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Accurate Parental Perception as a Milestone in Managing Childhood Obesity

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Accurate Parental Perception as a Milestone in Managing Childhood Obesity

Florence Walusimbi

Culminating Experience

Wright State University

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Abstract

Objective: There were three objectives of this study: to determine the accuracy of parental perception of their child's weight status; to compare parent and child perception of the child's weight status; and, to ascertain if comments from the child's health professional about the child's weight status was related to the accuracy of the parent's perception.

Methods: Using NHANES 2011-2012 data, chi square analysis ($p < 0.05$) and weighted Kappa were used to examine parental perception and accuracy ($n = 2,775$), child perception and accuracy ($n = 1,387$), and comments to parents from a health professional ($n = 2,959$). Secondary analysis examined socio-demographic and lifestyle factors that may be related to accuracy of parental perception ($n = 2,774$). Subgroup analyses were conducted for overweight/obese children ($n = 882$). **Results:** Overall, 24.7% of parents and 29.6% of children underestimated the child's weight status. For overweight/obese children, 60.1% of parents and 60.4% of children underestimated the child's weight status. Almost 90% of parents did not recall a conversation with a health care provider about their child's weight status. The study hypothesis was confirmed that there was significant parental underestimation of child's weight status regardless of child age, gender, race, or household income.

Conclusions: Parents and children need accurate perception of weight status in order to initiate weight management strategies. Improved communication between health professionals and parents of overweight/obese children could assist parents attain accurate perception of their child's weight.

Keywords: weight estimation, health professional comments

Accurate Parental Perception as a Milestone in Managing Childhood Obesity

Childhood obesity is a nationwide problem that has been increasing in prevalence over several decades. Although recent national data suggest that childhood obesity rates in the United States (US) may have been constant for the last few years, the obesity rate in children (ages 2-19 years) are almost three times higher than the rate of four decades ago.

Immediate health effects of childhood obesity include high cholesterol, high blood pressure, joint and bone problems, sleep apnea, and social and psychological problems such as low self-esteem. Obese children are more likely to grow into obese adults who have increased risk of type 2 diabetes, heart disease, stroke, cancers, osteoarthritis and early death.

Factors associated with higher risks of childhood obesity include Black and Hispanic ethnicity, low parental educational level, low income, and single mother head of household. Lifestyle factors associated with high rates of obesity include hours of TV/screen time, amount of physical activity, and nutritional and caloric food intake. In addition to these socio-demographic and lifestyle factors, a child's weight status during early childhood impacts the weight trajectory throughout childhood into adulthood. Moreover, evidence suggests that parents' accurate perception of their child's weight status is a critical prerequisite for addressing childhood obesity. Parents who do not recognize that their child is overweight or obese are not likely to make any changes or take any action to help the child achieve and maintain a healthy weight and lifestyle.

Statement of Purpose

The purpose of this paper is to examine the accuracy of parents' perception of their child's weight status in a nationally representative sample of children and adolescents in the US. Publicly available de-identified data from the 2011-2012 National Health and Nutrition

Examination Survey (NHANES) collected by Centers for Disease Control and Prevention (CDC) was used for all analyses. The key relationship studied was the association between parental perceptions of childhood obesity and actual weight status of their child, as determined by body mass index (BMI). The hypothesis was that there was significant parental underestimation of child's weight status regardless of the child's age or gender, race, or household income.

The three primary study questions were:

- What is the accuracy of parental perception of their child's weight status?
- Is there agreement between parent and child perception of the child's weight status?
- Do comments from a health professional correlate with accurate parental perception of the child's weight status?

The secondary study question was:

- Are the socio-demographic and lifestyle factors related to childhood obesity also related to accuracy of parental perception of their child's weight status?

Literature Review

Definitions for Childhood Obesity

BMI is expressed as weight in kilograms divided by height in meters squared (kg/m^2). BMI is commonly used to classify weight status. For the United States (US), the CDC has established the age- and gender-specific BMI growth charts for children aged 2–19 years. Children with BMI values at or above the 85th percentile and less than the 95th percentile are categorized as overweight, and at or above the 95th percentile are categorized as obese (Ogden, Carroll, Kit, & Flegal, 2013). The World Health Organization (WHO) has developed age- and gender-specific criteria that are used by other countries to categorize child weight status. For children aged zero to five years, BMI values at or above the 97th percentile and less than the 99th

percentile are categorized as overweight, and at or above the 99th percentile are categorized as obese (World Health Organization [WHO], n.d.). For children aged five to nineteen years, the BMI values at or above the 85th percentile and less than the 97th percentile are categorized as overweight, and at or above the 97th percentile are categorized as obese (WHO, n.d.).

Childhood obesity is a public health problem in many developed countries. In the US, recent calculations determined that over one-third of all children, ages 2–19 years, were overweight or obese (Ogden, Carroll, Kit, & Flegal, 2014). Using the WHO definition, in Canada, over 30% of children and adolescents were considered overweight or obese (Canadian Agency for Drugs and Technology in Health, 2013). Studies in Europe and England estimated rates ranging from one quarter to one third of children as overweight or obese (Jones et al., 2011; Lopes, Santos, Pereira, & Lopes, 2013; Regber et al., 2013). Prevalence rates in Australia were slightly lower, with an estimated 20–25% of children and adolescents overweight or obese (Spargo & Mellis, 2014).

Trends in Childhood Obesity

The percentage of overweight and obese children has been steadily increasing for the past 40 years, from 1971-2010. Children and adolescents in the US were taller (on average 2.5 cm) and heavier than their counterparts from the early-1970s (Murasko, 2011). Analyzing data from the Early Childhood Longitudinal Study from 1998–2007, Cunningham, Kramer, and Narayan (2014) found that 12.4% of US children entering kindergarten were already obese, and 14.9% were overweight. According to Cunningham and colleagues (2014), only 13% of overweight kindergarteners became normal weight eighth graders, and 45.3% of overweight kindergarteners became obese eighth graders. The incidence of obesity from kindergarten through eighth grade was four times higher among children who had been overweight in kindergarten than among

children who had a normal weight at that age (Cunningham, Kramer, & Narayan, 2014).

