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Trisha Patel

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Obesity in Hispanic Children: The Effect of Parent's Nutritional Knowledge

by

Trisha Patel

Dr. Melvin Konner
Adviser

Department of Anthropology

Dr. Melvin Konner
Adviser

Dr. Carol Worthman
Committee Member

Dr. Tracy McGill
Committee Member

2013

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By

Trisha Patel

Dr. Melvin Konner

Adviser

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Abstract

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Over the past several decades, the childhood obesity and overweight epidemic has emerged as an area of concern for physicians and researchers. This epidemic disproportionately affects Hispanic children, making it essential to understanding the various causes of overweight and obesity in this population in order to develop appropriate intervention. The primary purpose of my thesis was to test the hypothesis that, within Atlanta's Hispanic population, parent's lack of knowledge of healthy eating is related to his or her child being overweight or obese. My project also attempted to ethnographically characterize the study population, to characterize nutritional knowledge of parents, and to better understand patterns of child feeding in the study population. Thirty semi-structured interviews with parents (15 parents of overweight or obese children and 15 parents of normal weight children) were conducted at the Lindbergh Women and Children's Center and the International Medical Center to assess nutritional knowledge and child-feeding habits of the study population. By connecting parents' level of nutritional knowledge with their child's Body Mass Index (BMI), the relationship between parents' nutritional knowledge and child's weight was evaluated. Results showed no evident association between nutritional knowledge and weight classification of children (normal weight, overweight, or obese). Thus, other factors are important to consider in order to fully understand the causes of overweight and obesity in the study population. Based on the findings, these factors include percent of monthly income spent on food, fruit and vegetable consumption, portion size of breakfast and dinner, food insecurity, and child control over diet.

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Chapter 1: Introduction

I. Background

Over the past several decades, obesity has quickly become a global crisis, permeating to all regions of the world. The World Health Organization defines obesity as “the condition of excess body fat to the extent that health is impaired” and uses Body Mass Index (BMI, weight (kg)/height (m)²) as a marker of obesity (Wang and Beydoun 2007: 7). For adults, a BMI between 25 and 29 indicates overweight, while a BMI over 30 indicates obesity. In children, “a BMI greater than or equal to the sex-age-specific 95th BMI percentile....[and] a BMI greater than or equal to the 85th percentile but less than the 95th percentile” are considered indicators of obesity and overweight, respectively (Wang and Beydoun 2007: 7). Studies have shown that childhood BMI is associated with adult adiposity and thus BMI may be used as an indicator of obesity (Freedman, et al. 2005; Guo, et al. 2000). However, limitations exist that prevent BMI from being a comprehensive predictor of obesity. These limitations include the disregard for the effect of “relative leg length or relative sitting height” on stature and the disregard of the difference between lean tissue and fat tissue when accounting for weight (Garn, et al. 1986) . Thus, although BMI is an important indicator of obesity, researchers must keep the limitations of BMI in mind when determining its effectiveness.

Globally, obesity prevalence has more than doubled since 1980; in 2008, approximately 1.4 billion adults worldwide were overweight or obese, while “more than one in ten of the world’s adult population was obese” (World Health Organization 2012). The obesity and overweight epidemic also affects much of the world’s child population, as in 2010 more than forty million children under the age of five were defined as overweight. Although researchers “once considered [high prevalence of childhood overweight and obesity] a high-income country

problem,” the epidemic has spread to other countries throughout the world, as “close to thirty-five million overweight children are living in developing countries and eight million in developed countries” (World Health Organization 2012). However, despite the widespread nature of the obesity epidemic, the crisis remains a particular area of concern in the United States, as the United States has “the highest [obesity rates] among all of the high-income countries in the world” (Harvard School of Public Health 2013).

According to the Centers for Disease Control and Prevention (CDC), 69% of US adults are overweight or obese, while 35.7% of adults are obese (Centers for Disease Control and Prevention 2012). Given current trends, by 2030, approximately half of all men and women in the United States will be obese (Harvard School of Public Health 2013). In addition to being widespread in the United States’ adult population, the obesity epidemic is also very prevalent in the United States’ child population, as the United States has “some of the highest [childhood] obesity rates in the world” (Harvard School of Public Health 2013). Approximately 17% of all children and adolescents are obese in the United States, while “obesity prevalence among children and adolescents has almost tripled” since 1980 but has recently stabilized (Centers for Disease Control and Prevention 2012; Ogden, et al. 2008). In particular, certain states within the United States, such as Georgia, have extremely high prevalence of obese and overweight children. In 2007, approximately 37% of children in Georgia were overweight or obese (Data Resource Center for Child and Adolescent Health 2007). Although childhood obesity permeates through “gender... socioeconomic status, racial/ethnic groups, and geographic regions,” the epidemic also disproportionately affects some populations within the United States, especially the Hispanic population (Wang and Beydoun 2007:6).

According to Michelle Obama's "Let's Move" campaign, childhood obesity in the Hispanic population is increasing faster than in any other ethnic group within the United States. Approximately 40% of Hispanic children are overweight or are obese and Hispanic children of preschool age are now more likely to be obese than their Caucasian and African American counterparts (Let's Move 2012). The Office of Minority Health also states that Mexican American children, in particular, are 1.4 times more likely to be overweight as Non-Hispanic White Children (The Office of Minority Health 2012). Furthermore, "from 1999 to 2010, Mexican American infants were 67 percent more likely to have a high weight" for their height in comparison to non-Hispanic Caucasian infants (Harvard School of Public Health 2013). Current hypotheses for the obesity epidemic in the Hispanic community include strong genetic contribution, lack of physical activity and poor diet (Butte 2006). The pervasiveness of childhood obesity within the Hispanic population is alarming, as obesity has a myriad of associated health risks, including diabetes, heart disease, high blood pressure, cancer and asthma (Kopelman 2007). Despite the connection between obesity and disease, interestingly, some studies have shown that overweight individuals with a BMI between 25 and 32 have lower mortality rates compared to individuals with normal BMI for cardiovascular diseases (Lavie, et al. 2009). Researchers name this phenomenon the "obesity paradox" and further research is necessary to determine if levels of adiposity can serve as a protective factor.

Because of the numerous health risks associated with obesity listed above, many campaigns and organizations are focusing on the complex childhood obesity epidemic, targeting lack of exercise and unhealthy diets in order to affect change. Nutrition and diet have been areas of particular interest, as a change in diet can serve as a preventative approach to

combat obesity. Specifically, researchers have started to study the parent's role in affecting diet and nutrition in children in order to better understand how to fight obesity. Parents play a key part in creating a family's eating environment, thereby affecting their child's early eating practices (Birch, et al. 2001). Specifically for the Hispanic community, lack of parental knowledge of nutrition may play an even bigger role in childhood obesity, as family and respect for elders are core values; consequently, children are less likely to "question or argue with elders, because this would signify a lack of respect" (Resnicow, et al. 1999; Benavides, et al. 2006: 82). With this, Latino parents are extremely important in creating a healthy food environment for their children, as they hold a special position of authority and respect in the family. Parents determine what food, how much food, and when the child eats, affirming the importance of parental knowledge and intervention in childhood obesity. Therefore, because of the important role of the parent in Latino families, the power of parental knowledge about obesity and nutrition proves to be extremely important in order to better understand the factors that cause the obesity epidemic for this population.

II. Research Goals and Objectives

This research project has three main objectives. First, this study aims to ethnographically characterize and understand the study population, primarily through a description of the research site. The study population is the Hispanic community in Atlanta, Georgia, since childhood obesity disproportionately affects this state and population, and specifically is the Hispanic population near Buford Highway. A second goal of this study is to characterize nutritional knowledge of parents and to better understand patterns of child feeding in the study population. The final goal of this study is to test the hypothesis that

parental knowledge of nutrition is an explanation for childhood obesity in the Hispanic population. This study investigates whether or not lack of knowledge of healthy eating in parents is associated with obesity or overweight in their children. Specifically, what influence does a parent have in shaping a child's eating environment and what is the parent's role in contributing to the childhood obesity and overweight epidemic? The second and third goals will be assessed through semi-structured interviews with primarily qualitative data analysis, but also some quantitative data analysis.

Chapter 2: Literature Review

I. Prevalence of the Obesity Epidemic

In adults in the United States, disparities in the prevalence of obesity occur primarily within “gender, age, geographic regions, socioeconomic status, and racial/ethnic groups” (Wang and Beydoun 2007: 6). Based on data from the National Health and Nutrition Examination Survey (NHANES) from 2008, in comparing gender, women had a higher age-adjusted obesity prevalence than men (35.5% to 32.2%) (Flegal, et al. 2010: 238). However, more men than women were overweight or obese (72.3 percent vs. 64.1 percent),” highlighting the overall higher prevalence of overweight in men and the higher prevalence of obesity in women than in men (Flegal, et al. 2010: 238).

In relation to trends among various age groups, “the combined prevalence [of obesity] increased with age”; more than 70% of those sixty years or older were obese or overweight from 2003 to 2004 (Wang and Beydoun 2007: 8). Throughout adulthood, BMI gradually increases and reaches peak levels between ages 50 and 59 for both men and women (Villareal, et al. 2005: 1849). Data from NHANES demonstrates that the fastest rate of increase in obesity prevalence among women occurs in the 20 to 34 year age group, while the rate of increase in obesity for men is consistent among all age groups (Wang and Beydoun 2007: 8).

Within the United States, the literature states that higher prevalence of obesity tends to occur in the southeastern United States, while the West Coast, Midwest, and Northeast tend to have lower instances of obesity (Wang and Beydoun 2007: 12). Between 1990 and 2005, the difference in obesity prevalence throughout the country became more distinct; although no clear regional trends existed in 1990, by 2005, obesity prevalence clearly increased in the southeastern region in the United States (Wang and Beydoun 2007).

In regard to the prevalence of obesity in different socioeconomic levels, the literature emphasizes that socioeconomic status (SES) alone cannot fully explain differences in obesity (Wang and Beydoun 2007: 11). Many other “social-environmental factors might have a more profound effect in influencing an individual’s body weight status than an individual’s characteristics such as SES” (Zhang and Wang 2004: 1628). Furthermore, because “neither education nor income, two commonly used markers, reflect SES level equally across ethnic groups,” a comprehensive indicator of SES does not exist, making comparing obesity’s effect among different SES levels complex (Wang and Beydoun 2007: 11). However, despite the complexities of determining trends between SES and obesity, researchers have established that generally “low-SES groups in the United States [are] at increased risk of obesity” and typically “less educated persons in the United States (those with less than a high school education) have a higher prevalence of obesity than their counterparts” (Wang and Beydoun 2007: 11). Variations in the influence of SES on obesity also occur within gender; for example, while women in high SES levels usually have lower weights, women in medium and low SES levels have higher weights (McLaren 2007: 36-37). Despite these general trends, the relationship between SES and obesity remains complex and therefore other factors may better explain patterns of obesity prevalence.

One of these other factors that proves essential to understanding disparities in obesity is racial and ethnic groupings. According to data from NHANES, large disparities exist among racial and ethnic groups, especially in women (Wang and Beydoun 2007: 8). Generally, “minority groups (i.e., non-Hispanic Blacks and Mexican Americans) had a higher...[obesity] prevalence than non-Hispanic Whites by almost 10 percentage points” (Wang and Beydoun

2007: 8). On the whole, the “prevalence of overweight and obesity among Asian Americans was much lower than the national average,” underscoring that disparities in the prevalence of obesity exist especially for the non-Hispanic Black and the Hispanic populations (Wang and Beydoun 2007: 9). When comparing obesity in different racial and ethnic groups and between the genders, “the racial/ethnic differences among men were much smaller than among women” (Wang and Beydoun 2007: 9). In 2001, while the difference in obesity prevalence was only 3% for 18-26 year old non-Hispanic Black men and non-Hispanic White men, the difference in obesity prevalence for 18-26 year old non-Hispanic Black women and White women was approximately 13%, with non-Hispanic Black men and women having a higher prevalence (Wang and Beydoun 2007: 9). In summary, the obesity epidemic disproportionately affects minority populations, especially African-American and Latino/Hispanic individuals, and specifically Mexican Americans.

In addition to the presence of racial and ethnic disparities in obesity and overweight throughout adulthood, differences in obesity prevalence also persist throughout childhood. In adolescence, the occurrence of overweight is the highest for Black females and then for Hispanic males and females (Nicholson and Browning 2012). These findings stress how obesity and overweight affect different racial and ethnic groups disproportionately throughout not only adulthood but also childhood. Therefore, because “the change from a healthy weight to overweight or obese [in childhood] is a risk factor for” health issues in adulthood, the high childhood overweight and obesity prevalence in minority populations is an area of concern for researchers and physicians (Nicholson and Browning 2012: 53; Deckelbaum and Williams 2001: 240). By having a better understanding of childhood obesity and overweight and their causes,

researchers and physicians can aptly target this epidemic to prevent health issues related to obesity and overweight for individuals in adulthood.

II. Summary of Causes of Childhood Obesity

In regards to causes of childhood obesity, the literature proposes a variety of explanations, including genetic, behavioral, and environmental. Genetic factors prove significant to understanding the childhood obesity epidemic because of the potential to realize these influences early in life. Many studies have found that maternal and child BMI are strongly associated with each other, more so than paternal and child BMI, highlighting the influence of the maternal genome in childhood obesity (Magnusson and Rasmussen 2002; Whitaker 2004; Rasmussen and Kjolhede 2012). For instance, 25% of children born to obese mothers are obese by age 4, while obese 4-years olds with obese mothers are three times more likely to be obese as young adults (Whitaker 2004: 34). This strong association between obesity in mother and child suggests “intrauterine influences, imprinting effects, an influence of mitochondrial genes, or a rearing effect” (Hebebrand and Hinney 2008: 84). An additional example of the role of genetics and maternal health in determining childhood obesity is in the Barker hypothesis. This “thrifty phenotype hypothesis” proposes that poor fetal nutrition and stresses during fetal life, such as maternal or placental abnormalities, can lead to obesity in childhood and adulthood. The period of fetal malnutrition and intrauterine stress is “followed by overnutrition in childhood and adult life” and subsequently obesity and often times type 2 diabetes (Hales and Barker 2001:7).

In addition to the influence of the maternal genome and the intrauterine experience, twin studies have also shown that genetic effects contribute to obesity, as the BMI of

monozygotic twins has a high heritability range for BMI (Pietiläinen, et al. 1999; Hebebrand and Hinney 2008; Anderson and Butcher 2006). Specific genetic influences of obesity include Prader-Willi syndrome, mutations for leptin, and the contribution of the MC4R polygene (Hebebrand and Hinney 2008). However, despite the clear connection between genetics and obesity, genes cannot solely explain the rapid increase in obesity prevalence globally over the last few decades (Deckelbaum and Williams 2001). This span of time is far too short to affect the gene pool and subsequently other factors must also contribute to the obesity crisis.

