taveras et al., 2013) and not being able to measure the implications of consuming sugar sweetened beverages (SSB) over time (Lim et al., 2009). Albeit, we hypothesize an increase in prevalence of overweight and obesity with prolonged SSB consumption.

Relevance to the PA Profession.

Racial/Ethnic minorities such as Hispanics and African-Americans are over represented in childhood obesity. Identifying the factors that are implicated in this disparity will enable health care professionals combat childhood obesity. The aim of this research is to unravel the factors that contribute to childhood obesity in African American and Hispanic population. Understanding the protective effect of prolonged breastfeeding, types of maternal feeding styles, significance of home food and neighborhood environment will better equip physician assistants in proper counselling of this population. Specifically, the physician assistant in a prenatal or primary care setting will be able to efficiently strategize interventions for this demographic.

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Figures

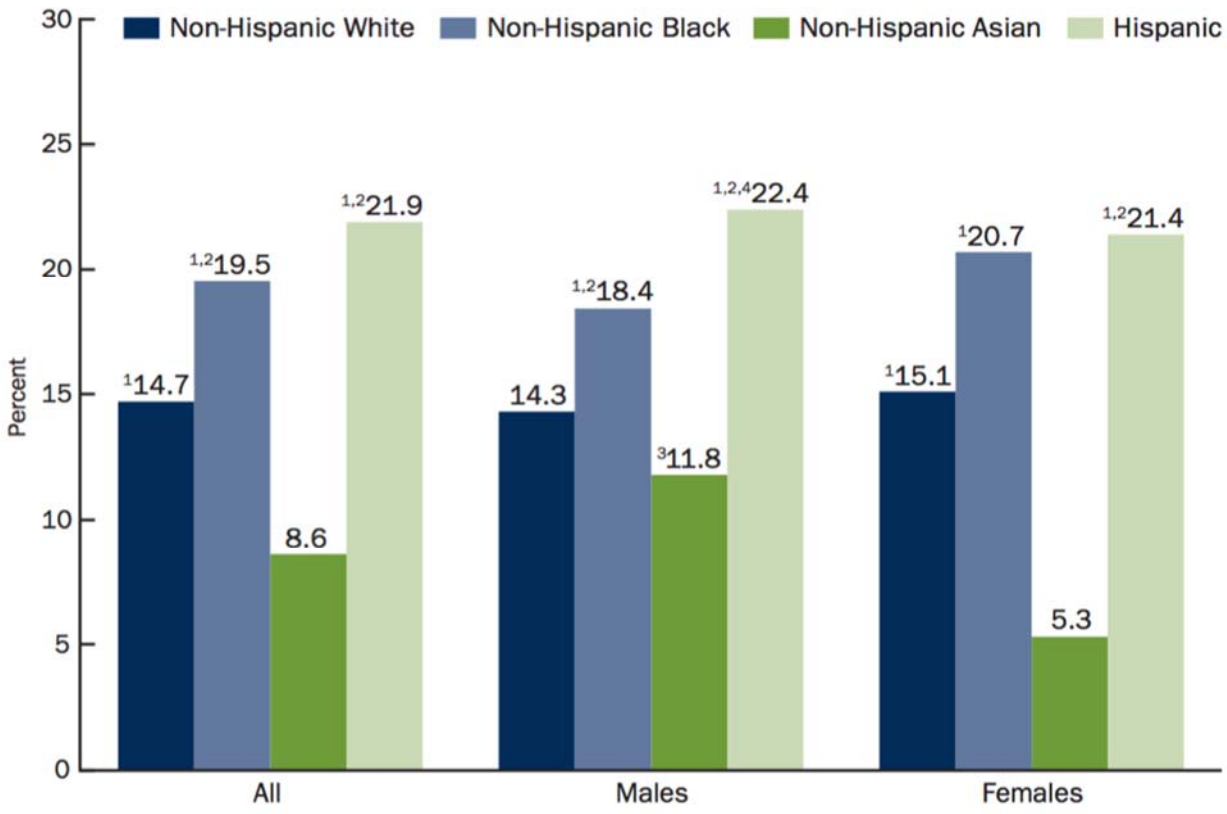

Figure 1

Prevalence of Obesity among ages 2 to 19 in the United States. Data from CDC/NHANES (2011-2014). Retrieved from *the* STATE *of* OBESITY.