Therefore, excess weight during early childhood tended to lead to overweight and obesity in adolescence. Overweight young children were likely to maintain their weight trajectory and become overweight or obese teenagers. Moreover, there is increasing evidence that excess weight in childhood predicted excess weight in adulthood (Lundahl, Kidwell, & Nelson, 2014).

Factors Influencing Childhood Obesity

In the US, childhood weight status varied by race/ethnicity. The prevalence of childhood obesity was higher for Hispanic (38.9%) and non-Hispanic Black (35.2%) than non-Hispanic White children (28.5%) (Ogden et al., 2014). Mexican-American boys and African-American girls were more likely to be overweight or obese than any other children (Franzini et al., 2009; Ogden et al., 2014; Singh, Kogan, Van Dyck, & Siahpush, 2008). It is during the pre-teen and teen years that ethnic differences in obesity rates became very evident. Using data from a large national longitudinal study, Rendall, Weden, Fernandes, and Vaynman (2012) determined that by eighth grade, about one quarter of Hispanic and Black children were obese, representing a prevalence rate that was 50% higher than for White children. Overweight and obese Hispanic and Black children were less likely to achieve normal weight during pre-teen and teen years than overweight and obese White children (Rendall, Weden, Fernandes, & Vaynman, 2012).

Childhood obesity differed by socio-economic status. There was generally a negative correlation between household income and childhood obesity. Data analyzed from a state-level cross-sectional study and a national longitudinal study revealed that this negative correlation was particularly strong and significant for obese children (Eagle et al., 2012; Jo, 2014). Children in the poorest households were 83% more likely to be obese than children in the wealthiest

households (Singh et al., 2008). Jo (2014) also found that the difference in obesity rates between low and high-income children increased as children age.

Lifestyle factors affected weight status. The amount of leisure time children spent engaged in physical activity or watching TV/videos/computers directly impacted a child's weight. In addition to foregoing more active leisure activities, children often consumed more high calorie/low nutrition food and sugar-sweetened beverages while watching TV, thereby increasing caloric intake without the equivalent energy expenditure (Council on Communications and Media & Strasburger, 2011). The current recommendation is for children over two years old to engage in at least 60 minutes of physical activity each day, and to limit screen time (TV/Video/computer) to less than two hours each day (American Academy of Pediatrics, 2010). However, children ages 8–18 years spent an estimated average of more than seven hours/day in front of a screen, far exceeding the recommended limits (Council on Communications and Media & Strasburger, 2011).

Socio-demographic factors were linked to lifestyle issues. Carlson and colleagues (2010) reported that children of an ethnic minority had lower levels of physical activity and higher levels of TV/screen time than White children. The study revealed that children in families of higher household income spent more time engaged in leisure time physical activity than children in lower income households. Furthermore, Carlson and colleagues (2010) stated that almost 34% of children in lower income households (less than \$25,000 per year) exceeded the recommended TV viewing limits, compared to 21% of children in higher income households (greater than \$75,000 per year). Other studies have had similar results. Eagle et al. (2012) found that children in families with lower household incomes engaged in three times as much screen time as

children in higher income households. In addition, Appelhans et al. (2014) found that more screen time was an important influence on obesity rates for lower income children.

Race/ethnicity, income and education levels affected food consumption patterns. Children in families with lower household incomes consumed twice as much fried food than children in higher household incomes (Eagle et al., 2012). Moreover, a recent review of five NHANES surveys from 1999–2008 determined that Black and Hispanic children and adolescents were more likely to consume sugar-sweetened beverages than White children and adolescents (Han & Powell, 2013). The review also reported that lower household income and lower parental education levels increased the likelihood to consume any sugar-sweetened beverage (Han & Powell, 2013).

Parental Perception of Childhood Obesity

The role of parents was critical in establishing healthy lifestyle habits for their children. Usually, parents determined the meals for the family, and decided leisure time activities. Parental control over food choices and leisure time decreased as the child gets older. However, children of all ages continued to be influenced by their parents' beliefs and decisions throughout their teen years. Given the role of parents in their child's life, successful efforts to address childhood obesity may start with the accurate recognition by parents of excess weight in children. Without accurate recognition, parents will not see a need to make any changes to help their child achieve a healthy weight.

Underestimation of child weight status occurred for all weight groups, underweight, healthy weight, overweight and obese. Underestimating the weight of underweight or healthy weight children could lead to parents encouraging them to eat until weight gain results in overweight status. Underestimation of overweight children could lead to further weight gain into

obesity status. Parental underestimation of child weight status is a global phenomenon that is more pronounced among parents of overweight and obese children (Chen et al., 2014; Lundahl et al., 2014). A recent meta-analytic study by Lundahl, Kidwell, and Nelson reviewed 76 articles in order to determine the extent of parental underestimation of child's weight status, and to identify factors that can influence the misperceptions. The overall rate of parental underestimation of overweight/obese child's weight was 67.5% (Lundahl et al., 2014).

There were a variety of possible explanations for such high rates of parental underestimation of overweight/obese children's weight. Parents may have been unaware of potential health risks to their children or did not want to label their children. Accuracy of parental perception may have been influenced by the child's gender, age, and weight category (overweight or obese). In addition, there have been changing societal norms regarding weight such that parents of an overweight child believed their child to be of a healthy weight because so many other children were also overweight.

Parental perception behavior change model.

The author adapted the Transtheoretical Model (Prochaska, DiClemente, & Norcross, 1992; Mason, Crabtree, Caudill, & Topp, 2008) for the conceptual framework for this study. In the Transtheoretical Model, there are five stages of change: pre-contemplation, contemplation, preparation, action, and maintenance. The Transtheoretical Model is circular. People can exit and re-enter the cycle as their circumstances change. People can also revert to a previous level on the cycle over time. It can take years for a person to move through all five stages of change to maintain behavior change. For this study, the cross-sectional data does not allow for the examination of people's movements over time in and out of the different stages of change.