Epigenetics, or the “study of heritable changes which affect gene function without modifying the DNA sequence,” may also play an important role in obesity and possibly may help account for the rapid increase in obesity worldwide (Herrera, et al. 2011:46). Studies have shown that early environmental influences can cause epigenetic variation, through DNA methylation and histone modification, and “thereby permanently [affect] metabolism and chronic disease,” leading to obesity in some cases (Herrera, et al. 2011: 47). Thus, epigenetics may serve as an explanation for the rapid increase in obesity prevalence worldwide.

According to the literature, supplemental to the influence of genes and epigenetics on obesity and overweight are behavioral factors, specifically increased energy intake and decreased physical activity. Regarding increased energy intake as an explanation for childhood obesity, the literature primarily focuses on the consumption of fast-food meals, sweet beverages (soda and juice), and snack food. Typically, individuals who consume fast food meals, sweet beverages, and snacks have a higher energy intake than those who do not. In general, the consumption of fast food and sweet beverages is associated with an increased likelihood of obesity (Fraser, et al. 2012; Malik, et al. 2006; Berkey, et al. 2004; Bray 2010). This strong

association between fast food and sweet beverage intake and obesity contrasts with the more ambiguous association between snacking and obesity. Because the definition of a snack is unclear, no consensus on the relationship between snacking and obesity exists. Although some studies show that increased consumption of “high-fat, energy-dense, salty, savory, or sweet food” as snacks increases along with the prevalence of overweight, other studies show no significant relationship between snack foods and BMI (Patro and Szajweska 2010: 302; Kerr, et al. 2009; Phillips, et al. 2004). Thus, further research is necessary to better understand the effects of snacking on obesity. In addition to the ambiguity in the association between snacking and obesity, uncertainty still exists regarding the connection between fast food consumption and obesity. Some studies have found that children who consume fast food are not necessarily more prone to overweight or obesity; instead, those that eat fast food and are overweight or obese tend to not expend as much energy as those who eat fast food and are normal weight (Ebbeling, et al. 2004). As a result, in addition to increased energy intake, decreased energy expenditure also may contribute to childhood obesity.

Decreased energy expenditure typically refers to increased physical inactivity, manifested as decreased exercise and increased sedentary activities, like television viewing and computer use. Overall, the literature is inconsistent in its findings regarding the association between physical inactivity and obesity, underscoring that “youth physical activity is a complex behavior determined by many factors” (Sallis, et al. 2000). However, despite the inconsistencies, studies do suggest that physical inactivity plays a role in childhood obesity, because decreased physical activity is associated with increased waist circumference (an indicator of increased abdominal fat) and because obese children do not partake in moderate

and vigorous physical activity as much as their normal weight counterparts (Klein-Platat, et al. 2004; Trost, et al. 2001). In addition to decreased physical inactivity contributing to obesity, increased sedentary behavior, specifically watching television, has a positive correlation with childhood obesity and may even be associated with a lower metabolic rate than the resting metabolic rate in some cases (Dietz and Gortmaker 1985; Klesges, et al. 1993). Consequently, based on the literature as a whole, both increased energy intake and decreased energy expenditure are important contributors to the childhood obesity and overweight epidemic but the factors that contribute to these conditions are still areas for future research.

Finally, environmental factors also influence the childhood obesity epidemic. These factors include the effects of the child's community and home environment. A child's community environment proves essential to understanding obesity, because if a community lacks healthy food options or recreational areas, children will not be able to eat healthy foods or exercise adequately and thus may be more prone to be overweight or obese. The literature regarding availability of food suggests that disadvantaged and minority neighborhoods typically have a lower availability of healthy food choices in comparison to affluent and White neighborhoods (Wechsler, et al. 1995; Horowitz, et al. 2004). Furthermore, fresh produce usually is of poor quality and is expensive in these low-income neighborhoods; these financial barriers to healthy food prove to affect childhood obesity, as after controlling for baseline BMI, age, real family income and socio-demographic characteristics, children in areas with low-priced produce had lower gains in BMI in childhood (Sturm and Datar 2005). In addition to the lack of healthy food in grocery stores, low-income neighborhoods typically also have fewer healthy options in restaurant menus and a greater density of fast-food restaurants per square

mile (Lewis, et al. 2005; Block, et al. 2004). Although the literature is inconclusive regarding the effects of proximity to fast-food restaurant on obesity, the consumption of unhealthy food is influential to obesity, as this increases an individual's energy intake and therefore contributes to obesity. In addition to the lack of healthy food options affecting childhood obesity, the lack of recreational outlets may also contribute to the childhood obesity epidemic. According to the literature, many low-income communities do not have recreational parks or exercising facilities, often times due to the fact that these community environments are dangerous. Studies have found that an increased number of exercise facilities was associated with decreased instances of overweight and increased instances of physical activity and that individuals in low-income neighborhoods were more prone to obesity and to engage in no physical activity (Kipke, et al. 2007; Sallis and Glanz 2006; Estabrooks, et al. 2003; Gordon-Larsen, et al. 2006; Sundquist, et al. 1999). Hence, the community environment is extremely influential for childhood obesity, as both the deficiency of healthy food and exercise facilities affect the prevalence of obesity, particularly in low-income neighborhoods.

In addition to the effect of the community environment on childhood obesity, the home environment is also very crucial for understanding the causes of childhood overweight and obesity. This is because parents have an important position as role model and as teacher for their children, since children often emulate their parents (Lindsay and Sussner 2006; Golan and Crow 2004). A literature review summarizing studies about physical activity of children has shown that this connection between parent and child is very important for determining the level of physical activity in adolescents, as "measures of parental support [and] direct help from parents...were consistently related to adolescent physical activity" (Sallis, et al. 2000). As a

result, by affecting the level of physical activity in their children, parents have a strong influence on the weight of their child, since increased sedentary behavior is associated with higher levels of obesity as discussed earlier. In addition to influencing levels of physical activity in children, parents also have an effect on childhood obesity due to their levels of education. Studies have found a relationship with low SES, low parental education and elevated childhood obesity rates, especially when parents are obese (Lamerz, et al. 2005; Langnase, et al. 2002). Therefore, parents' weight and education status also may be related with childhood obesity, highlighting the importance of the parent in a child's life and the effect of the home environment on childhood obesity.

Finally, as stated earlier, parents have a crucial role in that they shape a child's eating environment, "through the choice of an infant feeding method, by the foods they make available and accessible, by direct modeling influences, by the extent of media exposure in the home, and by the way they interact with children in the eating context" (Birch and Fisher 1998: 543). With this, parents control their child's eating environment and consequently understanding why parents give certain food to their children is also important to consider. A fundamental component to this is parental knowledge of nutrition, as parents must realize that an item is healthy in order to encourage their child to consume it, like in the case of fruits and vegetables (Birch and Fisher 1998; Lindsay and Sussner 2006). As a result, parental knowledge of nutrition proves essential to examining the childhood obesity and overweight epidemic.

III. Parental Knowledge of Nutrition and Childhood Obesity

With regard to the connection between parental nutritional knowledge, unhealthy eating, and obesity and overweight, the literature does not appear to reach a general

consensus, as some studies have established a positive correlation between lack of parental nutritional knowledge and obesity, while others have not. In various studies, researchers found a strong relationship between mothers' nutritional knowledge and children's fruit intake, as well as a strong correlation between fruit and vegetable consumption in both mother and child (Gibson, et al. 1998; Hart, et al. 2010; Prichard, et al. 2012). Some mothers also believed "that eating more fruits and vegetables could reduce people's chances of becoming overweight," emphasizing that mothers attempted to promote healthy eating in their children in order to reduce overweight and obesity (Gibson, et al. 1998: 219). This study affirms that knowledge about healthy eating has the power to affect childhood obesity, as increased maternal nutritional knowledge was associated with increased child fruit intake and thus increased healthy eating.

In addition to the positive association between maternal nutritional knowledge and healthy eating, the presence of adequate nutritional knowledge is also associated negatively with children's total energy and fat intake (Contento, et al. 1993). Consequently, parental nutritional knowledge not only promotes the intake of healthy foods but also influences children to not consume unhealthy foods. Because increased energy and fat intake are associated with obesity, the intervention of parents to stop this consumption emphasizes the importance of nutritional knowledge to preventing childhood obesity and overweight. A Flemish study also confirms the association between maternal nutritional knowledge and healthy eating, as mothers with better nutritional knowledge restricted their child's unhealthy eating (Vereecken and Maes 2010).

Additionally, a study assessing the relationship between nutritional knowledge and overweight preschool children found that mothers with less education did not categorize their children as overweight, even though they were in actuality (Baughcum, et al. 2000; Pakpour, et al. 2011). These mothers also had poor knowledge of healthy eating, as found by questionnaires asking about the frequency of junk food consumption. As a result, this study also affirms that lack of nutritional knowledge is related to childhood obesity and overweight, since mothers with poor nutritional knowledge did not recognize overweight tendencies in their own children. The ability to recognize abnormal weight is crucial to controlling the obesity epidemic, since if parents are aware that their child is overweight, they can appropriately intervene to control their child's weight (Pakpour, et al. 2011).

Another study found comparable results in the Mexican American population on the Texas-Mexico border; mothers inaccurately identified overweight and at risk children, believing them to be normal weight, while associating the label of overweight with children who were in reality extremely obese (Bayles 2010). Furthermore, a study analyzing child feeding in Head Start groups also highlights the effects of parents' nutritional knowledge, specifically in preventing the consumption of unhealthy snacks. Researchers found that few parents "viewed snacks positively...[and] generally viewed snacks as expensive, high in sugar, and unhealthy" and consequently did not permit their children to eat such food (Hoerr, et al. 2005: 188). With this, the literature stresses the effect of parents' nutritional knowledge on childhood obesity and overweight, as by eliminating unhealthy snacking from their child's diet, the parents decrease their child's energy intake and in turn likelihood of becoming obese or overweight.

However, despite the parents' influence to prevent unhealthy snacking, the Head Start study also found that some parents had difficulty influencing their children's diet as a whole. Much of the time, parents stated that their children refused to eat healthy food, such as vegetables and fruits, emphasizing that children were actually in control of their diet (Hoerr, et al. 2005: 189). In fact, a past study has showed that this lack of parental control on a child's diet is associated with increased child adiposity (Johnson 2000). This finding highlights that despite the fact that parents have adequate nutritional knowledge, they may be unable to influence their child's diet and consequently parents' nutritional knowledge does not have as much of an influence in controlling childhood obesity or overweight as previously thought. In the case of the Head Start study, parents understood the nutritional value of fruits and vegetables but were unable to convince their children to eat these foods, highlighting the disconnect between parents' nutritional knowledge and the prevention of childhood obesity and overweight.

In addition to the findings of this study, a study by Brewis and Gartin also suggests the potential lack of influence of parental knowledge of nutrition on the obesity epidemic. In this study conducted in rural Georgia, researchers found that despite knowledge of healthy feeding practices, parents permitted high calorie diets, full of high sugar and fatty foods, for their children (Brewis and Gartin 2006). Parents cited that children refused to eat healthy foods and in order to avoid an argument, parents consequently catered to their child's wishes and permitted unhealthy foods. With this, the association between parental knowledge of nutrition and prevention of childhood obesity is ambiguous, as despite adequate nutritional education, parents allowed obesogenic child diets and thus were unable to prevent behavior associated with childhood obesity and overweight (Brewis and Gartin 2006). As a result, although the

literature about the effects of parents' nutritional knowledge on childhood obesity is unclear, with further research, researchers will be able to clarify this connection. With this new understanding, parental nutritional knowledge may prove to be an important target for decreasing childhood obesity for all populations, especially since this epidemic disproportionately affects some groups more than others.

IV. The Causes of Obesity in the Hispanic Population

As stated earlier, one group that is particularly affected by the childhood obesity epidemic is the Hispanic population, but specifically Mexican Americans. Because childhood overweight and obesity has a disproportionate effect on the Hispanic population, knowledge of the causes of childhood obesity and overweight, specific to this population is fundamental to understanding how physicians and researchers can decrease the prevalence of overweight and obesity. Overall, the literature points to multiple explanations for the increased prevalence of obesity in Hispanic children, including genetic, behavioral, and environmental reasons. In regard to genetics, researchers have found a strong correlation between parental obesity and increased instances of child obesity in Hispanic populations, suggesting that genetic heritability may play an important role in the obesity epidemic for the Hispanic population (Butte, et al. 2006). Additionally, the literature has also shown a strong relationship in the Hispanic population between "genes that augment glucose and adiposity," especially those genes that control the metabolic syndrome (Harrington 2008: 390). With this, the heritable component of obesity once again emerges as an important explanation for the obesity epidemic, as genes that increase fat levels and therefore overweight and obesity are prevalent in the Hispanic population.

In addition to the genetic explanations for the disproportionate prevalence of the childhood obesity epidemic in the Hispanic population, behavioral factors also play a vital part in this crisis. An important component of behavioral factors that relate to obesity and overweight is diet. Typically, Latino households have lower incomes and thus are of low socioeconomic status (Mazur, et al. 2003). Due to financial constraints, parents are not able to always buy healthy food for their children and select cheaper, more energy-rich foods (Harrington 2008). Consequently, the disproportionately low SES of the Latino population could be an explanation for the high levels of childhood obesity, as parents cannot afford nutritious foods for their children. A child's diet may also have an important influence on childhood obesity and overweight due to the levels of magnesium intake, as magnesium is crucial to the break down of carbohydrates and to the control of insulin (Huerta and Kington 2005). A study has found that obese children have lower magnesium levels in their blood; Latino children also typically have lower levels of magnesium in their blood because they consume less than three or four servings of fruits and vegetables daily, highlighting the possible relationship between lower magnesium levels and increased prevalence of obesity and overweight (Huerta and Kington 2005).

Studies have also found that homes with Spanish-speaking parents were associated with lower micronutrient intake and as a result, a less nutritious diet (Mazur et al. 2003). In addition to the role of a poor diet in affecting childhood obesity and overweight, the lack of physical activity and increased sedentary behavior also affect childhood obesity and overweight in the Hispanic population. A study has shown that 52% of Latino youth watch more than the recommended maximum of two hours of television daily (Lowry, et al. 2002). Because

increased television watching is associated with lower energy expenditure (as it can replace exercise) and with higher energy intake (due to eating while watching television or due to food advertising), the disproportionately high levels of television watching may also be an explanation to the high prevalence of childhood obesity and overweight in the Hispanic population (Gordon-Larsen, et al. 2002). In summary, increased instances of poor diets and decreased instances of physical activity are possible explanations for the disproportionate prevalence of obesity and overweight in Hispanic children.