	Low				Middle			
	Black (%)	White (%)	Hispanic (%)	P-value	Black (%)	White (%)	Hispanic (%)	P-value
Maternal age								
<20 years	36.3	35.5	21.7	0.120	17.9	7.4	13.7	<0.001
20–34	57.3	59.2	71.7	–	72.2	81.5	75.5	–
>34	6.4	5.3	6.6	–	9.8	11.1	10.8	–
Marital status								
Married	16.6	44.4	50.3	<0.001	37.6	75.2	62.8	<0.001
Not married	83.4	55.6	49.7	–	62.4	24.8	37.2	–
Parity								
None	39.1	44.6	45.6	0.570	43.2	40.9	41.9	0.240
One	29.5	24.4	22.1	–	31.2	38.3	35.1	–
≥2	31.4	31.0	32.3	–	25.6	20.9	23.0	–
Smoking during pregnancy								
No	88.5	51.8	96.5	<0.001	94.5	85.1	96.8	<0.001
Yes	11.5	48.2	3.50	–	5.5	14.9	3.2	–
Delivery				0.877				0.016
Vaginal	80.8	81.2	79.2	–	76.4	78.6	71.2	–
Cesarean	19.2	18.8	20.8	–	23.6	21.4	19.7	–
Birth weight								
Normal (≥2500 g)	87.9	92.3	92.4	0.100	88.5	93.8	94.5	0.001
Low (<2500 g)	12.1	7.7	7.6	–	11.5	6.2	5.5	–
Gestational age								
Term (≥37 weeks)	80.3	91.1	88.3	0.010	85.1	91.1	91.0	0.020
Preterm	19.7	8.9	11.7	–	14.9	8.9	9.0	–
Breastfeeding initiation								
Never breastfed	60.5	50.9	25.9	<0.001	46.2	29.3	24.1	<0.001
Breastfed	39.5	49.1	74.1	–	53.8	70.7	75.9	–
Breastfeeding duration								
Breastfed <2 months	37.7	63.9	48.3	0.006	32.5	44.6	51.6	0.002
Breastfed ≥2 months	62.3	36.1	51.7	–	67.5	55.4	48.4	–
Breastfed <4 months	77.0	89.2	74.0	0.023	62.7	68.2	74.9	0.033
Breastfed ≥4 months	23.0	10.8	26.0	–	37.3	31.8	25.1	–

Table 1

"Breastfeeding and characteristics (%) of women with normal BMI stratified by SES and race/ethnicity". Data from Kitsantas et al. 2012.

	Low				Middle			
	Black (%)	White (%)	Hispanic (%)	P-value	Black (%)	White (%)	Hispanic (%)	P-value
Maternal age								
<20 years	36.3	35.5	21.7	0.120	17.9	7.4	13.7	<0.001
20–34	57.3	59.2	71.7	–	72.2	81.5	75.5	–
>34	6.4	5.3	6.6	–	9.8	11.1	10.8	–
Marital status								
Married	16.6	44.4	50.3	<0.001	37.6	75.2	62.8	<0.001
Not married	83.4	55.6	49.7	–	62.4	24.8	37.2	–
Parity								
None	39.1	44.6	45.6	0.570	43.2	40.9	41.9	0.240
One	29.5	24.4	22.1	–	31.2	38.3	35.1	–
≥2	31.4	31.0	32.3	–	25.6	20.9	23.0	–
Smoking during pregnancy								
No	88.5	51.8	96.5	<0.001	94.5	85.1	96.8	<0.001
Yes	11.5	48.2	3.50	–	5.5	14.9	3.2	–
Delivery				0.877				0.016
Vaginal	80.8	81.2	79.2	–	76.4	78.6	71.2	–
Cesarean	19.2	18.8	20.8	–	23.6	21.4	19.7	–
Birth weight								
Normal (≥2500 g)	87.9	92.3	92.4	0.100	88.5	93.8	94.5	0.001
Low (<2500 g)	12.1	7.7	7.6	–	11.5	6.2	5.5	–
Gestational age								
Term (≥37 weeks)	80.3	91.1	88.3	0.010	85.1	91.1	91.0	0.020
Preterm	19.7	8.9	11.7	–	14.9	8.9	9.0	–
Breastfeeding initiation								
Never breastfed	60.5	50.9	25.9	<0.001	46.2	29.3	24.1	<0.001
Breastfed	39.5	49.1	74.1	–	53.8	70.7	75.9	–
Breastfeeding duration								
Breastfed <2 months	37.7	63.9	48.3	0.006	32.5	44.6	51.6	0.002
Breastfed ≥2 months	62.3	36.1	51.7	–	67.5	55.4	48.4	–
Breastfed <4 months	77.0	89.2	74.0	0.023	62.7	68.2	74.9	0.033
Breastfed ≥4 months	23.0	10.8	26.0	–	37.3	31.8	25.1	–