Parents must play an important part in the reduction of childhood obesity. However, parents of overweight/obese children are at different states of readiness to make behavior changes to decrease their child's weight. Readiness includes accurate perception of their child's weight. Achieving accurate perception and subsequently managing their child's weight occurs in a series of stages. Stages reflect parent's increasing intent and desire to make changes to reduce their child's weight. Moving through the stages, parents would accept that their child is overweight or obese, believe that they can do something to improve their child's weight status, know what to do and have access to necessary resources (such as, nutritious food and physical activity) to implement behavior/lifestyle changes, and have social support (from other family or friends, health or other professional) to maintain lifestyle changes. These stages, illustrated in Figure 1, are described using the Transtheoretical Model constructs.

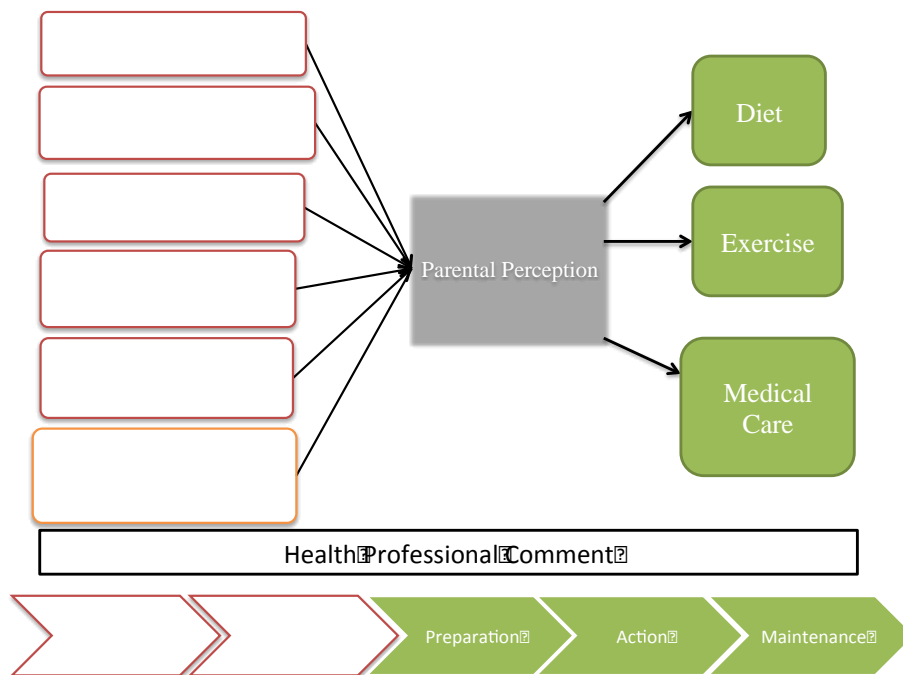


Figure 1. Conceptual model of parental management of child weight status.

Parent action. The early stages of the Transtheoretical Model are pre-contemplation and contemplation during which parents consider the benefits and disadvantages of behavior change. In pre-contemplation, parents do not have accurate perception of their child's weight status and have no intention to change their behavior to help their child achieve and maintain a healthy weight. In the contemplation stage, parents acknowledge the benefits of changing their behavior, but do not yet have a commitment to action. In order to move into the preparation stage, parents must have accurate perception of their child's weight status. For the preparation stage, parents recognize that their child is overweight. This stage marks the intent to change behavior. Parents have increased belief that they can do something to improve their child's weight status (e.g., increased self-efficacy). In the action stage, parents have successfully changed their behavior and are actively assisting their overweight child reach a healthy weight. The maintenance stage marks sustained behavior change for a longer period of time (e.g., six months). In these final two stages, parents may seek support from medical or other professionals to assist in managing their child's weight. The child's health professional can influence parental perception in any of the five stages of change.

Agreement of perception by the parent and child is also important to address weight status. Accuracy of parental perception of their child's weight status seems to improve as children age (Lundahl et al, 2014) and parental perception is more likely to be accurate for children with a higher BMI (e.g., >95th percentile) (Chen et al., 2014; Lundahl et al., 2014). However, as children get older, the influence their parents yield on lifestyle behaviors (food choices, leisure time activities) decreases. Therefore, accurate child perception becomes more important as children move into the teen years.

This study focused on accuracy of parental perception. Parents who underestimate their overweight or obese child are not ready to take any action to help their child reduce weight. Several things, such as their child having social issues, their child not keeping up with other children, or conversations with their child's health professional about weight, can aid accurate perception. The current study addressed only the comments from the health professional. In addition, due to the data available, parent characteristics are not addressed in this study.

Concern about health risks.

When parents underestimated a child's weight status, they may have been less aware or not concerned about potential health consequences. Awareness or knowledge of obesity may be an important precursor to concern about possible health risks. Moore, Harris, and Bradlyn (2012) designed a study to explore the factors that may be associated with parental concern about child's weight and if this concern was associated with specific actions to improve child health. In the study, parents were asked about their knowledge of health risks associated with childhood obesity. Moore et al. (2012) found that obesity knowledge was not significant in parental estimation or concern of child's weight status. However, Chen and colleagues (2014) reported that parental perception was one of the significant predictors for their concerns about child's weight and health.

Feeling concerned about their child's weight may convince parents to manage actively their child's diet and physical activity levels. Parents seemed to be more concerned with their child's social health (such as playing with other children, having friends and being happy) than their child's weight (Goodell, Pierce, Bravo, & Ferris, 2008; Jones et al., 2011). Parents of overweight/obese children who underestimated their child's weight status may have been much less likely to be concerned about health consequences (Tschanler, Conn, Cook, & Halterman,

2010). As a result, the parents were much less likely to make any lifestyle changes or encourage healthier behavior.

Underestimates may not have been so intentional. Qualitative research indicates that parents do not consider their child to be overweight if he or she engaged in physical activity, was not teased about his or her size, and had no obviously threatening health problems (Lundahl et al., 2014; Jones et al., 2011). Alternatively, parents may not have been willing to recognize that their child was overweight because doing so would require that they recognize that they, too, may need to implement healthy lifestyle changes (Lundahl et al., 2014; Moore, Harris, & Bradlyn, 2012).

Fear of social stigma.