Finally, environmental factors, especially the role of parent's perception of obesity, are also fundamental to the childhood obesity epidemic in the Hispanic and Latino populations. A review of the literature studying the effect of parental perceptions of obesity in Mexican Americans demonstrates that many parents are unable to appropriately classify their child as overweight or obese, highlighting a lack of understanding of healthy weight in children (Sosa 2012:400). In addition, many parents did not consider normal weight crucial to the health of a child; instead, a healthy child was one that lived in a happy and loving home environment (Crawford, et al. 2004). Furthermore, another study assessing views on obesity also showed that 40% of Mexican American mothers with overweight children did not view being overweight as a health issue (Ariza, et al. 2004). With this, the literature highlights the lack of understanding of the significance of obesity and of its causes in many Hispanic and Latino households. This lack of understanding potentially fosters the high prevalence of childhood obesity in Hispanic children, since parents (as role models) are responsible for promoting healthy living in their children. Therefore, a knowledge deficiency about obesity can lead to the

absence of a healthy lifestyle and consequently the persistence of unhealthy habits throughout childhood.

One aspect absent from the literature about Hispanic parents' role in affecting childhood obesity is the effect of parents' knowledge of nutrition on childhood obesity. Although literature exists that highlights Hispanic mothers' understanding of their position as role models for healthy eating, a gap also exists in the literature that assesses the relationship between parents' nutritional knowledge and childhood obesity in Hispanic children (Sosa 2012). Thus, as stated earlier, further research about the effect of Hispanic parents' nutritional knowledge on childhood obesity is necessary to understand if increasing nutritional knowledge can serve to decrease the prevalence of childhood obesity for the Hispanic population. The pervasiveness of this crisis is extremely widespread in the Hispanic population in particular, affirming the need for effective intervention in the near future in order to improve health for Hispanic children.

V. Summary

Overall, the literature studying childhood obesity and overweight highlights the effects of genetic, behavioral, and environmental factors. On the whole, researchers agree that many factors combine to cause childhood obesity; there is no one cause or explanation for this recent global epidemic, stressing the complicated nature of the crisis. Despite the global nature of obesity, childhood obesity disproportionately affects certain populations more than others, particularly Hispanic and Latino children. Although researchers have hypothesized reasons for this uneven prevalence, including genetic, behavioral, and environmental factors, the role of the parent in affecting childhood obesity, particularly the role of parental nutritional knowledge

in Hispanic populations, has not been studied in great detail. Further research is indispensable in order to understand if parents' nutritional knowledge is truly influential for childhood obesity in the Hispanic population.

In all populations, based on the literature regarding parents' nutritional knowledge and the prevention of obesity, the association between nutritional knowledge and obesity is still unclear. Although some studies affirm the power of nutritional knowledge in curbing childhood obesity and overweight, other studies underscore the lack of influence parents' nutritional knowledge can have on controlling their child's diet. In these cases, children refuse to eat healthy foods and control their own diets; parents defer to their child's wishes to avoid arguments and consequently foster an environment in which obesogenic child diets are prevalent. Due to this lack of agreement regarding the effects of parents' nutritional knowledge on childhood obesity and overweight, further research is necessary in order to better understand the parent's role in preventing childhood obesity.

VI. Hypothesis

This project will address this gap in the literature, by adding to the existing understanding of the power of parents' nutritional knowledge on childhood obesity, focusing on the Hispanic population. Because Hispanic culture stresses the importance of family and elders, due to the core values of family and respect of authority, parents' knowledge of nutrition is an important aspect to better understand in order to address the childhood obesity and overweight crisis in Hispanic children (Resnicow, et al. 1999). Based on the literature, I hypothesize that a parent's lack of knowledge about healthy eating is related to his or her child being overweight or obese. As discussed earlier, parents are crucial to creating their child's

home environment and to establishing healthy eating habits early in life; consequently, the less knowledge a parent has about healthy eating, the more likely his or her child will be overweight or obese (Lindsay and Sussner 2006).

Chapter 3: Research Site

I. Rationale for Project

In addition to addressing the gap in the literature relating to the causes of childhood obesity and overweight in the Hispanic community, this project also has special importance for me personally. After taking Predictive Health at Emory University in the spring of 2011, I developed an interest in childhood obesity, as this is a current area of concern in preventive medicine because of obesity's connection with chronic diseases, such as high blood pressure and diabetes. In addition to my interest in childhood obesity because of its connection with predictive health, I also aspire to become a pediatrician in the future. Because of this desire, I wanted to research and learn more about issues that are currently plaguing childhood health. With this, understanding childhood obesity and overweight and their causes emerged as areas of interest for me. Finally, my particular interest in childhood obesity in the Latino community surfaced because of my Spanish major and my experiences with Latino health in the Atlanta community. Being a Spanish major, I have a passion for the Spanish language and have the ability to communicate with members of the Latino community; I therefore wanted to incorporate this ability and passion in my research project.

Additionally, my interest in Latino health also relates to my experiences with Spanish medical interpretation. In the spring of 2011, I worked with a group of students to start an organization called Volunteer Medical Interpretation Services (VMIS) that trains undergraduate and graduate students to serve as medical interpreters, primarily at Grady Hospital and at reduced-cost clinics in the Atlanta metropolitan area, such as Good Samaritan Health Center. While at Good Samaritan Health Center in Spring 2011, I noticed that many of the Hispanic patients came to the clinic because of chronic diseases, like diabetes and hypertension, and

often time were overweight or obese. At times, I saw families in which the mother, father, and children were overweight or obese; I quickly realized that obesity and overweight were problems for Atlanta's Hispanic community and wanted to learn more about the causes of this epidemic, specifically focusing on the parent's role. Thus, through my experience at Good Samaritan Health Center, I learned more about the health issues that affect Atlanta's Latino population, spurring my desire to focus my honors thesis on exploring childhood obesity and overweight in the Latino population in particular. Therefore, because of my experiences in Predictive Health and my interests in Latino health and pediatrics, I decided to explore childhood obesity and overweight in the Hispanic population.

II. Description of Research Sites

Being a student in Atlanta, I was fortunate enough to have the ability to work with a large and rapidly growing Hispanic community. As a whole, the Atlanta metropolitan area has had "the second most rapid growth rate in the United States between 1980 and 2000" for the Hispanic population, and has continued to experience rapid growth for this population since 2000 (The University of Georgia Business Outreach Services 2003). Because of this population growth, areas with a predominant Hispanic population emerged within Atlanta, such as the Buford Highway area. This area of Atlanta serves as a melting pot of cultures and has historically experienced high levels of Hispanic immigration, especially from Mexico, dating back to the early 1980s (Walcott 2002). The high influx of Mexican immigrants is attributed to Mexico's economic decline of 1975 and Atlanta's flourishing suburban job market in the 1980s (Walcott 2002). "La Buford," as named by Hispanic residents, provides Hispanic immigrants with a strong community away from their home country and a space where residents can

gather and enjoy ethnically targeted retail, entertainment, and cuisine (Walcott 2002).

Examples of Hispanic establishments on Buford Highway include a Mexican video store, a Colombian travel agency, a music hall with Mexican bands, and Mexican grocery stores (Walcott 2002).

In addition to Hispanic retail, entertainment, and cuisine establishments, health clinics also exist on Buford Highway that predominantly treat Latino patients. An example of one of these clinics is the Lindbergh Women and Children's Center, the site where I conducted the majority of my research. This clinic is one of Grady Health System's Neighborhood Health Centers and provides primary care for Buford Highway area children and obstetric and gynecologic care for the area's women. Although this clinic does not solely treat Hispanic patients, many patients who go to the clinic are Hispanic immigrants and are limited-English-proficient. Because of this, many of the nurses and physicians are fluent in Spanish; those that are not rely on Spanish interpreters to help them provide care for their patients. In addition to primarily serving a Hispanic population, the Lindbergh Women and Children's Center also treats many low-income individuals. Being a part of the Grady Health System network, the clinic has a special commitment to working with Atlanta's underserved and works diligently to make sure patients receive financial assistance if necessary. Each day, social workers meet with families to help these low-income individuals determine how they will finance their medical appointments. Thus, the Lindbergh Women and Children's Center primarily serves a very specific population within the Atlanta community: low-income Hispanic immigrants.

Because of this strong connection to the Hispanic community, the Lindbergh Women and Children's Center quickly became the ideal location for me to carry out my data collection.

With the help of Dr. Flavia Mercado, the director of the International Medical Center at Grady Hospital, I was able to get approval to work at the Lindbergh Women and Children's Center and also at the International Medical Center. I initially began my data collection at the International Medical Center, a clinic that primarily serves Hispanic immigrants, but found it difficult to recruit parents with children for my study, as most of the patients who came to the clinic were adults. Following Dr. Mercado's suggestion, I started recruiting participants at the Lindbergh Women and Children's Center and was much more successful in finding parents with children who were willing to participate.

Upon arriving at the Lindbergh Women and Children's Center, I quickly noticed the large patient load that constantly populated the clinic. The clinic had two waiting rooms, one for the pediatric clinic and one for the obstetric and gynecological clinic. Morning clinics typically were just for pediatric patients, while the afternoon clinics were for obstetric and gynecological patients. On any given morning, the waiting room was completely full; children from different families played together or enjoyed a snack together, while parents enjoyed the company of fellow parents. I observed a strong sense of community in the waiting room amongst the children and their families, often because the families originated from the same home country, paralleling the strong sense of ethnic community that exists in "La Buford" (Walcott 2002). In addition to the strong community amongst patients, I also noticed strong relationships between patients and clinicians. Because many of the nurses and physicians could speak Spanish, patients seemed to feel more comfortable and connected with the staff at the clinic. With this, the Lindbergh Women and Children's Center has a culture of its own, rooted in the strong community of patients and clinicians.

Chapter 4: Methodology

I. Timeline of Project

The project was granted expedited approval by the Emory Institutional Review Board (IRB00057390) on June 13, 2012. Prior to this date, I conducted preliminary research about the issue of childhood obesity and overweight in the Hispanic population and developed project goals. Goals of this project include assessing the relationship between Hispanic parent's nutritional knowledge and childhood obesity and overweight, and developing a better understanding of the parent's role in the child-feeding environment. After June 13, 2012, I began data collection, through semi-structured interviews with parents of normal weight, overweight, and obese Hispanic children. These interviews were conducted primarily at the Lindbergh Women and Children's Center but additionally at the International Medical Center at Grady Hospital. I interviewed participants from June 2012 to July 2012. After this date, I began transcription of interviews and data analysis.

II. Study Design

In order to determine whether or not lack of knowledge of healthy eating in parents is associated with obesity and overweight in their children, an interview questionnaire was developed. Interviews were conducted with 30 Hispanic mothers and fathers, 15 parents of overweight or obese children and 15 parents of children with normal weight. The interviews followed a semi-structured approach, meaning participants responded to structured open-ended questions, as well as other questions that emerged from the dialogue between interviewer and participant (DiCicco-Bloom and Crabtree 2006). With a semi-structured interview, participants are not limited by the answer choices of a survey or by the questions of

a structured interview, and instead are able to expand upon any areas of discussion that they wish and can engage in a conversation with the interviewer.

In order to develop the interview questionnaire, I drew on the expertise of Dr. Craig Hadley and Dr. Flavia Mercado, and also consulted the Child Feeding Questionnaire (Birch, et al. 2001). This questionnaire “assesses aspects of child-feeding perceptions, attitudes, and practices and their relationships to children’s developing food acceptance patterns, the controls of food intake and obesity” (Birch, et al. 2001:201). Thus, the Child Feeding Questionnaire served as a very useful tool in developing an interview questionnaire, as it assesses the connection between child feeding and obesity and overweight. The interview questionnaire for this project includes questions about demographics and child-feeding habits, and additionally evaluates parents’ knowledge of nutrition (see Appendix B). Answers to these questions helped determine the parent’s level of nutritional knowledge and therefore were crucial to the completion of project goals.

Because the Lindbergh Women and Children’s Center and the International Medical Center are primary care clinics, I was able to easily determine BMI by asking the nurses who measure BMI for the children prior to the physical examination. Despite the limitations of BMI, as stated in the literature review, I used BMI to determine the weight classification of the child (normal weight, overweight, or obese) because this index was the tool that the clinic used to determine obesity. By investigating the levels of nutritional knowledge of parents of normal weight children and comparing these levels to that of parents of overweight or obese children, I could assess whether or not parent’s nutritional knowledge has an effect on childhood obesity and overweight in the study population.

III. Study Population

The study population included all Hispanic immigrants with children between the ages of 3 and 15 who went to the International Medical Center or the Lindbergh Women and Children's Center. The majority of interviews took place at the Lindbergh Women and Children's Center.

IV. Data Collection

In order to collect data for the project, I first determined criteria for eligibility. Criteria for selection included being a native Spanish speaker and being the parent of a normal weight, overweight, or obese 3 to 15 year old child. Participating parents were also older than 18 years. As stated previously, in order to determine if the child was normal weight, overweight, or obese, I used BMI information from nurses at the clinics. Fifteen participants had children with BMIs greater than the 85th percentile for their age (overweight or obese), while fifteen participants had children with BMIs between the 5th and 85th for their age (normal weight).

I recruited participants in the clinic waiting rooms, using systematic sampling, asking every third person entering the clinic to participate in the project. If the individual agreed to participate in the study, I determined eligibility using a questionnaire based on the eligibility criteria listed above (see Appendix A). I prevented coercion to participate in the study by asking the individual if he or she would like to participate once; if the individual refused to participate, no further contact was made. If the individual was eligible for the study, I conducted a semi-structured interview based on the interview questionnaire described previously (see Appendix B) to learn about the parent's feeding beliefs and biomedical understanding of obesity and overweight.

Interviews were recorded and were conducted in Spanish in clinic waiting rooms, while the parent waited for her or his child's appointment. These interviews typically lasted ten to fifteen minutes. As a Spanish major, I was able to converse in Spanish with the participants and was able to formulate new questions that connected with the participant's comments. To ensure complete accuracy, a certified Grady translator translated the questions used in the interview. For ethical reasons, after the interview, if I determined that the parent had gross knowledge deficits about nutrition and obesity, I spoke with him or her about feeding practices with nutritional information from the United States Department of Agriculture. In order to ensure confidentiality, I asked participants if they wanted to move to a conference room in the clinic. Many of the participants refused, stating that they did not want to miss their child's appointments, and thus I conducted the majority of interviews in the waiting room of the clinics.