Table 2

"Breastfeeding and characteristics (%) of overweight/obese women stratified by SES and race/ethnicity". Data from Kitsantas et al. 2012.

Correlate	Physical-activity related parenting practice						
	Engagement/ structure	Register child for sports or dance	Have outdoor toys available for child	Safety concerns	Psychological control	Promote inactivity	Promote screen time
Socio-demographic							
Child's gender (ref: male)							
Female	0.04 (-0.11, 0.19)	-0.15 (-0.52, 0.23)	-0.25 (-0.52, 0.02)	0.10 (0.08, 0.28)	0.13 (-0.05, 0.31)	0.07 (-0.10, 0.25)	0.01 (-0.17, 0.18)
Child's age	-0.05 (-0.14, 0.04)	0.01 (-0.21, 0.23)	-0.10 (-0.25, 0.07)	-0.02 (-0.13, 0.09)	0.02 (-0.09, 0.13)	-0.20*** (-0.30, -0.10)	-0.01 (-0.11, 0.09)
Respondent's age	0.01 (-0.01, 0.02)	-0.02 (-0.05, 0.02)	0.01 (-0.01, 0.04)	-0.01 (-0.02, 0.01)	-0.02* (-0.03, -0.01)	-0.01 (-0.02, 0.01)	0.02* (0.00, 0.03)
# children in household	-0.08* (-0.15, -0.02)	0.01 (-0.15, 0.17)	0.01 (-0.11, 0.13)	0.01 (-0.08, 0.08)	0.05 (-0.03, 0.12)	-0.05 (-0.12, 0.03)	0.02 (-0.05, 0.10)
Highest education in household (ref: < high or technical school)							
High or technical school	-0.15 (-0.35, 0.06)	-0.18 (0.71, 0.35)	-0.32 (-0.68, 0.05)	-0.15 (-0.40, 0.10)	-0.07 (-0.33, 0.19)	0.13 (-0.12, 0.37)	0.02 (-0.22, 0.26)
At least some college	-0.35* (-0.63, -0.06)	0.11 (-0.60, 0.82)	-0.49 (-1.01, 0.04)	-0.03 (-0.38, 0.32)	-0.15 (-0.50, 0.19)	0.01 (-0.32, 0.34)	-0.14 (-0.47, 0.18)
Type of home (ref: single family or duplex)							
Apartment/condo or other	0.12 (-0.06, 0.30)	-0.27 (-0.69, 0.14)	-0.40* (-0.74, -0.05)	0.20 (-0.03, 0.42)	0.22* (0.01, 0.42)	0.01 (-0.20, 0.21)	-0.16 (-0.36, 0.04)
Cultural							
Acculturation – non-Hispanic	0.08 (-0.02, 0.17)	-0.02 (-0.26, 0.21)	0.17 (-0.01, 0.34)	-0.01 (-0.12, 0.12)	-0.05 (-0.16, 0.07)	-0.08 (-0.23, 0.07)	0.09 (-0.02, 0.19)
Familism	0.09 (-0.03, 0.22)	-0.30 (-0.63, 0.03)	-0.09 (-0.32, 0.13)	-0.16 (-0.32, -0.01)	-0.02 (-0.18, 0.14)	-0.01 (-0.12, 0.10)	0.04 (-0.11, 0.19)
Objective environmental							
Crime index	0.001 (-0.001, 0.001)	0.001 (-0.001, 0.002)	0.001 (-0.001, 0.002)	-0.001 (-0.001, 0.001)	0.001 (-0.001, 0.001)	0.001 (-0.001, 0.001)	-0.001 (-0.001, 0.001)
Traffic index	-0.007 (-0.025, 0.011)	0.004 (-0.034, 0.043)	-0.003 (-0.040, 0.034)	0.004 (-0.019, 0.027)	0.004 (-0.014, 0.022)	0.005 (-0.015, 0.026)	0.010 (-0.010, 0.029)
Distance to nearest park (km)	0.001 (-0.02, 0.04)	0.01 (-0.06, 0.009)	0.02 (-0.05, 0.09)	-0.01 (-0.06, 0.02)	0.03* (0.00, 0.07)	0.03 (-0.01, 0.07)	0.01 (-0.02, 0.05)