Parental underestimation of children's weight status may have been because parents were resistant to labeling or stigmatizing their children. Several studies noted that parents rarely use the term obese when discussing overweight and obesity, even for children with the BMI >95th percentile (Eli, Howell, Fisher, & Nowicka, 2014; Puhl, Peterson, & Luedicke, 2011). Parents considered the clinical terms to be more stigmatizing and blaming the parents. Instead, parents preferred other terms that were more vague yet implied excess weight (Eli et al., 2014; Puhl et al., 2011). Some parents believed discussing excess weight with their children would affect their self-esteem, and that overweight should only be discussed if there is a perceived health or social problem (Eli et al., 2014).

Social stigmatization can take many forms. Overweight and obese boys and girls of all races/ethnicities have experienced negative attitudes because of their weight. Puhl and Latner (2007) reviewed research on weight stigma in children and adolescents. Weight bias can begin as young as age three and become worse throughout childhood. As many as 30% of overweight

girls and 24% of overweight boys reported weight based teasing in middle and high school (Puhl & Latner, 2007). Boys reported more bullying and girls reported more social exclusion. Negative attitudes toward obese youth came primarily from peers. However, teachers and parents also expressed weight bias. The effects of weight stigmatization on youth included lower self-esteem and poor body image. Over time, this could lead to feelings of loneliness, loss of confidence and increasing social isolation (Puhl & Latner, 2007).

Child characteristics.

Several child characteristics may have improved or reduced the accuracy of parental perception. An integrative review of 17 studies (15 cross-sectional and two qualitative) found that child age, gender and ethnicity might have influenced parental perceptions of child weight status (Townes & D'Auria, 2009). The results of the 15 cross-sectional studies included in the integrative review were mixed.

Child gender. The role of gender in accuracy of parental perception varied. In some studies, parents were more likely to underestimate the normal weight of their sons as compared with their daughters (De La O et al., 2009; Spargo & Mellis, 2014). In other studies, mothers were more likely to recognize overweight in daughters than sons (Lundahl et al., 2014; Moore et al., 2012; Wald et al., 2007). Although these findings may have reflected actual differences in body composition for boys and girls, it could also be that these findings reflected what constitutes “ideal” body shapes for both boys and girls (Jones et al., 2011).

Child age. Inaccurate parental perception occurred for children of all ages. Even children as young as two years old were at risk of parental underestimation of their weight status. Parents often considered excess weight as a problem only for older children. Some parents consider “baby fat” as cute and temporary (Eli et al., 2014). Many parents of young children believed

their children will eventually “grow out” of the excess weight and that steady increases in height and weight indicated good parenting and nutrition (Eli et al., 2014; Lundahl et al., 2014; Jones et al., 2011). However, it was more likely that these overweight/obese young children would grow into obese teenagers and adults. A recent large meta-analytic study suggested that parental perceptions seemed to become more accurate as children get older (Lundahl et al., 2014).

Amount of excess weight.

Accuracy of parental estimation varied depending on the amount of excess weight; accuracy generally improved as the amount of excess weight increases. Interestingly, most parents correctly identified an image of a healthy, overweight or obese image but misclassified their own child (Hernandez, Cheng, & Serwint, 2010; Lundahl et al., 2014). Children with a BMI percentile just over the cutoff for overweight were at greater risk for being misclassified as normal weight by parents than those with a higher BMI and, thus, clearly overweight or obese (Lundahl et al., 2014; Tschamler et al., 2010). This was consistent with Chen and colleagues (2014) who reported, utilizing NHANES data from 2007–2010, that overweight children were more likely to be misclassified than obese children.

Several studies have shown parental perception was less accurate for overweight than for obese children. Among normal weight children, the overall rate of parental underestimation was 14.3% (Lundahl et al., 2014), which was much lower than for overweight or obese children. In one study of parents of children up to eight years old, an overwhelming 89.6% of overweight children were misclassified as normal or underweight by their parents (Hernandez et al., 2010). Another study of elementary school children found that all parents of obese children and 75% of parents of overweight children underestimated their child’s weight status (De La O et al., 2009). Chen et al. (2014) reported that about 20% of parents of overweight children accurately

estimated the weight status. However, a large majority, 73% of parents of obese children accurately estimated their weight status (Chen et al., 2014). These results suggested that parents were able to detect obesity in extreme amounts, but not small amounts of overweight (Lundahl et al., 2014).

Changing social norms.

As the percentage of overweight/obese children has increased, the image parents had of a healthy weight child may have changed. Goodell, Pierce, Bravo, and Ferris (2008) reported that parents might have been comparing their child with other children of similar age rather than with an absolute scale, such as BMI or growth charts. Popular media reports regarding childhood obesity often stereotyped overweight children by showing images of severely obese children, a practice that may have distorted parents' understanding of what actually qualifies as overweight (Jones et al., 2011). When looking at parental accuracy over time using data from several NHANES surveys (1988–2010), it seems that there has been a decrease of 24% in parents' accurate perception of overweight status at the same time that the percent of overweight and obese children has increased (Hansen, Duncan, Tarasenko, Yan, & Zhang, 2014). In their study to assess changes in parental perception using nationally representative data, Hansen, Duncan, Tarasenko, Yan, and Zhang (2014) posited that as the prevalence of pediatric obesity has increased, the socially accepted ideal body weight might have also shifted accordingly.

Health professional comments.

Parents and health professionals could be complementary partners in the effort to reduce childhood obesity. Klein and colleagues (2010) analyzed survey responses from a nationally representative sample of board certified pediatricians. In general, pediatricians saw their role as important to the prevention of childhood overweight/obesity. However, they reported insufficient

time for effective weight counseling, and lack of simple diet and exercise recommendations to provide to parents. In fact, pediatricians underused the BMI screening tool (Klein et al., 2010). A study piloted an enhanced BMI screening tool and a rapid assessment questionnaire to gauge physical activity levels and diet for pediatricians to use with parents of overweight/obese children (Perrin et al., 2010). Those parents with whom clinic staff used the new tool had increased accuracy of weight perception, and had improved the consumption of more nutritious snacks and decreased consumption of unhealthy snacks (Perrin et al., 2010).