V. Data Analysis

Data was analyzed using a quantitative approach for numerical and demographic information, but principally was analyzed using a qualitative approach. For quantitative analysis, I used the Mann-Whitney U test (a non-parametric test for two independent populations) and the Fisher's exact test (a test used for categorical data in a small population). For qualitative analysis, I transcribed all of the interviews to Microsoft Word and then analyzed the transcripts looking for repeated themes and key words. Key themes include attitudes towards obesity, protective factors, food insecurity, child control over food environment, perception of child's eating, perception of child's weight, healthy or unhealthy eating of parents as children, whether or not the child enjoys healthy or unhealthy food, and parents' actions in

response to obesity. In order to evaluate parent's knowledge of nutrition, I paid special attention to the following questions that particularly addressed nutritional knowledge:

1. Please list five healthy food items. Please list five unhealthy food items.
2. How many servings of vegetables and fruits does your child eat a day? Are these foods important for him/her to eat?
3. Does your child eat many sweets (candy, ice cream) and junk food? Is this good or bad?

If parents were unable to name any healthy or unhealthy foods or incorrectly identified healthy or unhealthy foods, this indicated a lack of nutritional knowledge. By analyzing the participants' responses to the questions above and connecting them to the BMI of the participants' children, I was able to assess the relationship between knowledge of nutrition and childhood obesity. I used the other interview questions to better understand the participants' perceptions of obesity and child-feeding practices, therefore gaining more insight into the parent's role as a whole in the childhood obesity and overweight epidemic.

Chapter 5: Results

I. Interviewee Profile

The following demographic information characterizes the study population. During data collection, I interviewed thirty parents—three parents at the International Medical Center and twenty-seven parents at the Lindbergh Women and Children’s Center. Fifteen of the participants had normal weight children, while fifteen participants had overweight or obese children. The children in both of these groups differed in age, spanning from three to fourteen years old. The average age for the children in this project was 7.9 years; the average age for the overweight or obese group was 7.3 years and the average age for the normal group was 8.5 years. Twenty-seven of the participants in this project were immigrant mothers of Hispanic children, while three of the participants were immigrant fathers. Although I spoke with three fathers, mothers were usually the only parent taking their child to the medical checkup, while fathers were working. Of the fathers I observed, only one was at the clinic without his wife, while the others accompanied their whole family to the clinic.

Of the thirty participants, twenty-seven emigrated from Mexico, two from El Salvador, and one from Honduras. Additionally, all of the participants emigrated from their home country at minimum six years prior to the interviews and at maximum twenty years prior to the interviews; on average, the participants had lived in the United States for approximately twelve years and had established roots in the Atlanta immigrant community. In addition, the average amount of schooling for parents was 8.5 years, meaning most parents had at least completed middle school. The minimum years of schooling was five, while the maximum was sixteen years. Thus, on the whole, the majority of the study population included Mexican mothers who lived in the United States for at least six years, and had at least a middle school education.

Table 1: Interviewee Profile

Participant	Years in US	Years of Schooling	Country of Origin	Relationship to child	Age of Child	Weight Classification of Child
1	12	12	Mexico	Mother	8	obese
2	7	7	El Salvador	Father	3	normal
3	13	5	El Salvador	Mother	10	overweight
4	10	9	Mexico	Mother	5	overweight
5	12	5	Mexico	Mother	5	obese
6	14	12	Mexico	Mother	7	obese
7	8	6	Mexico	Mother	6	overweight
8	12	16	Mexico	Mother	4	normal
9	13	8	Honduras	Mother	8	overweight
10	8	10	Mexico	Mother	8	normal
11	19	8	Mexico	Mother	5	normal
12	13	- ^a	Mexico	Mother	12	normal
13	15	7	Mexico	Mother	10	overweight
14	14	5	Mexico	Mother	9	obese
15	18	12	Mexico	Father	11	normal
16	20	9	Mexico	Father	14	normal
17	-	10	Mexico	Mother	7	overweight
18	10	9	Mexico	Mother	6	obese
19	19	10	Mexico	Mother	11	normal
20	8	9	Mexico	Mother	13	normal
21	6	6	Mexico	Mother	5	normal
22	6	10	Mexico	Mother	11	overweight
23	-	-	Mexico	Mother	7	normal
24	16	10	Mexico	Mother	7	obese
25	9	6	Mexico	Mother	7	normal
26	11	16	Mexico	Mother	6	normal
27	6	6	Mexico	Mother	4	obese
28	9	6	Mexico	Mother	10	normal
29	14	12	Mexico	Mother	11	normal
30	13	5	Mexico	Mother	7	obese

a: Dashes indicate a lack of response.

II. Quantitative Results

In this section, I address the following research goals through numerical data and quantitative analysis: 1) characterizing nutritional knowledge of parents 2) testing the

hypothesis that parental knowledge of nutrition is an explanation for childhood obesity and 3) understanding patterns of child feeding.

a) Knowledge of Nutrition and Weight Classification

In order to test my hypothesis that the less knowledge a parent has about healthy eating, the more likely his or her child will be overweight or obese, I assessed parent's nutritional knowledge throughout my interviews, using the approach outlined in the methodology section. All parents were able to correctly categorize sweets and junk food as unhealthy and fruits and vegetables as healthy when asked to do so. These findings suggest that all parents in the study had a baseline level of nutritional knowledge. In other words, when prompted with examples of healthy and unhealthy foods, all participants could correctly categorize types of food. However, even though all participants were able to categorize healthy and unhealthy foods, participants without sufficient nutritional knowledge were unable to verbally produce examples of healthy and unhealthy items. Thus, parents that did not have adequate nutritional knowledge were those that were unable to name, or incorrectly named, examples of unhealthy and healthy food (see Table 2).

Specifically, participant 5, 13, 17, 21, and 23 were unable to list healthy foods, unhealthy foods, or both without assistance. Participant 5 was unable to list any unhealthy foods; after I prompted her with the example of sweets, she agreed that sweets were unhealthy but could not provide any additional examples of unhealthy items. Participant 13 was the only participant unable to list both healthy and unhealthy food, stating that she did not know any examples of either. Similarly to participant 5, participant 17 was unable to list any unhealthy items and when asked to list five unhealthy items, the participant responded "no sé cuales son [I do not

know what they are]”. Participant 21 also stated she did not know examples of unhealthy foods and asked “No, no este que lo que uno come es saludable, no? [No, no, isn’t that whatever someone eats is healthy?],” affirming her uncertainty about food that constitutes as unhealthy. Similarly, Participant 23 stated “La verdad, no sé [The truth is, I don’t know]” in response to being asked to list unhealthy foods. Participant 22 was the only participant who gave incorrect examples of healthy foods; this participant stated that fried chicken and fried fish were both healthy items.

Parents with adequate nutritional knowledge were those that were able to correctly name examples of unhealthy and healthy food without assistance. Although I asked for five examples of unhealthy food and five examples of healthy food, I did not assess nutritional knowledge solely based on the quantity of examples listed. Many parents listed food groups (such as fruits, vegetables, fast food etc.) instead of specific food items (such as apples, spinach, hamburgers etc.) and thus typically named three to five examples of unhealthy and healthy foods, despite correctly giving examples. Although they listed less than three examples of healthy and unhealthy items, participants 16, 18, and 19 exemplified good nutritional knowledge because they were able to verbalize examples of categories of healthy food (fruits, vegetables) and unhealthy items (hamburgers, bacon, fast food, junk food) without any assistance. Parents that exemplified good nutritional knowledge also typically identified fruits, vegetables, fish, and wheat products (“trigo” or “integral”) as healthy and identified juices, French fries, hamburgers, pizza, soda, and sweets as unhealthy.

Table 2: Parent's Nutritional Knowledge and Weight Classification of Child

Participant	Parent's Nutritional Knowledge	Weight Classification of Child	Number of healthy foods listed	Number of unhealthy foods listed
1	Yes	obese	7	2
2	Yes	normal	5	4
3	Yes	overweight	3	4
4	Yes	overweight	4	3
5	No	obese	1	unable ^a
6	Yes	obese	4	4
7	Yes	overweight	4	2
8	Yes	normal	5	4
9	Yes	overweight	4	4
10	Yes	normal	5	3
11	Yes	normal	5	4
12	Yes	normal	5	4
13	No	overweight	unable	unable
14	Yes	obese	5	1
15	Yes	normal	4	3
16	Yes	normal	2	2
17	No	overweight	4	unable
18	Yes	obese	2	1
19	Yes	normal	1	2
20	Yes	normal	4	4
21	No	normal	3	unable
22	No	overweight	Incorrect ^b	2
23	No	normal	unable	unable
24	Yes	obese	3	3
25	Yes	normal	4	3
26	Yes	normal	5	4
27	Yes	obese	5	3
28	Yes	normal	5	3
29	Yes	normal	5	4
30	Yes	obese	5	4

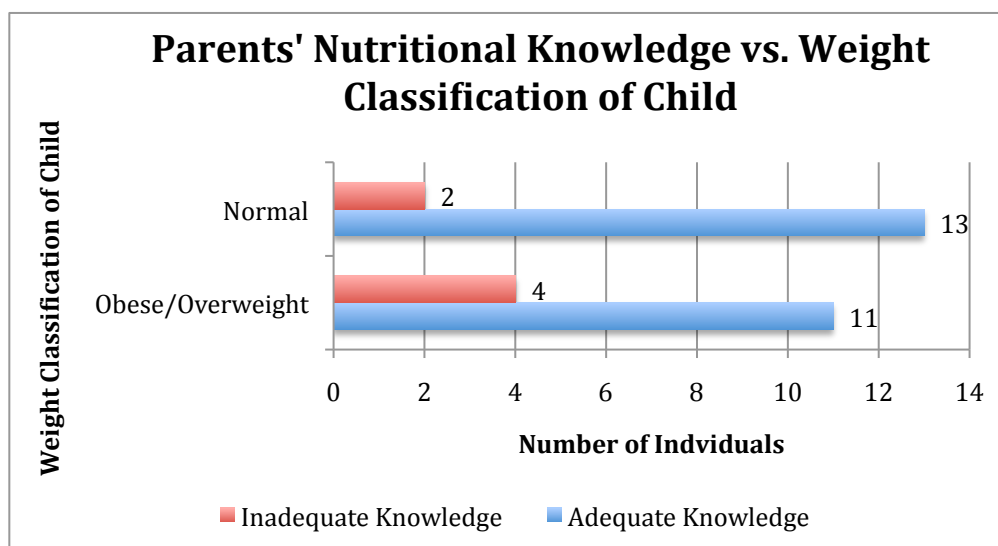
a: Unable indicates that participants were unable to give examples of food.

b: Incorrect indicates that participants gave incorrect examples of food.

Based on the table above, there does not appear to be a strong connection between the nutritional knowledge of parents and the weight classification of their children. Eleven parents

of overweight and obese children and thirteen parents of normal weight children had adequate nutritional knowledge; four parents of overweight and obese children and two parents of normal weight children had inadequate nutritional knowledge (Figure 1). Subsequently, because no real differences exist in levels of nutritional knowledge between parents of normal weight children and parents of overweight and obese children, parent's nutritional knowledge does not appear to have a strong effect on childhood obesity; my results do not support my hypothesis. This lack of a relationship suggests that other factors related to nutrition and child-feeding practices affect childhood obesity and overweight and may explain the causes of overweight and obesity in children better than parent's nutritional knowledge. In the subsequent sections, I will address other factors that may help explain the causes of abnormal weight in overweight and obese children in the study population, in addition to factors that contribute to the study population's child-feeding environment.

Figure 1: Parent's Nutritional Knowledge vs. Weight Classification



b) Parents' Demographics and Weight Classification of Child

In addition to considering the connection between parents' knowledge of nutrition and the weight classification of the child, the connection between parents' demographics, specifically the parents' years of schooling and the years lived in the United States, and weight classification of the child is also important to consider. On average, participants with normal weight children spent 9.8 years in school, while participants with overweight or obese children spent 7.9 years in school. This difference of close to two years suggests that parents' level of education may play a slight role in the weight differences between normal weight children and overweight or obese children in the study population; however based on a two-tailed Mann-Whitney test this difference is not significant ($p > 0.05$, $U = 123$, $n_1 = 14$, $n_2 = 13$). Additionally, on average, parents of normal weight children lived in the US for 12.4 years prior to the time of interviews, while parents of overweight or obese children lived in the United States for 11.6 years prior to the time of interviews. The similarity in these values suggests that number of years lived in the United States does not explain the weight differences between normal weight children and overweight or obese children in the study population.

c) Food Purchasing and Weight Classification of Child

One important topic of discussion in my interviews was information related to food purchasing. Of the twenty-eight participants who responded, twelve of the participants (43%) reported they received subsidies for their food from the government with Women, Infants, and Children (WIC) or Food Stamps, highlighting that the study population includes Atlanta's low-income Hispanic population. Five of thirteen (38%) parents of obese or overweight children and six of fifteen (40%) parents of normal weight children were on WIC or Food Stamps, illustrating no difference between the two weight groups and government subsidies (two participants did

not respond). Additionally, the minimum estimated monthly income of the participants was \$400 and the maximum was \$2500. Using a two-tailed Mann-Whitney test, I determined that the difference in monthly income levels between the overweight or obese group and the normal weight group is tending toward significance in the direction of my hypothesis (that there is a difference in income levels in households of normal weight and in households of overweight or obese children) ($p=0.10$, $U=84.5$, $n_1=11$ $n_2=10$).

In addition, based on a two-tailed Mann-Whitney test, the difference in the amount spent on food per month in households with normal weight children and in households with overweight or obese children is tending toward significance ($p=0.08$, $U=118$, $n_1=13$, $n_2=13$). Also, based on twenty-one participants' calculated percent of monthly income spent on food (based on estimated monthly income and estimated amount spent on food per month), a trend does appear to exist between the weight classification of the participant's child and the percent of income spent on food. Four out of the five highest percentages of monthly income spent on food corresponded to the overweight or obese weight classification, while four out of the five lowest percentages of monthly income spent on food correspond to the normal weight classification (Table 3). Based on a two-tailed Mann-Whitney test, the difference between the two groups is significant ($p<0.05$, $p=0.037$, $U=84.5$, $n_1=11$ $n_2=10$). The highest percentage of monthly income spent on food was 80%, while the lowest percentage of monthly income spent on food was 5%. These values are extreme and therefore must be considered with caution, as parents reported estimates and may have misreported information or may have neglected to take money spent with WIC or Food Stamps into account.