Perceived environment							
Signs of physical and social disorder	0.24*** (0.12, 0.36)	-0.19 (-0.49, 0.10)	-0.15 (-0.38, 0.08)	0.05 (-0.10, 0.21)	-0.10 (-0.24, 0.04)	-0.07 (-0.21, 0.07)	0.07 (-0.07, 0.21)
Traffic safety	0.16* (0.03, 0.28)	0.12 (-0.19, 0.43)	0.09 (-0.14, 0.33)	-0.12 (-0.27, 0.04)	0.03 (-0.12, 0.18)	0.01 (-0.14, 0.15)	-0.12 (-0.26, 0.03)
Traffic hazards	-0.06 (-0.17, 0.05)	-0.12 (-0.40, 0.17)	0.08 (-0.13, 0.28)	0.33*** (0.20, 0.47)	0.09 (-0.04, 0.23)	0.09 (-0.04, 0.22)	-0.03 (-0.16, 0.10)
Stranger danger	0.01 (-0.08, 0.10)	-0.06 (-0.28, 0.16)	0.02 (-0.15, 0.18)	0.21*** (0.10, 0.32)	0.15** (0.04, 0.26)	0.02 (-0.08, 0.13)	-0.03 (-0.13, 0.07)
Availability of active play equipment	-0.01 (-0.02, 0.01)	0.01 (-0.02, 0.05)	0.06*** (0.03, 0.09)	-0.05*** (-0.06, -0.03)	0.01 (-0.02, 0.02)	0.01 (-0.01, 0.03)	0.00 (-0.02, 0.02)
Places for child's physical activity	0.03* (0.00, 0.06)	0.08* (0.01, 0.15)	0.01 (-0.04, 0.07)	-0.03 (-0.06, 0.01)	-0.04* (-0.08, -0.01)	0.01 (-0.03, 0.04)	0.01 (-0.03, 0.03)
Neighborhood informal social control	0.15* (0.03, 0.27)	0.17 (-0.12, 0.46)	0.24* (0.03. 0.46)	-0.05 (-0.19, 0.10)	0.12 (-0.02, 0.26)	-0.03 (-0.17, 0.10)	0.04 (-0.10, 0.17)

Note: Data were collected in Harris County, TX from July 2011 to March 2012.
All regression analyses were conducted using mixed linear models accounting for CBG-level clustering effects. Ref = reference category; # = number. *$p < .05$; **$p < .01$; *** $p < .0$.

Table 3

Adjusted associations between socio-demographic, cultural and environmental characteristics with physical-activity related parenting practice in Latino parents in Harris County, Tx (2011-2012). Data from O'Connor et al. 2014.

Abstract

Objective: Our intent was to identify factors associated with childhood obesity in Hispanics and African Americans to equip health care providers with the necessary information needed to combat childhood obesity.

Method: Databases searched included PubMed, JAMA, EBSCOhost.

Results: 26 articles on childhood obesity in African American and Hispanic population were selected and reviewed.

Conclusion: Based on this literature review, duration of breastfeeding, maternal feeding style, home food and parental perception of neighborhood environment are key determinants of childhood obesity. Thus, it is quintessential to focus on these factors while implementing efficient programs to address childhood obesity.

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