Regardless of socio-demographic background, several studies have suggested that the lack of effective communication between parents and physicians could have been an important barrier to promote a healthy weight status in a child (Puhl et al., 2011; Perrin, Skinner, & Steiner, 2012). A review of over ten years of NHANES data by Perrin, Skinner, and Steiner (2012) revealed that an increasing percentage of parents reported that a health professional had mentioned their child's overweight/obese weight status. For overweight/obese children, there were 29.1% of parents reporting the health professional's comments. This was a significant increase from the beginning of the ten-year period (Perrin et al., 2012).

Comments from health professionals to parents about child's weight could have been an important step in accurate weight perception. Puhl, Peterson, and Luedicke (2011) reported that parents preferred the physician's office to seek treatment for their child's weight. The conversation between the health professional and parents should be motivating and useful. Words and phrases used by health providers to discuss child's weight that parents consider stigmatizing or blaming did not assist parents to help their child reach and maintain a healthy weight (Puhl et al., 2011). Some parents reported feeling blamed by providers for their children's excess weight and being provided with vague advice or unhelpful suggestions (Puhl et al., 2011).

Terminology from health professionals should be in terms parents can utilize to change behaviors.

Parent characteristics.

Several parent characteristics could have influenced accuracy of perception of their child's weight status. Existing research on this issue illustrated the difficulty in concluding definitively the impact parent characteristics have on parental perception. The extensive integrative review by Towns and D'Auria (2009) found that the parent's weight and race could have affected accuracy of perception of their overweight child's weight. An overweight parent may have underestimated the child's weight perhaps because recognizing the overweight may mean that the parent might have also needed to lose weight (Lundahl et al., 2014). However, in a smaller study, Keller, Olsen, Kuilema, Meyermann, and Belle (2013) found that parents who recognized their own overweight or obese status were more concerned about their child's weight, and more accurately perceived their overweight or obese child's weight. In several studies reviewed by Towns and D'Auria (2009), African American and Hispanic parents favored larger body types or did not view excess weight as a problem for their child. In one review, parent's education level and parent's age were not significant characteristics affecting accuracy of perception (Towns & D'Auria, 2009). However, Keller et al. (2013) found that a lower parental education level led to increased likelihood of underestimating the child's weight.

Methods

Study Description

NHANES studies were designed to assess the health and nutritional status of adults and children in the United States. The NHANES survey was divided into two parts – interviews and examinations. The interviews included demographic, socioeconomic, dietary, and health-related

questions. The physical examinations consisted of medical, dental, and physiological measurements, and laboratory tests. The NHANES program began in the early 1960s with the first survey in 1963. Since then, there have been a series of surveys focusing on different population groups or health topics. In 1999, the survey became a continuous program that examines a nationally representative sample each year. The NHANES 2011-2012 survey included responses from 9,756 individuals. De-identified publicly available data from the NHANES 2011-2012 survey was used for all analyses. The full description of NHANES survey instruments can be found at http://www.cdc.gov/nchs/nhanes/nhanes2011-2012/questionnaires11_12.htm.

Determination of Study Sample

The NHANES 2011-12 data set included responses from 9,756 people, of which 3,575 were children ages 2–19 years. NHANES utilized age-appropriate questionnaires for different age groups. This study focused on children ages 2–15 years. The survey question defining the main study sample was the parents' response to "How do you consider your child's weight?" for ages 2–15 years. A total of 2,959 parents responded to this question. Of these parents, BMI was calculated for 2,775 of their children. The survey question "How do you consider your weight?" was asked of children ages 8–15 years. A total of 1,395 children responded to this question; BMI was calculated for 1,387 of them. Figure 2 summarizes the size of the study sample for the research questions addressed in this study.