Table 3: Food Purchasing and Weight Classification of Child

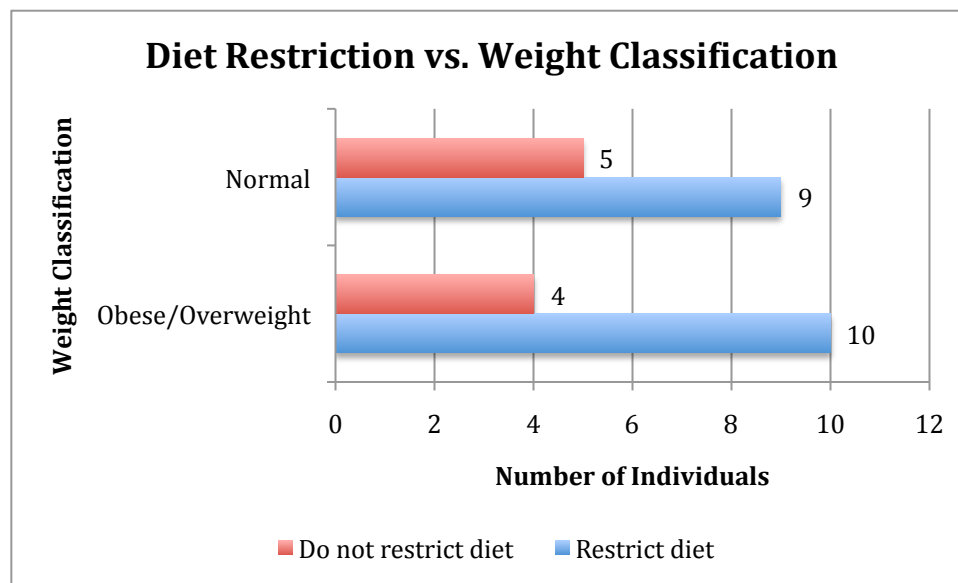
Participant	Weight Classification of Child	WIC or Food Stamps	Percent of monthly income spent on food	Monthly Income
1	obese	No	- ^a	\$1,200
2	normal	No	25.0%	\$800
3	overweight	-	18.2%	\$2,200
4	overweight	No	62.5%	\$400
5	obese	No	25.0%	\$1,200
6	obese	No	80.0%	\$1,000
7	overweight	Yes	-	-
8	normal	Yes	5.0%	\$2,300
9	overweight	-	26.7%	\$1,500
10	normal	Yes	6.9%	\$1,450
11	normal	No	30.0%	\$2,000
12	normal	Yes	-	-
13	overweight	Yes	10.6%	\$1,600
14	obese	No	35.8%	\$600
15	normal	No	-	-
16	normal	No	30.0%	\$1,000
17	overweight	No	66.7%	\$1200
18	obese	Yes	-	-
19	normal	Yes	-	-
20	normal	No	38.9%	\$900
21	normal	Yes	-	-
22	overweight	No	27.8%	\$900
23	normal	No	-	-
24	obese	No	-	-
25	normal	Yes	20.6%	\$1,700
26	normal	No	6.7%	\$1,500
27	obese	Yes	40.0%	\$1,000
28	normal	Yes	11.4%	\$2,200
29	normal	No	12.0%	\$2,500
30	obese	Yes	29.4%	\$1,360

a: Dashes indicate lack of response.

d) Restricting Diet and Weight Classification

In addition to assessing how parents purchase their food, I also asked parents if they restricted the diet of their children. Examples of restricting diet included preventing children from eating sweets, junk food, and soda. Based on my findings, there does not appear to be a difference between diet restrictions in normal and obese or overweight children. Nine parents of normal weight children and ten parents of obese or overweight children restricted their child's diet, while four parents of normal weight children and five parents of obese or overweight children did not restrict their child's diet (Figure 2). Two participants did not respond to this question. The similarity in the number of parents that restricted their child's diet suggests that most parents perceived diet restriction as an important aspect of child feeding.

Figure 2: Diet Restriction vs. Weight Classification

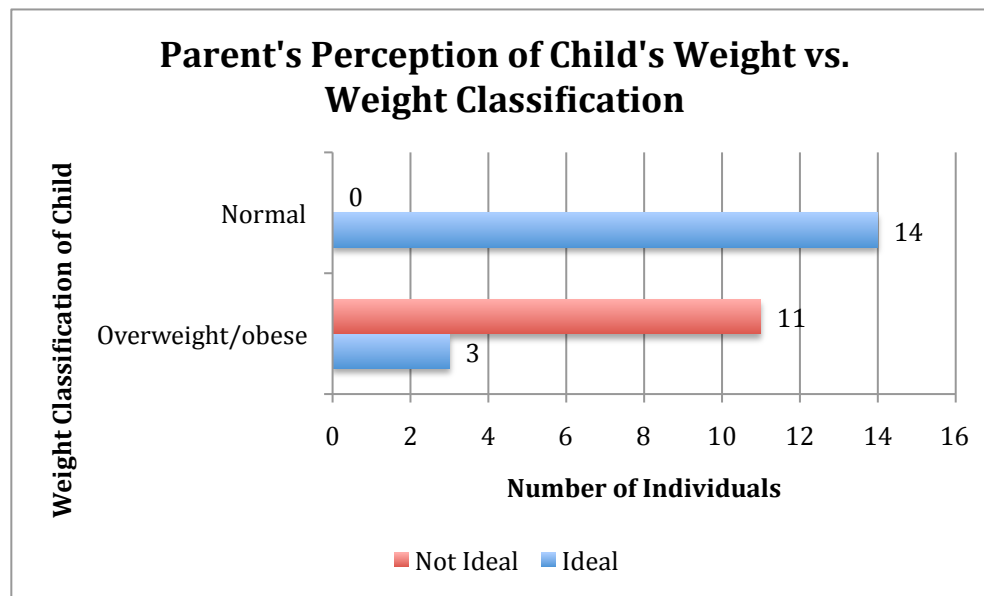


e) Parent's Perception of Child's Weight

Another factor that I considered during my interview was parent's perception of their child's weight. On the whole, parents seemed to correctly identify whether or not their child's

weight was ideal or not ideal. All of the parents with normal weight children correctly identified their child as having an ideal weight, while eleven of the parents with overweight or obese children correctly identified their child as not having an ideal weight. Of the three parents who incorrectly identified their child as having an ideal weight, two were parents of overweight children and one was the parent of an obese child. Two parents did not respond to this question. These findings suggest that the majority parents in the study understood the concepts of ideal and not ideal weight, and are correctly able to associate normal weight with ideal weight and overweight or obese with not ideal weight.

Figure 3: Parent's Perception of Child's Weight vs. Weight Classification

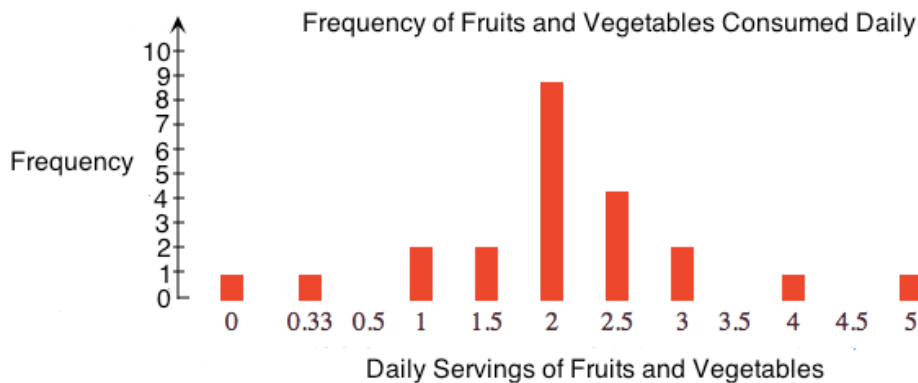


f) Fruit and Vegetable Consumption and Weight Classification

Another interesting point of comparison is between the number of servings of fruit and vegetables that normal weight and overweight or obese children consume daily. Figure 4 displays the distribution of the servings of fruits and vegetables; the median serving of fruits and vegetables per day was two. On average, in the study population, normal weight children

consumed 2.87 servings of fruit and vegetables daily, while overweight or obese children consumed 1.89 servings of fruit and vegetables daily (based on data from twenty-three participants). This difference of one daily serving between normal weight and overweight or obese children suggests that increased consumption of fruits and vegetables daily could be connected with normal weight in children in the study population. However, despite this difference of one serving size, based on a Mann-Whitney two-tailed test this difference is not significant ($p=0.196$, $U=83.5$, $n_1=14$, $n_2=9$). Despite this lack of significant results, the difference in daily serving of fruits and vegetables is substantial and should be an area for further investigation. Additionally, although normal weight children consumed, on average, one more serving of fruits and vegetables daily than overweight or obese children, neither group consumed the recommended daily number of servings of fruits and vegetables.

Figure 4: Frequency of Fruits and Vegetables Consumed Daily



g) Meals and Weight Classification

Two other numerical values obtained in interviews with parents were the number of meals consumed by the child daily and the time of dinner for the child. The average number of meals consumed by both the normal weight and overweight or obese groups was nearly the same; the average for normal weight children was 2.7 meals daily, while the average of

overweight or obese children was 2.6 meals daily. Although these values are very similar, both of the groups had an average number of meals that was less than three, suggesting that some participants' children did not consume the typical three meals a day. Similarly to the average number of meals consumed, the average time for dinner for both the normal weight and overweight or obese groups was basically the same; both groups had an average dinner time of approximately 6:45. The similarities between the two groups in the number of meals consumed and the time of dinner suggest that these factors are not important in explaining the weight differences between the normal weight children and the overweight or obese children.

h) Summary of Quantitative Results

In summary, my quantitative results did not support my hypothesis that parent's nutritional knowledge can explain the difference in weight classification between overweight or obese children and normal weight children. Of the alternative hypotheses that may explain this difference in weight classification, only the difference in percentage of monthly income spent on food between the two weight groups was significant. The difference in income levels and the difference in dollar amount spent on food in households with overweight or obese children and in households with normal weight children were tending toward significance. For these cases, a bigger sample size would have been valuable because the differences may have proved statistically significant. The difference in daily servings of fruit and vegetable consumption between the two groups, although not significant, was an important finding. In addition, based on the quantitative data, there was no significant difference in the child-feeding environments of normal weight and overweight or obese children.

II. Qualitative Results

In this section, I will report my results based on key themes discussed by participants throughout the semi-structured interviews. Key themes included in this section are protective factors, food insecurity, child's control over diet, participants' concepts of meals, and participants' eating habits as children. This section primarily addresses the goal of understanding patterns of child feeding in the study population but also attempts to address the causes of overweight and obesity in the study population.

a) Protective Factors

A theme discussed by the participants throughout the interviews was the concept of factors that positively influence their child's eating environment. All participants emphasized a type of protective factor in their interview. Commonly emphasized protective factors include the family unit eating dinner together, parents having time to cook, and parents having no problems with purchasing food due to money or transportation. In regards to the family eating dinner together, most participants (96% of twenty-seven respondents) stressed that the whole family always gathered during dinnertime to eat together. When asked if her family ate together, one participant stated "siempre....nosotros somos cuatro miembros de la familia y todos comemos en familia [always...we are four members in the family and we all eat together as a family]". One female participant stated that dinnertime "depende en que llega el papá del trabajo [depends when the father returns from work]". Thus, for many of the participants in the study, dinner was not defined by a specific time but instead by the concept of the family unit eating together. Participants valued the role of family and prioritized the family unit when

establishing mealtimes. These findings suggest that the family unit is important for the child-feeding environment of the study population.

In addition to the family unit eating dinner together, during the interviews, most participants (77% of twenty-seven respondents) stated that they typically had enough time to cook their child's food. When asked if there was an instance in which she did not have enough time to cook meals for her children, one participant stated "Casi no. Como no trabajo [Almost never. Since I don't work]". Because most of the participants were mothers who did not work, participants emphasized that they normally had ample time to cook food for their children. When asked if she had time to cook, another mother stated that "Pues en realidad siempre estaba con ellos...y puedo cocinar de todo. O sea que ya si quieren un sándwich lo [hago] [Well, in reality I am always with them and I can cook. That's to say, if they want a sandwich, I can make it] ". The mother emphasizes that she is always with her children and because of this she cooks everything; for example, if the children want a sandwich, the mother could make one for them. With this, the participant stressed that she controlled her child's eating environment and was able to provide home cooked meals for her children.

Additionally, although nearly all of the female participants stated that they cooked the food for their children on a daily basis, two participants also stated that their husbands cooked as well. One woman stated that "cuando no soy, está el papá [when I am not there, the father is]". This highlights the fact that when the mother did not have time to cook, the father shared the responsibility and cooked for his family. Thus, on the whole, participants made it a priority to cook their child's meals and typically had ample time to cook their child's food inside the

home, underscoring the importance of home cooked meals in the child-feeding environment for the study population.

A final protective factor that participants discussed in interviews was being able to purchase food without issues with finances and transportation. A majority of the participants (69% of twenty-nine respondents) stated that they had no issues with transportation or finances when buying groceries. In order to prevent issues with finances, many participants were on WIC or Food Stamps, and thus had governmental support in order to buy food for their family. In regards to transportation, most participants were able to walk, take the bus, or get a ride to a grocery store and did not have issues with purchasing groceries. Interestingly, one mother reported that “Estas tiendas latinas está haciendo este programa también. Porque a veces no maneja, o no tiene un auto. Tu hablas por teléfono y puede retraer a tu casa con tus compras y regresa a tu casa [Some of these Latin stores are having a program also. Because sometimes one does not drive or have a car. You call and they deliver your purchases to your house]”. With this program, the Hispanic community of Buford Highway supported each other and allowed families without cars to easily purchase groceries. Therefore, because of this ability of many of the participants to buy food without the stress of finances or transportation, the child-feeding environment of the study population is characterized by support from the community, specifically the government and the Latino community of Buford Highway.

b) Food Insecurity

Although many participants stressed positive factors that contributed to the eating environment of their child, some of the participants also reported factors that contributed negatively to the child-feeding environment of their children. Examples included difficulty in

preparing food due to time constraints and the inability to purchase groceries due to finances or transportation. Participants who reported difficulties with time constraints were typically mothers who had to work. In order to make sure that her children had food to eat, one mother stated that “trato concinar en la noche y es lo que come al otro día porque yo trabajo en el día [I try to cook in the night and that is what she eats the next day because I work during the day]” and another mother reported that “hago la comida en la noche para el otro día que voy a trabajar [I make the food in the night for the next day that I have to work]”. Therefore, although time influences the ability of participants to feed their children, preparing a home cooked meal the day before can help to remedy the situation.

On the other hand, when asked what they did if they did not have sufficient time to cook, three parents stated that they bought food for their children from Mexican restaurants, McDonald’s, or Burger King, even though all of these parents recognized that these fast food restaurants were unhealthy. In addition, of the six participants who reported difficulties with feeding their children, four participants’ children were obese or overweight (66%). This difference is not significant based on the calculated p-value using a Fisher’s exact test. However, despite this lack of statistical significance, the time constraints participants face when preparing food is important to consider as an explanation for overweight and obese children in the study population because the majority of participants with time restraints had overweight or obese children.

In addition to facing the burden of time constraints, eight parents also reported trouble with finances and with transportation when purchasing food. When asked if she had problems with purchasing food, one participant stated that “pues como no manejo entonces, no puedo ir

[because I do not drive, I cannot go],” highlighting the barriers that the lack of transportation created. Another participant stated that although she was able to walk to the grocery store, “cuando no tengo quien me llevo así nada más compro un pollo, carne, no compro todo lo demás [when I do not have anyone to take me, I buy nothing but chicken, meat. I do not buy the rest]”. Thus, type of transportation also posed a problem for participants, as this mother was not able to purchase everything she needed, even though she was able to walk to the grocery store because her groceries were too heavy to carry.

In addition to issues with transportation, issues with finances also posed a problem for participants. Due to the lack of funds, one mother stated that she had to limit what she purchased at the store, reporting that she bought “más huevos, menos carne [more eggs, less meat]”. Therefore, due to issues with finances, participants sacrificed elements from their child’s diet, contributing negatively to their child’s eating environment. Other parents stated that they were not able to purchase yogurt or even vegetables. Five out of the nine parents (55%) who reported problems with purchasing food had overweight or obese children, illustrating that financial and transportation barriers to purchasing food may be a contributor to overweight or obesity in the study population.

On the whole, seven of the thirteen participants (54%) who reported problems with preparing food due to time constraints or problems with purchasing food due to problems with finances or transportation had overweight or obese children. This shows that food insecurity is an important problem for children in the study population. In addition, only two participants reported both barriers to preparing and barriers to purchasing food. Both of these participants were parents of obese or overweight children, suggesting that a combination of factors relating

to food insecurity may explain unhealthy weight for some of the members of the study population. Therefore, the problem of food insecurity is essential to understanding the study population, because it contributes negatively to the child-feeding environment (as parents were sometimes unable to provide healthy food for their children) and also has a connection with overweight and obese children (as a majority of participants who reported food insecurity had overweight or obese children).

c) Child Control over Diet

Another common theme that parents reported in interviews was child control over diet, meaning that children shaped their own diet. Ways in which children commonly shaped their own diet include instances in which the child refused to eat healthy foods, chose to eat unhealthy foods in school, or consumed unhealthy foods without the parent's consent. Throughout the interviews, most parents discussed how their children refused to eat fruits and vegetables because the children did not like them. One mother reported that "luego viene la hora de comer yo sé que los van a tirar [when dinnertime comes, I know that they are going to throw away]" the vegetables. In this case, the children exerted control over their diet by throwing away healthy food items and refusing to eat them.

Another mother stated that her son did not eat any rations of fruits, vegetables, or meat because he did not like them, stressing how some participants deferred to the child's choice when creating the child-feeding environment. Even though the participants recognized the importance of fruits and vegetables, they did not force the child to eat these types of food. In the case of a parent who successfully convinced her child to consume fruits or vegetables, the mother used words like "batallo [I battle]," and "regañar [to scold]" to describe the situation.

In addition, one mother reported that when her children did not want to eat home cooked meals, “a veces su papá compra este chicken wings, o a veces arroz chino [sometimes his father buys chicken wings or Chinese rice]”. In this scenario, the mother deferred the construction of the food environment to the child, as the child determined what he wanted to eat.

Consequently, children exerted control over their own diet by being picky eaters and refusing to eat healthy food. This choice negatively impacts the food environment of the child, as he or she does not consume a well-balanced diet.

Regarding unhealthy eating in school, one participant stated that at school “le dan una pizza, pollo, panqueques..esta comida es buena grasosa [they give him pizza, chicken, pancakes...this food is very greasy],” while another parent stated her child ate “pizza, pollo, chicken tenders, chicken wings [pizza, chicken, chicken tenders, chicken wings]”. In the home, the parent had the ability to limit these types of unhealthy foods but at school, the child had the ability to choose to consume unhealthy food and often did so. Because the parent could not control the child’s food environment at school, the child was able to consume unhealthy food without the parent’s approval. Because of this, school lunches contributed negatively to the study population’s children, as children had the freedom to eat unhealthy food without their parents consent.

In regards to children consuming unhealthy food without their parent’s consent, participants commonly cited examples of children sneaking unhealthy foods into their diet or of children purchasing unhealthy foods on their own. When discussing sweets consumption, one participant stated that “es que ellos comen, en vez de comer comida, comen mejor esto [it’s that they eat, instead of eating dinner, they eat this more]”. Children chose to consume sweets

instead of meals at times thereby negatively affecting their food environment. Additionally, some children consumed sweets when their parents were not aware. When asked if her son ate sweets, one participant stated, “este si cuando yo no miro él come [when I’m not looking, he eats],” while another participant stated when asked about unhealthy snack consumption stated “cuando no estoy, sí aprovechan y comen [when I’m not there, yes they take advantage and they eat]”. This emphasizes how some of the children sneaked unhealthy food into their diet, even if their parents tried to prevent them.

In addition to sneaking sweets into their diet, two participants also stated that because they live close to the store, their children have bought unhealthy food without parental approval in the past. One of these mothers reported that “ellos van por lo regular, van a la tienda como estamos cerca de donde está la tienda...y compran sus bolsitas de sabritas o poner allí como galletas, solo que no está bien [They go regularly, they go to the store because we live close to where the store is...and they buy little bags of savory snacks or cookies, only things that are not healthy]”. The other mother stated that “hay una tienda abajo y a veces...le hará un dulce, un sabrito, y eso no es saludable por ellos [there is a store below and at times...they get a sweet or a snack and this is not healthy for them]”. These participants once again emphasized how children acted independently of their parents in regards to creating their food environment. Just like the participant whose child ate sweets without her permission, these participants tried to prevent their children from consuming unhealthy food; however, the children circumvented the parents’ authority and consumed the unhealthy snacks anyway.

Of all the instances of child control over diet, only one participant’s son exerted positive control over his own diet. The participant reported that her son preferred food from inside the

home (such as vegetables, fruits, pasta) to food from outside the home (such as food from restaurants and school). The other participants' children exerted negative control over their own diet by choosing to eat unhealthy foods instead of healthy foods. Of the thirty participants, twenty-one participants (70%) reported that their children tried to shape their own diet, positively or negatively. Twenty participants (66%) expressed that their child negatively controlled his or her diet and twelve of these twenty participants (60%) were parents of obese or overweight children. This difference is not significant based on the calculated p-value using a Fisher's exact test ($p=0.24$) but still suggests that a child's negative control over his or her diet may serve as an explanation for overweight or obesity in the study population, and that this effect might be significant in a larger sample.

d) Parents' Concepts of Meals

Another interesting theme relating to the child-feeding environment that emerged from my interviews was the differences in the concept of a meal. Many participants reported differences in the number of meals consumed compared to the traditional three meals a day that many Americans adhere to. For instance, when discussing the number of meals their children consumed daily, many participants reported different categories for meals, such as "comidas grandes [big meals]," "comidas buenas [good meals]," or "comidas fuertes [strong meals]" and "meriendas [snacks]". The majority of participants stated that their children consumed two or three "comidas grandes" a day, with lunch typically being the biggest meal of the day. In addition, nearly all of the parents reported that their children also ate snacks throughout the day, although some participants also stated that they limited the portion sizes and frequency of these snacks. In response to a question about portion sizes for snacks, one

parent stated “No. Pequeñita...no la deajo comer mucho [No. Very small...I do not allow her to eat much]”. Typical snack food included cereal, quesadillas, junk food, fruit, and yogurt.

Contrary to the opinion of many of the parents, one parent of a normal weight child reported that her son ate “dos comidas fuertes y como tres ‘snack’ [two big meals and three snacks],” suggesting that this mother believed smaller meals were more important than large meals.

Additionally, eleven of the participants reported that they did not consider breakfast a meal for their children and instead considered it a snack. Of these eleven participants, seven were parents of overweight or obese children (63%), illustrating that parents’ concept of breakfast may have a link with overweight and obesity in children. I was unable to statistically analyze this value because I did not explicitly ask all parents about their opinions about breakfast. Eleven of the parents self-reported this concept without prompting and thus the significance of the difference in the meal classification of breakfast between weight groups is unknown. Furthermore, breakfast was not considered as important of a meal for many children in the study population, as some parents allowed their children to completely skip breakfast all together. One parent stated “pues ahorita que no están en la escuela no han desayunado. Se despiertan tarde. [Because now they are not in school they do not eat breakfast. They wake up late.]” This statement affirms that breakfast was not an important component of the child-feeding environment for many of the children in the study population.

A third common topic of discussion during interviews regarding meals was the idea of cereal as a meal. Eight participants (27%) reported that their children ate cereal for dinner, while ten participants (30%) reported that their children ate cereal for breakfast. This similarity in the frequency of cereal consumed for both breakfast and dinner suggests that cereal is an

important part of the diet for the children in the study population. Of the eight participants who ate cereal for dinner regularly, only two (25%) were overweight or obese, highlighting the potential protective factor of a smaller dinner. This difference is not significant based on the calculated p-value using a Fisher's exact test ($p=0.21$) but it is still important to understanding the child-feeding environment and differences in child weight classification because of the emphasis placed on portion sizes and on the difference between "comidas fuertes" and "meriendas".

e) Parents' Eating Habits as Children

In addition to parents' concepts of meals, parents' eating habits as children also are an important aspect to consider in understanding the child-feeding environment and the causes of overweight and obesity in the study population's children. Of the twenty-three respondents, eight (35%) reported healthy eating habits as children, while fifteen (65%) reported unhealthy eating habits as children. Factors that described healthy eating for parents as children included a well-balanced diet and food security, while factors that described unhealthy eating included a limited diet and food insecurity. The difference in the diet of the study population highlights that many of the participants came from impoverished backgrounds, as 65% of respondents were food insecure or were unable to purchase healthy food.

Participants who reported a healthy diet typically ate a variety of foods, such as fish, rice, lentils, beans, chicken, fruits and vegetables. Within the group of participants who reported healthy eating as children, three participants emphasized that their diet was healthy because of the freshness of the food. One parent commented "Todo es fresco y no hay como aquí tienditas así como chucherías que McDonalds. Ni existen allí. Pueblo no [Everything is fresh

and there are not stores here like fast food restaurants such as McDonalds. They do not exist. Not in the towns]”. For this mother, the freshness of the food and the lack of fast food was what made her diet healthy; she was able to eat a variety of fresh food, such as fish, beans, vegetables, and fruits and was able to avoid eating unhealthy food because fast food restaurants were not prevalent in her hometown.

In contrast, participants who reported unhealthy eating as children typically ate limited types of food, such as beans, rice, tortillas, cheese, or eggs. Participants rarely ate meat, fruits, or vegetables because these types of food were too expensive for many of the families to purchase. One mother stated that she ate “Frijoles, leche. Carne muy a poco porque pues en el país esta comida es carra [Beans, milk. Meat very rarely because in my country this food is expensive]”. Thus, poverty served as a barrier to healthy eating for some of the participants in the study population when they were children. Another mother commented “pues allá la verdad es no tenía suficiente para lo más que comíamos es los frijoles, huevos...y... comemos carne no casi no [The truth is there we did not have enough and the thing we ate the most was beans or eggs...and...we ate meat almost never]”. This statement affirms the problems food insecurity posed for some participants. Because they were limited by the amount of food available, some participants were unable to eat a well-balanced diet or were unable to eat sufficient amounts of food.

Another important theme relating to parents’ eating habits as children is that many participants served the same food to their children as they themselves ate when they were children. This suggests that parents’ eating habits as children drive the child-feeding environment they create for their children. For example, when describing a traditional dinner

that she served to her family, one mother described sopes, a dish that “es una comida típica porque se hace en mi pueblo [is a typical food because it is made from my town]”. This dish contains “cebolla, queso fresco, y crema [onion, fresh cheese, and cream]” and when discussing sopes, the participant stated “eso me encanta. Y ella le encanta [I love this. And my daughter loves it]”. Thus, healthy and unhealthy eating perpetuated to the next generation depending on what parents ate as children.

Finally, in regards to parents’ eating habits as children and its connection with the weight classification of the parents’ children, of the eight participants who reported healthy eating as children, four (50%) were parents of overweight or obese children. In addition, of the fifteen participants who reported unhealthy eating habits as children, eight (53%) were parents of overweight or obese children. Thus, in this sample, no connection between parents’ eating habits and child weight classification can be made. Therefore, although parents’ eating habits as children are important in creating the child-feeding environment, as parents cook food that they themselves ate as children, this theme does not appear to have a connection with the weight classification of the participants’ children, as parents who ate unhealthy food when they were children were not more likely to have obese or overweight children.

f) Summary of Qualitative Results

In summary, with regard to understanding the causes of abnormal weight in overweight and obese children, the qualitative data did not yield statistically significant results. However, differences between weight classification in food insecurity (due to finances, transportation, and time constraint), negative child control over diet, and the concept of meals are important to consider. In addition, in regards to understanding the child-feeding environment, the

qualitative results highlight that participants typically ate with their families (and often cook food similar to what they ate as children), had the time to cook for their children, had some trouble with purchasing food, and at times deferred control of diet to their child. Therefore, for the study population, the qualitative results present information about the causes of abnormal weight in overweight and obese children and also provide narratives that describe the child-feeding environment.

Chapter 6: Discussion and Limitations

I. Overview

In this study, I attempted 1) to test the hypothesis that parents' knowledge of nutrition is an explanation for childhood obesity and overweight in the study population and 2) to characterize patterns of child feeding in members of Atlanta's Hispanic community. In this chapter, I will address these two study goals based on findings from my results. Regarding the first goal, my results do not support a connection between lack of nutritional knowledge and increased instances of overweight or obese children. Although the small sample size makes it impossible to rule out some effect of nutritional knowledge, other factors must contribute to overweight and obesity in children in the study population; I will explore alternative factors that may serve as better explanations for overweight and obesity in children in the study population in this chapter. Regarding the second study goal, four primary characteristics are evident in the study population's child-feeding environment: 1) family eats together 2) parents typically cook for their children 3) some instances of food insecurity and 4) negative control of diet by children.