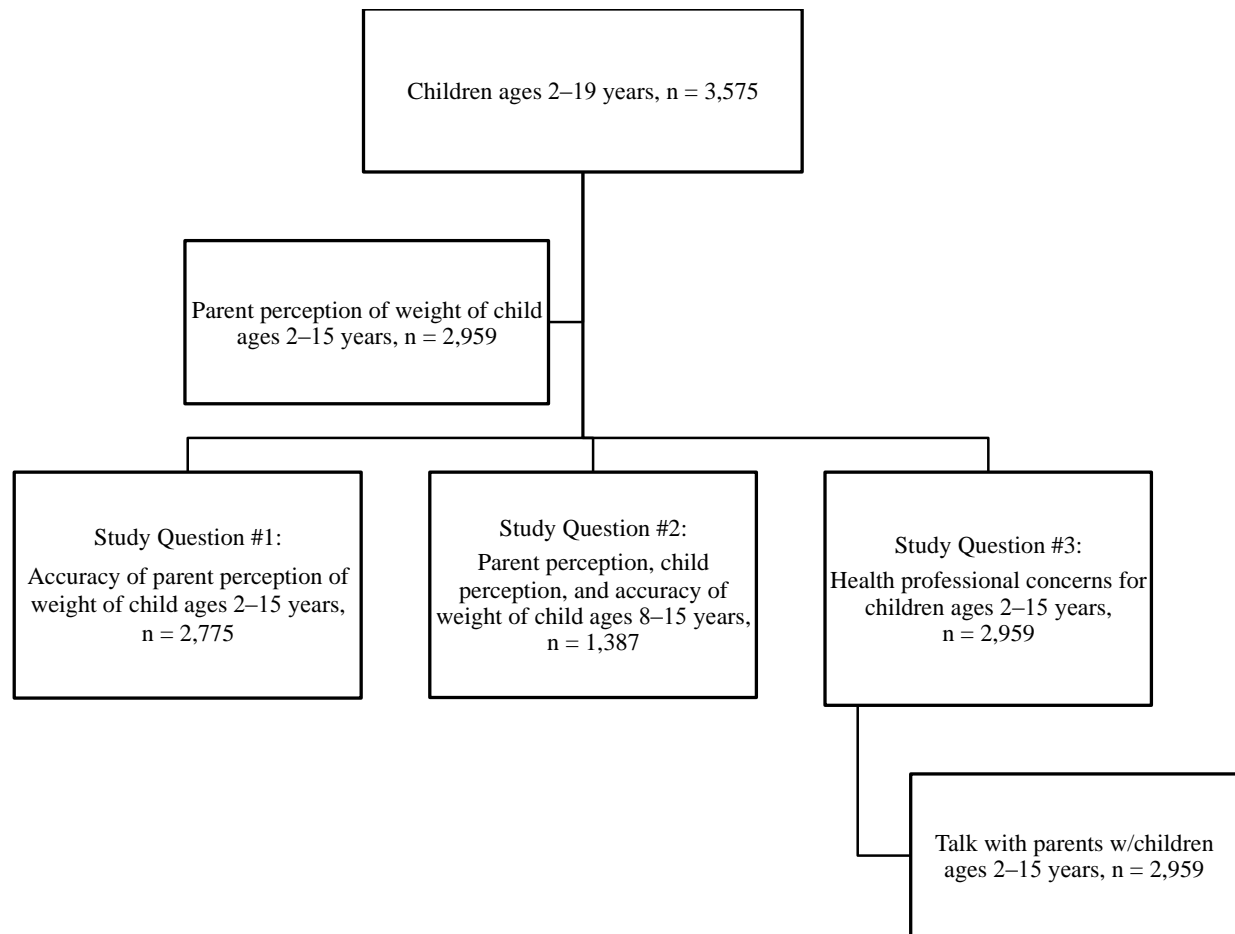


Figure 2. Summary of study sample for the primary research questions.

Data Collection

There were seven topic areas selected from the NHANES 2011-2012 survey (current health status, demographic background, early childhood, health insurance, income, physical activity/physical fitness, and weight history). The first step was to create the appropriate data set and variables from these seven topics. New variables were constructed to consolidate descriptive and lifestyle information. Multiple questions in NHANES for health insurance coverage, physical activity levels, TV/video viewing, and computer use were combined into one variable each to facilitate analysis. Three socio-demographic variables (child gender, race, household income), and weight status according to age-and gender-adjusted BMI (underweight, normal

weight, overweight, obese) for children ages 2–15 years were studied. In addition, analyses were conducted of the verbal description of the parent's and the child's estimation of child's weight status, and if the child's health professional had mentioned to the parent that the child was overweight.

Multiple steps were taken to create the main study variables, being parent and child accuracy of perception of child weight status. In the NHANES survey, parents of children ages 2–15 years were asked for a verbal description of their perception of the child's weight status (too thin, about right, or overweight/obese). The parental response was then compared to the BMI-for-age status for their child. Parental perception was categorized as “underestimate” if the description was in a lower weight category than the child's BMI-for-age. For example, if a parent selected “about right”, but the child's BMI-for-age put the child in the overweight category, this response was coded as “underestimate”. Parental response was categorized as “overestimate” if the parent's description was in a higher category than the child's BMI-for-age. Responses were categorized as “accurate” when the parents' response was consistent with their child's BMI-for-age. Child accuracy for children 8–15 years old was determined using the same process. The variables used for the primary research questions are listed in Table 1.

Table 1

Primary Research Variables: Perception and Accuracy Variables

Variable Name	Description	Categorization of Reponses
Parent_Perception	How do you consider your child's weight, ages 2–15 years	Underweight About right Overweight/obese
ParentAccuracy	How accurate is the parent's perception of the child's weight, ages 2–15 years	Overestimate Accurate Underestimate
DocMention_Parent	Has a doctor/health professional ever told you your child was overweight birth to 15 years	Yes or No
Child_Perception	How do you consider your weight, ages 8–15 years	Too thin About right Overweight/fat
ChildAccuracy	How accurate is the child's perception of his/her own weight status, ages 8–15 years	Overestimate Accurate Underestimate

The secondary research question required the description of the study sample. Analysis was conducted to explore the relationship between the descriptive information (socio-demographic and lifestyle factors) and accuracy of weight perception. Socio-demographic and lifestyle variables used in the study are listed in Table 2.

Table 2

Secondary Research Variables: Socio-demographic and Lifestyle Variables

Variable Name	Description	Categorization of Responses
<u>Socio-Demographic Variables</u>		
ChildAge	Age in years at screening for all ages	Children: $2\text{yrs} \leq \text{Age} < 8\text{yrs}$ Pre-teen: $8\text{yrs} \leq \text{Age} < 12\text{yrs}$ Teen: $12\text{yrs} \leq \text{Age} \leq 15\text{yrs}$
Gender	Gender for all ages	Male or Female
Race	Race/Hispanic origin with Non-Hispanic Asian for all ages	All Hispanics Non-Hispanic white Non-Hispanic black All others, including multi-racial
HH_Income	Annual household income	Low income: $\text{Income} < \$25,000$ Lower middle: $\$25,000 \leq \text{Income} < \$45,000$ Upper middle: $\$45,000 \leq \text{Income} < \$75,000$ High income: $\text{Income} \geq \$75,000$
Child_BMI	BMI category, ages 2–15 years	Underweight: BMI percentile $< 5^{\text{th}}$ percentile Normal weight: 5^{th} percentile $< \text{BMI percentile} < 85^{\text{th}}$ percentile Overweight/obese: BMI percentile $\geq 85^{\text{th}}$ percentile
GenHealth	General health	Excellent/very good Good Fair/poor
HealthIns ^a	Type of health insurance coverage	Uninsured Private insurance Public insurance

Table 2 (cont'd)

<u>Lifestyle Variables</u>		
PhyAct2_12 ^b	Days per week physically active at least 60 minutes, ages 2–11 years	Active less than 7 days/week Active 7 days/week
TotalPhyAct ^b	Moderate or vigorous recreational activities minutes per day or days per week converted to minutes per week	Inactive: Active <10 min/wk Low activity: 10–149 min/wk Sufficient/medium activity: 150–299 min/wk High activity: Active ≥300 min/wk
TV_Video	Hours watch TV or videos past 30 days, ages 2+ years	TV<2hrs 2 hrs≤TV<4 hrs TV≥4 hrs
Computer	Hours use computer past 30 days, ages 2+ years	Computer<2 hrs 2hrs≤Computer<4 hrs Computer≥4 hours

Notes: ^aThe NHANES survey included 13 questions about different types of health insurance. These were merged into one variable, HealthIns, which consolidated health insurance coverage into three categories – public, private, or no insurance.