II. Knowledge of Nutrition and Weight Classification

As was discussed in the literature review, the effect of parent's knowledge of nutrition on childhood obesity is ambiguous in the general population and is largely unknown in the Hispanic population. Contrary to my expectations, the results of this study support the literature that finds no connection between parents' nutritional knowledge and overweight or obese weight classification in their children. In spite of the important role parents have in Hispanic culture, due to core values of family and respect for authority, the nutritional knowledge of parents in the study population does not appear to influence the weight

classification of their children (Resnicow, et al. 1999). Based on my findings, I propose five alternative factors that may influence abnormal weight in overweight and obese children: 1) percentage of monthly income spent on food 2) daily fruit and vegetable consumption 3) portion size of breakfast and dinner 4) food insecurity and 5) children negatively controlling their diet.

III. Percentage of Monthly Income Spent on Food

After analyzing my results, my only statistically significant finding was the difference in percentage of monthly income spent on food in households of overweight or obese children and in households of normal weight children. In the study population, participants with obese and overweight children reported a significantly higher percent of income spent on food than participants with normal weight children. This result was unexpected, as the literature highlights that in order to achieve a healthier diet, individuals typically spend more money on food due to the high costs of fresh produce and healthy food (Drewnowski and Specter 2004; Sturm and Datar 2005). Thus, participants with overweight and obese children would be expected to spend less of their monthly income on food because they are unable to purchase healthy, more expensive items.

A possible explanation for this unexpected result is that households with overweight and obese children spend more monthly income on food because these children eat more food. Because the children eat more food, parents devote more of their income on groceries in order to make sure that their child does not go hungry. Another explanation is based on the types of food parents of overweight and obese children purchase. Parents of overweight and obese children may spend additional income on food in the form of unhealthy snacks or fast food.

Therefore, although these parents spend similar amounts as parents of normal weight children on groceries, they spend additional income on unhealthy food, contributing to overweight and obesity in their children. Reasons for this additional spending on unhealthy food may be to appease the child or to reward the child (Brewis and Gartin 2006).

Despite the statistical significance of this value, limitations to these results exist. In order to calculate percent of income spent on food, I relied on the self-reported data of participants. Participants could have misreported their data and may have perceived that they spent more or less of their income on food, when in actuality this was not true. This perception of dollar amount spent on food is an interesting point to consider, especially for participants who spent an extremely high or extremely low percent of their income on food (such as 5% or 80%). The difference in perception of the amount spent on food could point to a difference in the importance of food for various households (as families who value food more would spend more of their income on groceries) or could point to a lack of awareness of prices of food and of family income.

Another limitation is that parents did not consider money spent on subsidized groceries with Food Stamp and WIC when they reported the dollar amount they spend on food per month. Because of this, some parents may have underreported the amount of money they spent monthly on food. A final limitation is that not all participants reported their income or the amount they spent on food because they were unsure of the dollar amount or were unwilling to share this information with me. This lack of response proves to be a limitation because the sample that responded to this question was small and therefore limits the statistical analysis (n=21). Despite these limitations, the percentage of income spent on food and its connection

with overweight and obese children may be an interesting aspect for future studies.

Specifically, future research should consider the type of food purchased, the amount of food purchased, the amount of fast food and unhealthy food purchased, and should focus on ways to ensure more accurate self-reports of income and money spent on food monthly.

IV. Fruit and Vegetable Consumption

A second factor that is notably different (although not significantly different) between the overweight or obese weight group and the normal weight group was the daily servings of fruits and vegetables; on average, the normal weight group consumed one serving size more per day than the overweight or obese group. This trend, although not significant, supports much of the literature relating to body size and fruit and vegetable consumption, as studies have found “higher body weight to be associated with lower fruit or vegetable consumption among adults” and have also found similar associations among children (Tohill, et al. 2004: 370). Specifically in children, a study by Lin and Morrison showed that overweight boys ate fewer vegetables than normal weight boys, while overweight girls ate less fruit than normal weight girls (Tohill, et al. 2004). Therefore, lower levels of fruit and vegetable intake appear to be associated with overweight and obesity in children.

Despite this association, my results do not point to causation between lack of fruit and vegetable intake and overweight and obesity in children because I did not control for confounding factors; however, this factor is still important to consider because of what it indicates about the diet of overweight and obese children. Lower levels of fruit and vegetable intake in overweight and obese children in the study population may indicate that children are replacing healthy food with unhealthy food. Instead of eating fruits and vegetables as a snack,

children may be replacing these items with high-fat and high-sugar items for snacks, highlighting that these children replace healthy snacks with unhealthy snacks. In addition, on average, both normal weight and overweight or obese weight children in the study consumed less than three servings of fruits and vegetables. As stated in the Literature Review, a study found that Latino children typically ate less than three servings of fruits and vegetables per day (Huerta and Kington 2005). Based on this, my findings are consistent with the study, since on average the children in my study consumed less than three servings daily.

This lack of consumption of optimal levels of fruit and vegetable is also a critical finding, in that it may indicate a fundamental problem with the diet of Hispanic children. In a study from 1994, researchers found that Latino children consumed less than the recommended five servings of fruits and vegetables; the mean number of servings of fruits and vegetables was 2.7 (Basch, et al. 1994). The study population for my project presented a similar mean number of daily servings as the study population from 1994, potentially indicating the stability in the diet of the recently immigrated Hispanic population over time. A limitation to this assertion is that the study populations differ based on location and thus environment, as the population of my project was from Atlanta, Georgia while the study population of the 1994 was from New York. Overall, fruit and vegetable consumption and its connection with overweight and obesity in Hispanic children is an important topic for future research, especially since Hispanic children consistently have consumed less than the recommended daily number of servings of fruits and vegetables over time.

V. Portion Size of Breakfast and Dinner

Another interesting finding from my project was parents' concept of meals, especially in the perception of breakfast and dinner. Based on interviews, some parents seem to believe that breakfast is solely considered a snack and not a meal. Parents seemed to distinguish between a snack and a meal based on portion size but definitions within the study population may have differed. This perception of breakfast as a snack seems to be associated with participants with overweight and obese children and consequently may be a point of interest in order to better understand the causes of overweight and obesity in children. A possible reason for this link between perception of breakfast as a snack and overweight or obese children is that children eat smaller breakfasts but later eat abnormally large lunches or dinners. This means that children get hungry sooner because they eat small breakfasts and in order to compensate for this hunger gorge on lunch or dinner. The literature seems to support this idea, as studies have found that meal skipping leads to gorging on large meals later in the day (McCrary and Campbell 2011; Toschke et al. 2005).

In addition, parents that perceive breakfast as a snack may also serve their children less nutritious food for this meal. As stated in the Literature Review, a study found that parents viewed snacking as unhealthy and viewed snacks as unhealthy food, typically high in sugar content (Hoerr, et al. 2005). Thus, parents who deem breakfast a snack may permit their children to eat unhealthy food in the morning, since their definition of a snack may be an eating episode with unhealthy food.

A third possible reason for the connection between perception of breakfast as a snack and overweight or obese children is in the protective factors of eating breakfast itself. Studies have found that a healthy breakfast, such as breakfast rich in high fiber or whole grain, is

associated with lower BMI (Alexander, et al. 2009). Thus, children who eat smaller breakfasts may not consume food rich in fiber or whole grains, consequently contributing to overweight or obesity. In understanding these results, an important limitation to consider is that the definition of a snack and a meal is variable within the population. Parents may perceive portion sizes of a snack and a meal in different ways, therefore making it difficult to establish standard definitions of a snack and a meal for the study population.

Another interesting finding is that some of the children ate cereal for dinner. Of these children only 25% were overweight or obese, suggesting a potential protective factor in eating cereal for dinner, possibly due to cereal's small portion size. This protective factor may be because children who eat cereal for dinner do not go to sleep after eating a heavy meal. Studies have found that being overweight or obese is associated with storing calories from nighttime eating (Berg, et al. 2009). Consequently, by eating a smaller dinner before going to sleep, children burn off what they ate for dinner while they are asleep, instead of storing the food as excess fat. This prevents excess weight gain, explaining the connection between cereal for dinner and normal weight in children.

Another explanation for this association is that the concept of cereal for dinner is an indicator that children in the participant's household eat more frequently throughout the day. If the child eats snacks throughout the day, dinner would be a smaller meal because he or she has eaten a snack before dinner. Many studies have established a link between increased meal frequency and decreased instances of childhood obesity; as a result, increased eating frequency (in the form of either snacks or meals) in the study population could be an explanation for normal weight in children who eat cereal for dinner (Toshcke, et al. 2005; McCrory and

Campbell 2011). Future studies should focus on the correlation between portion size of dinner and weight classification.

VI. Food Insecurity

A third important finding from my project was the role of food insecurity in contributing to overweight and obesity in the study population. This means that participants had issues with purchasing foods, specifically due to difficulties with time constraints, finances, and transportation. My findings were consistent with past studies, as researchers have found a connection between difficulties with purchasing food due to time constraints, finances, and transportation and overweight and obesity (Fulkerson 2008; Widome, et al. 2009). Although instances of food insecurity were not widespread in the study population, they were present and were associated with overweight and obesity in children.

In regards to time constraints, of the six participants who reported issues with preparing food due to time constraints, four were parents of overweight or obese children. An explanation for this connection between time constraints and overweight or obesity in children is that in order to deal with time constraints, parents buy their children fast food. Similarly to the literature, participants reported that their alternative to cooking was purchasing fast food outside the home. This exemplifies how barriers to feeding the family can shape the child's food environment in an unhealthy way, as children consume more high-calorie and high-fat food. Because of these time restrictions, parents must provide children with unhealthy food for meals, contributing to overweight and obesity in their children.

In addition to the barriers that time restrictions create for participants, in the study population, financial and transportation barriers are also linked to overweight and obesity in

children. Both of these findings support the literature. As discussed in the Literature Review, low socioeconomic status (SES) is associated with overweight and obesity because individuals are unable to buy fresh produce and other more expensive healthy food items. Consequently, in this study, financial barriers may have contributed to overweight and obesity because parents were unable to purchase healthy food for their children and instead had to limit the diet of their children to cheaper, less nutritious food.

Supplemental to financial barriers are transportation barriers. Transportation barriers are also associated with low SES, as individuals in this group may be unable to save funds to purchase a car, and subsequently may have issues with transportation. As stated by participants in the study, lack of transportation prevented parents from purchasing fresh food and a large quantity of food because that was too heavy to carry. Consequently, parents who had issues with transportation were unable to provide a diverse and healthy diet for their children, and instead had to limit their child's diet. This may explain the association between issues with transportation and overweight or obesity because parents are unable to create a healthy, well-balanced feeding environment for their children. In conclusion, future studies should aim to clarify the link that exists with lack of transportation and weight classification. This may prove an important area for intervention for overweight and obesity, as improving access to healthy food (for example through the use of urban gardens in Atlanta or grocery delivery service) has the potential to decrease the prevalence of overweight and obesity in the Hispanic population.

VII. Child Control Over Diet

A final interesting finding from my study was the prevalence of negative control over diet in the study population by children. Of the twenty children who exerted negative control

over their diet, 60% were overweight or obese, indicating a possible connection between the negative changes children are making and overweight or obesity, even though this finding is non-significant in this study. One important limitation of this connection is that I relied on parents' self-reported narratives in order to establish this link. Parents may have over reported instances of child control over diet because they did not want to be perceived as uncaring if they were unable to establish a healthy diet for their child. Consequently, the prevalence of child control over diet may be overrepresented in the study population and therefore the connection between child control over diet and overweight and obesity must be considered cautiously.

In the study population, despite the efforts of parents to encourage their children to eat healthy foods, children actively chose not to listen and instead asserted control over their diet in negative ways. These ways included refusing to eat fruits and vegetables, eating unhealthy foods at school when parents are not present, and sneaking unhealthy foods into their diet (by purchasing cookies and savory snacks). In these ways, children in the study population had agency over their own diet because they were able to take control of their situation. This finding is very interesting because it indicates that the parents' role in creating the child's feeding environment is not as influential as previously thought. Although parents in the study tried to create a healthy food environment, children undermined their parents' actions and refused to comply with the environment their parents created for them. The children instead asserted agency by choosing to eat other unhealthy items.

With this, children have more power in controlling their feeding environment than previously expected. As stated in the Literature Review, a possible reason for why children at

times have more control over their diet than their parents is that parents are willing to sacrifice healthy eating for a more peaceful and tranquil feeding environment. Because children may throw tantrums or fight their parents when they do not want to eat a certain type of food, parents may defer to the wishes of their child in order to maintain a peaceful eating encounter. This hypothesis is consistent with a finding from my project, as one mother emphasized that she had to “battle” and “scold” her daughter so she would eat healthy food. These words portray the child-feeding environment as hostile and difficult, as the mother had to battle with her daughter in order for the girl to consume healthy food.

Although this mother ultimately was able to force her daughter to eat healthy food, other parents who were not willing to sacrifice a peaceful feeding environment may have been more prone to acquiescing to their child’s wishes. In addition, this hostile feeding environment highlights a fundamental conflict between parent’s wishes and child’s actions in regards to food. All parents in my study wanted their child to eat healthy foods but many of the children did not want to. Subsequently, a conflict between parent and child emerged; this highlights that future nutrition intervention may also need to address this conflict of interest to ensure that both parent and child are in agreement with the type of feeding environment established.

Thus, in order to improve the child-feeding environment and to decrease negative control over diet, future interventions should address the child’s actions. A possible way to target the child’s actions is to provide them with more nutritional education so they can make healthy choices. One way to do this is teach children about nutrition in health classes in school and also to direct advertisements about healthy eating to children. One study has tested the efficacy of school-based nutrition intervention in the form of garden-based intervention (trips

to farms, taste testing, after-school gardening program) and has been found it to have a positive impact on children's nutritional knowledge (Evans, et al. 2012). Other studies have also assessed the effectiveness of a program called Wellness, Academics & You and have found it effective as a method of obesity prevention, suggesting the merit of school-based intervention programs (Spiegel and Foulk 2006). In regards to advertisements of healthy eating directed at children, studies have shown that advertisements for healthy items have had some impact on children in "[promoting] positive attitudes and beliefs concerning these foods" (Dixon, et al. 2007; Beaudoin et al. 2007).

Based on these findings, children should also be made more aware of the detrimental effects their negative health choices have and should better understand the benefits of healthy eating, as this may have a preventative effect on overweight and obesity. Further studies could explore this aspect of child nutrition in order to better assess if children truly understand healthy eating and the effects of unhealthy eating on their health. One limitation of this recommendation that warrants mentioning is the underlying assumption that knowledge affects action, and specifically in this case can prevent overweight or obesity. This connection was the focus of the study for parents but was found to be non-existent, as most of the parents of overweight and obese children had adequate nutritional knowledge. However, if the child is the true controller of diet, increased knowledge for children may be more effective than increased knowledge for parents, as increased nutrition education will enable children to make healthier choices in regards to their feeding environment.