^bThe NHANES survey included 17 questions about physical activity for people of different ages. For children ages 2–11 years, one question asked for days physically active at least 60 minutes in the past seven days. For ages 12 years and older, 16 questions asked about number of minutes per day of moderate or vigorous recreational activities in a typical week. The new variable consolidated 8 of these responses by age group, Pre-teen (8 years ≤ Age <12 years) and Teen (12 years ≤ Age ≤15 years), into minutes per week of physical activity. The categorization of low, sufficient/medium, or high level of physical activity is based on CDC guidelines (<http://www.health.gov/PAGuidelines/>).

Statistical Analysis

This study involved three primary research questions:

1. How accurate is the parental perception of child weight status, ages 2–15 years? This was determined by cross tabulation of parental perception and actual weight status as determined by age-for-gender BMI. Weighted Kappa was used to test for agreement.
2. Do parents and children perceive the child's weight status similarly, ages 8–15 years? This was determined by a comparison of parent perception and child perception of child weight status, and accuracy of perception of the parent and the child. Weighted Kappa was used to test for agreement.
3. Is there a relationship between a conversation with the parent and a physician or other health professional and accuracy of perception of the child's weight? This was determined by comparing if the health professional had ever mentioned to the parent that the child was overweight and accuracy of perception (research questions #1 and #2 above).

This study involved one secondary question:

1. Are socio-demographic and lifestyle factors that increase risk for childhood obesity related to accuracy of parental or child perception of child's weight status?

The author examined whether there were any risk factors associated with parental underestimation by using chi-square analysis. The association and agreement between parents' or child's perception of the child's weight status and the child's actual BMI were determined by chi-square analysis and weighted Kappa. The direction and strength of association between ordinal variables (e.g., age groups *versus* parent accuracy) was examined using correlation coefficient analysis (i.e., polychoric correlation). There was investigation of whether the

conversation between the child's parents and child's health professional regarding child's weight status played a role in accurate parental perception of the child's weight status. Subgroup analyses were also conducted for overweight/obese children combined, and overweight and obese children separately. In a subset of children (ages 8–15 years), there was examination of whether there was any discrepancy between parental perception and child's perception of their own weight status. Secondary analysis was conducted to determine if any socio-demographic and lifestyle factors related to risk for childhood obesity were also related to accuracy of parental perception of child weight status.

IBM SPSS statistical analysis software version 22 was used for all analyses. The significance level for statistical tests was set at $\alpha=0.05$ (two-tailed). Weighted Kappa range: < 0 = poor agreement; $0 - 0.20$ = slight agreement; $0.21 - 0.40$ = fair agreement; $0.41 - 0.60$ = moderate agreement; $0.61 - 0.80$ = substantial agreement; and $0.81 - 1.0$ = almost perfect agreement.

Results

Descriptive Characteristics of Study Sample

The NHANES 2011-2012 collected a wide range of information to describe the survey respondents. Socio-demographic characteristics are summarized in Table 3. Lifestyle topics are summarized in Table 4. Child weight status, and parent and child perceptions are summarized in Table 5. The main study population is $n=2,959$ children ages 2–15 years. However, not all respondents answered every question. Therefore, the sample size varies for the topics summarized in the tables.

Table 3

Socio-demographic Characteristics of Study Sample (n=2,959)

			Age in Years			p-value
		n (%)	Children 2≤Age<8	Pre-Teens 8≤Age<12	Teens 12≤Age≤15	
Age		2959	1432 (48.4)	869 (29.4)	658 (22.2)	
Gender		2959	1432	869	658	0.752
	Boys	1509 (51.0)	735 (51.3)	434 (49.9)	340 (51.7)	
	Girls	1450 (49.0)	697 (48.7)	435 (50.1)	318 (48.3)	
Race		2959	1432	869	658	0.182
	All Hispanics	929 (31.4)	461 (32.2)	266 (30.6)	202 (30.7)	
	Non-Hispanic White	640 (21.6)	284 (19.8)	211 (24.3)	145 (22.9)	
	Non-Hispanic Black	873 (29.5)	440 (30.7)	249 (28.7)	184 (28.0)	
	All Others	517 (17.5)	247 (17.2)	143 (16.5)	127 (19.3)	
Annual Household Income		2719	1308	806	605	0.003
	Low Income	919 (33.8)	476 (36.4)	275 (34.1)	168 (27.8)	
	Lower Middle Income	689 (25.3)	328 (25.1)	215 (26.7)	146 (24.1)	
	Upper Middle Income	403 (14.8)	180 (13.8)	111 (13.8)	112 (18.5)	
	High Income	708 (26.0)	324 (24.8)	205 (25.4)	179 (29.6)	
Health Insurance		2856	1381	846	629	<0.001
	Uninsured	255 (8.9)	105 (7.6)	88 (10.4)	62 (3.0)	
	Private	1070 (37.5)	479 (34.7)	318 (37.6)	273 (43.4)	
	Public	1531 (53.6)	797 (57.7)	440 (52.0)	294 (46.7)	
General Health, ages 12+yrs		606				-
	Excellent/Very Good	331 (54.6)	-	-	331 (54.6)	
	Good	226 (36.3)	-	-	226 (36.3)	
	Fair/Poor	55 (9.1)	-	-	55 (9.1)	

Table 3 displays overall and age group specific socio-demographic information of the study sample. Nearly half of the study sample was children between two and eight years old. The older age groups were almost equally represented pre-teens between eight and 12 years old (29.4%) and teens between 12 and 15 years old (22.2%). The study sample was almost equally

divided between boys (49.9%) and girls (50.1%). There were approximately one-third each of Hispanic children and non-Hispanic Black children, with slightly less non-Hispanic White children (21.6%) and other races (17.5%). Approximately 40% of the study sample lived in middle-income households (\$25,000 to less than \$75,000 per year), with over one-third in lower income households of less than \$25,000 per year, and over one-quarter in the higher income households of greater than \$75,000 per year. There was a significant difference in distribution of household income levels across age groups (p -value = 0.003). A majority of children in the study sample was covered by some insurance, and over half received public insurance. However, nearly 10% of children in the study were uninsured. There was a significant difference in distribution of type of health insurance coverage across age groups (p -value < 0.001).