In addition, because many children were able to undermine their parents' wishes by consuming unhealthy, greasy food (like pizza, chicken tenders, and chicken wings) for lunch at

school, the feeding environment at Atlanta public schools is another extremely important area in need of intervention. Schools must improve their child-feeding environments, as children cannot be expected to eat nutritious foods if their education environment does not set a good example for them. By promoting healthy food options and by removing unhealthy food options in schools, officials force children to make healthier food choices, as the children do not have the opportunity to eat unhealthy, greasy foods. According to the Atlanta Public School's nutrition website, middle schools offer student the option of salad, homemade pizza, burgers, sandwiches and wraps, and a "homemade" meal (such as lasagna, barbecue chicken, or pasta alfredo). Thus, healthy options are available for students but many children in this study did not choose these healthier options. This suggests that school officials need to encourage children to select healthier food items in school, underscoring the power of increased nutrition education, and also that officials must remove unhealthy food options from the school environment. By taking these actions, school officials can effectively intervene in the feeding environment of the children and affect change in the diets of the kids.

VII. Child-Feeding Environment

My second research goal was the characterization of the child-feeding environment for the study population. The first important characteristic of the study population is that the family unit typically ate together. This finding is indicative of the value of the family unit for the study population. Parents seemed to make eating dinner together a priority and even pushed dinnertime back if not all members of the family were present. Therefore, the study population established a time for the family to gather on a daily basis in the form of dinnertime. Studies have affirmed the protective factor of family meals, especially for the psychosocial well being of

children and the consumption of healthier foods for children (Eisenberg, et al. 2004; Utter, et al. 2013). Therefore, the child-feeding environment of the study population contains a protective factor in the form of family meals.

Another positive aspect of the child-feeding environment is that parents typically cooked for their children, highlighting the value participants placed on home-cooked meals. This priority to cook in the home is probably because most of the study population did not work and thus had the time to cook meals for their children. With home-cooked meals, participants were able to avoid fast food and unhealthy restaurants, underscoring the protective effect of home-cooked meals and possible connection with overweight and obesity prevention (as long as parents cooked low-fat meals for their children). Consequently, the participant's ability to cook in the home is a potential positive aspect of the child-feeding environment. Two other negative characteristics of the child-feeding environment already discussed in this section are instances of food insecurity and negative control of diet by children.

VIII. Limitations

As in any study, my project has limitations that warrant mentioning, in addition to those that were mentioned previously. The first limitation of my study is due to my inexperience with interviewing study participants. Problems that I faced because I was untrained at interviewing included difficulty in getting participants to trust me and in getting participants to open up to me with personal narratives. However, despite being untrained, I gradually improved upon my interviewing skills throughout my study. Because of this, the interviews in the beginning of my study may not have addressed the same topics of discussion as well as interviews towards the end of my study.

A second limitation is that I spoke with parents solely in Spanish. Although I am a Spanish major and am near fluent in Spanish, I found it difficult to understand and communicate with some of the participants at times. Many of the participants used colloquial expressions that I was unaware of or spoke with accents that I was unaccustomed to hearing, making it difficult to understand them. By the same token, some participants also found it difficult to understand me, often times because the language I used was more formal than they were used to. These problems in communication may have led to errors in the transcription process or miscommunication during the interviews.

A third limitation is that the majority of my interviews with participants were conducted in the clinic waiting room. Many participants were unwilling to leave the waiting room, in fear that they would miss their child's appointment. Because of this, some parents may have been unwilling to truthfully answer the questions I asked because they did not want others in the room to overhear or judge their response. Therefore, there could have been an underreporting of certain perceived "bad behaviors," meaning that my data has a response bias. However, this underreporting of bad behavior would mean that this type of behavior is more prevalent than previously thought and therefore would strengthen my results.

A fourth limitation of my study is that the study population was very homogenous, in that almost all participants were low-income Mexican mothers who did not work. All of these women were at the Lindbergh Women & Children's Clinic, also indicating that they were receiving some healthcare support from Grady Healthcare. Because of this similarity in study population demographics, many of the responses to some of my questions were the same and thus I may not have gotten an accurate portrayal of nutritional knowledge in Atlanta's Hispanic

population as a whole. On the other hand, the homogeneity of the study population could also prove to be a strength since I was able to accurately assess nutritional knowledge and to understand the child-feeding knowledge of members of the Buford Highway community.

A fifth limitation of my study regards the ability to make generalizations from my results. My study population is not representative of the Hispanic population in general, due to the diversity that exists within this group and instead is only indicative of the Hispanic community of Buford Highway. Therefore, my findings are not indicative of the Hispanic immigrant population on the whole and consequently generalizations must be made cautiously.

A sixth limitation of my study is that I did not interview participants with children of the same age. The ages of the children in the normal weight group and the overweight or obese group varied from three to fourteen years old. Thus, certain types of behavior and attitudes may have been more characteristic of children of a specific age and could have contributed to the differences in weight classification.

A final limitation of my study relates to my quantitative analysis. My primary goal of this study was to address the problem of childhood overweight and obesity in Atlanta's Hispanic community qualitatively. After data collection, I decided to incorporate quantitative analysis and therefore did not ensure a 100% response rate for those participants who did not respond to questions. In addition, my sample size of thirty was very small for statistical analysis and therefore created problems for some of my quantitative analysis.

Chapter 7: Conclusion and Recommendations

I. Conclusion

Overall, my research project accomplished three goals: 1) to ethnographically characterize and understand the study population 2) to characterize nutritional knowledge of parents and to better understand patterns of child feeding in the study population and 3) to test the hypothesis that parental knowledge of nutrition is an explanation for childhood obesity in the Hispanic population. My quantitative and qualitative findings did not support an association between parents' knowledge of nutrition and overweight and obesity in the participants' children, highlighting the possible contribution of other factors in causing overweight and obesity. Based on my data, these factors included 1) percentage of monthly income spent on food 2) daily fruit and vegetable consumption 3) portion size of breakfast and dinner 4) food insecurity and 5) children negatively controlling their diet. All of these factors appear to have some association with overweight and obesity in children of the study population but cannot be causally linked to overweight and obesity. Particularly interesting findings included the effect of percentage of monthly income spent on food and the effect of child's negative control over their diet on overweight and obesity.

II. Future Studies

Although this project was unable to definitively suggest a causation between any of the factors discussed above and overweight or obesity, my findings are important for establishing future studies. In addition to those mentioned in the Discussion, other aspects that future studies should assess are the frequency of snacking and portion sizes of meals, the connection between parent's weight and child's weight, and finally levels of physical activity in children. Future studies should also consider expanding the study population to other income levels to

evaluate the differences in child-feeding habits among groups of different socioeconomic statuses. Additionally, percentage of monthly income spent on food may also be another area of study, since this finding was unexpected. Specifically, studies could focus on the difference in the food bought in households of overweight or obese children and in the households of normal weight children and could also focus on food's value in the two households (i.e. Does one household value food more? Does one household value satiation more?).

III. Recommendations

Based on my findings, I believe that child control over diet is an important aspect of policy intervention in the future for children in both the study population and the general population. As stated in the Discussion section, I recommend that intervention for overweight and obesity prevention focus on children because they have agency in controlling their diet. An example of intervention for children in the study population includes child-focused nutrition education during doctor's visits to the Lindbergh Women & Children's Center and the International Medical Center. By targeting children from a young age, health professionals can enable children to make healthy decisions and can ensure that children understand the causes, effects, and prevention methods of overweight and obesity. However, children cannot be taught to eat well when they are surrounded by an unhealthy food environment in the very schools where they are supposed to be learning; school eating environments must improve to restrict child control and set a better example. In addition to targeting children, intervention in the study population should also focus on family-based nutrition education during doctor's visits to ensure that both parents and children are in agreement with the established child-feeding environment. This intervention has the potential to reduce conflict between child and

parent in regards to feeding practices, as both child and parent will address problems with nutrition together.

Examples of intervention for the general population include increasing nutrition education for children in health classes beginning in kindergarten, establishing student-run community gardens at schools, eliminating unhealthy food options in school lunches and in vending machines, and implementing fruit and vegetable consumption in elementary schools through regular “snack times”. In addition, family-based nutrition education should be coupled to the interventions proposed above, as this intervention is crucial to reducing conflict during meals and to establishing a healthy eating environment for the family as a unit. All of these recommendations aim to create a healthy eating environment in children from a young age and aim to prevent children from using school as an avenue for unhealthy eating. Thus, on the whole, policy addressing overweight and obesity prevention should incorporate children into intervention, as they have agency in creating their feeding environment.

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Appendix

Appendix A

Addressed to Patient:

- 1) Are you of Hispanic or Latino origin or descent? Yes, No
¿Usted es de origen o descenso hispanico o latino? Sí, No
- 2) Are you a native Spanish-speaker? Yes, No
¿Usted es un hispanohablante nativo? Sí, No
- 3) Are you over the age of 18? Yes, No
¿Tiene más de 18 años de edad? Sí, No
- 4) Are you the mother or the father of the child?
¿Usted es la madre o el padre del niño(a)?
- 5) Is your child between the ages of 3 and 15? Yes, No
¿Su niño(a) tiene una edad entre 3 y 15 años? Sí, No
 - If answer to all of the questions above is yes, determine BMI of child from medical records. Proceed to subsequent section.

For Investigator:

- 6) Does BMI of child indicate normal weight, overweight, or obesity? Yes, No
 - If answer is yes, individual is eligible for the study. Proceed to subsequent steps.
- 7) Record “normal weight”, “overweight” or “obese”.
- 8) Patient ID number:

Appendix B

Demographics:

1. What is the age and sex of your child? Where was your child born?
2. What is your relationship to the child (mother, father, grandparent, other)?
3. How many years of schooling do you have?
4. In what country were you born? Did you live in a rural or urban area?
5. When did you arrive in America?
6. Are you currently working and getting paid?
7. How much money do you think all members of your household make per month?
8. How much money do you make in one month?
9. Are you in any programs that provide food for your child (WIC, reduced school lunch)?
10. Approximately, what percentage of your income do you spend on food?

Questions:

4. What does your son/daughter usually eat for each meal of the day? What are your child's favorite meals?
5. Tell me about a time when you did not have enough time to feed your family.
6. Are there any foods that your son/daughter does not eat that you believe is more nutritious and healthier than the foods in their current diet?
7. Please list five healthy food items. Please list five unhealthy food items.
8. Do you think your child eats healthily? Do you think being skinny is better than being overweight? Is your child at an ideal weight?
9. Tell me about what you typically ate as a child. In your opinion, was this healthy?
10. How many servings of vegetables and fruits does your child eat a day? Are these foods important for him/her to eat?
11. What does your child typically eat for snack and drink with each meal?
12. Are salty foods healthy or unhealthy? Why?
13. How many meals a day does your child eat? Is this too many or too little?
14. How do you cook your child's food (oil, lard)?
15. When your child is at home, how often are you responsible for feeding him/her?
16. Does your child eat many sweets (candy, ice cream) and junk food? Is this good or bad?
17. Do you limit any foods for your child?
18. Tell me about a time when you had issues with buying food (i.e. financial, transportation). Would you have bought other food if you had all the money you needed?
19. Does your child eat all her/his meals at home? If not, where?
20. Describe a typical family meal. Do you eat as a family? Who is present at the dinner table?
21. What time is dinner?
22. Where do you buy your food? Is the closest supermarket (with fruits & vegetables) near your home? How close in distance? How do you get there?

Preguntas

Preguntas demográficas:

1. ¿Cuál es la edad y el sexo de su niño(a)? ¿Dónde nació su niño(a)?
2. ¿Cuál es su parentesco con el niño(a) [madre, padre]?
3. ¿Por cuántos años usted fue a la escuela?
4. ¿En qué país nació? ¿Vivía en un área rural o urbana?
5. ¿Cuándo llegó a Estados Unidos?
6. ¿Está usted trabajando actualmente y recibe un sueldo?
7. ¿Cuánto dinero usted cree que ganan al mes los familiares que viven en su casa?
8. ¿Cuánto dinero usted gana al mes?
9. ¿Está usted en algún programa que proporciona alimentos para su niño(a) [WIC, rebaja en el almuerzo escolar]?
10. Aproximadamente, ¿qué porcentaje de su ingreso usted gasta en los alimentos?

Preguntas:

1. ¿Qué come su niño(a) regularmente en cada comida del día? ¿Cuáles son las comidas preferidas de su niño(a)?
2. Cuénteme sobre alguna vez en que no tuvo tiempo suficiente para alimentar a su familia.
3. ¿Hay algún alimento que su hijo(a) no come que usted cree que es más nutritivo y saludable que los alimentos que consume en su dieta actual?
4. Por favor enumere cinco alimentos saludables. Por favor enumere cinco artículos de comer que no son saludables.
5. ¿Usted cree que su hijo(a) come saludablemente? ¿Usted cree que es mejor estar flaco que tener sobrepeso? ¿Tiene su niño(a) un peso ideal (adecuado)?
6. ¿Qué usted comía típicamente en cada comida cuando era niño(a)? En su opinión, ¿era esto saludable?
7. ¿Cuántas raciones de verduras y frutas su niño(a) come al día? ¿Es importante para él (ella) que coma estos alimentos?
8. ¿Qué come su niño(a), por lo general, en las meriendas (entre comidas)?
9. ¿Son saludables o no los alimentos salados? ¿Por qué?
10. ¿Cuántas comidas al día come su niño(a)? ¿Son éstas demasiadas o muy pocas?
11. ¿Cómo usted cocina los alimentos de su niño(a) (aceite, manteca)?
12. Cuando su niño(a) está en la casa, ¿con qué frecuencia es usted el (la) responsable de alimentarlo(a)?
13. ¿Come su niño(a) muchas cosas dulces [golosinas (caramelos), helados] y alimentos que no son saludables (comida chatarra)? ¿Es esto bueno o malo?
14. ¿Usted limita algún alimento en la dieta de su niño(a)?
15. Cuénteme sobre alguna vez que haya tenido problemas para comprar alimentos (Ej. financieros, transportación). ¿Pudo haber comprado otros alimentos si hubiese tenido todo el dinero que necesitaba?
16. ¿Come su niño(a) todas las comidas en la casa? Si su respuesta es no, ¿dónde las come?
17. Describa una comida típica de su familia. ¿Comen ustedes en familia? ¿Quiénes están presentes en la mesa durante la cena?
18. ¿A qué hora es la cena?

19. ¿Dónde compra sus alimentos? ¿Está cerca de su casa el supermercado más cercano (con frutas y verduras)? ¿A qué distancia le queda? ¿Cómo llega ahí?