Table 4

Lifestyle Characteristics of Study Sample

	n (%)	Age in Years			p-value
		Children 2 ≤ Age < 8	Pre-Teens 8 ≤ Age < 12	Teens 12 ≤ Age ≤ 15	
Physical Activity					
60 min/day, ages 2–11 yrs	2299	1432	868		<0.001
< 7 days	521 (22.7)	255 (17.8)	266 (30.7)	-	
7 days	1778 (77.1)	1177 (82.2)	601 (69.3)	-	
Min/week, ages 12+ yrs				604	-
Inactive	-	-	-	117 (19.4)	
Low activity	-	-	-	79 (13.1)	
Sufficient activity	-	-	-	93 (15.4)	
High activity	-	-	-	315 (52.2)	
TV/Video Use: hours/week	2899	1431	865	603	0.001
Do not watch TV/video	40 (1.4)	22 (1.5)	10 (1.2)	8 (1.3)	
< 2 hours	1067 (36.8)	583 (40.7)	273 (31.6)	211 (35.0)	
2 - 3 hours	1335 (46.1)	613 (42.8)	433 (50.1)	289 (47.9)	
≥ 4 hours	457 (15.8)	213 (14.9)	149 (17.2)	95 (15.8)	

Table 4 (cont'd)

	n (%)	Age in Years			p-value
		Children 2 ≤ Age < 8	Pre-Teens 8 ≤ Age < 12	Teens 12 ≤ Age ≤ 15	
Computer Use: hours/week	2904	1432	868	604	<0.001
Do not use computers	765 (26.3)	554 (38.7)	165 (19.0)	46 (7.6)	
< 2 hours	1509 (52.0)	719 (50.2)	458 (52.8)	332 (55.0)	
2–3 hours	479 (16.5)	121 (8.4)	185 (21.3)	173 (28.6)	
≥ 4 hours	151 (5.2)	38 (2.7)	60 (6.9)	53 (8.8)	

Table 4 summarizes information regarding physical activity and screen time. Parents reported that over three-quarters of children ages 2–11 years had the recommended 60 minutes of physical activity every day. Slightly more than half (52.2%) of the teens reported high levels of physical activity. One-quarter to one-third of all children in the study sample reported the recommended two hours or less of screen time. There was a significant difference in distribution of TV/video viewing (p-value = 0.001) and computer use (p-value <0.001) across age groups.

Table 5

Weight Status, Parent and Child Perception

	n (%)	Age in Years			p-value
		Children 2 ≤ Age < 8	Pre-Teens 8 ≤ Age < 12	Teens 12 ≤ Age ≤ 15	
BMI	2775	1323	827	625	<0.001
Underweight	101 (3.6)	56 (4.2)	26 (3.1)	19 (3.0)	
Normal	1792 (64.6)	933 (70.5)	486 (58.8)	373 (59.7)	
Overweight	387 (14.0)	157 (11.9)	140 (16.9)	90 (14.4)	
Obese	495 (17.8)	177 (13.4)	175 (21.2)	143 (22.9)	
Parent Perception of child weight, ages 2–15 yrs	2959	1432	869	658	<0.001
underweight/too thin	221 (7.5)	118 (8.2)	69 (7.9)	34 (5.2)	
normal weight/about right	2347 (79.3)	1224 (85.5)	634 (73.0)	489 (74.3)	
overweight/obese	391 (13.2)	90 (6.3)	166 (19.1)	135 (20.5)	

Table 5 (cont'd)

	n (%)	Age in Years			p-value
		Children 2≤Age<8	Pre-Teens 8≤Age<12	Teens 12≤Age≤15	
Child perception of own weight, ages 8–15 yrs	1387		794	601	0.001
underweight/too thin	120 (8.7)	-	70 (8.8)	52 (8.7)	
normal weight/about right	1031 (74.3)	-	616 (77.6)	421 (70.0)	
overweight/obese	236 (17.0)	-	108 (13.6)	128 (21.3)	
Comment to parent	2958	1432	868	658	<0.001
Yes	312 (10.5)	93 (6.5)	112 (12.9)	107 (16.3)	
No	2646 (89.4)	1339 (93.5)	756 (87.0)	551 (83.7)	

Table 5 summarizes BMI, parent and child perception of weight status, and comments from the child's health professional regarding the child's weight. Almost one-third of the study sample was overweight/obese. Overall, approximately 14.0% (n=387) of children were overweight and 17.8% (n=495) were obese. Across age groups, children (ages between 2-8 years) had the smallest percentage (25.2%) being overweight/obese in the sample. There was a significant difference in distribution of weight categories across age groups (p-value <0.001). The positive correlation ($r_{\text{polychroic}} = 0.156$, 95% CI: 0.106, 0.206) between age groups and weight status indicated that overweight/obesity was more prevalent in older age groups.

Additional analyses were conducted to examine factors related to increased risk of childhood obesity (race, gender, household income, insurance, TV/Video viewing, and computer use). The analysis for all children found several factors that were significant: race (p-value <0.001); household income (p-value = 0.001); insurance (p-value = 0.011); TV/Video viewing (p-value = 0.007); and computer use (p-value = 0.002). There were significant differences in child weight status (as determined by BMI) across income groups, insurance types, and screen time. Age group analysis revealed different patterns of significant factors. For children, there

were significant differences in weight status for race (p-value <0.001), income (p-value = 0.005), insurance (p-value = 0.011), and computer use (p-value = 0.006). For the pre-teens, there were significant differences in weight status for race (p-value = 0.009), income (p-value = 0.045), TV/Video (p-value = 0.037) and physical activity (p-value = 0.032). For the teens, race was no longer significant (p-value = 0.077), and only gender emerged as a significant factor (p-value = 0.017) associated with weight status.

Nearly 80% of parents perceived their children as normal weight, while 13.2% of parents considered their children as overweight or obese. These percentages were similar to the children's responses. Among children ages 8–15 years, 74.3% perceived themselves as normal weight, and 16.9% perceived themselves as overweight or obese. Only 10.5% of parents reported that a health professional had mentioned their child was overweight or obese.

Research Question #1: Accuracy of Parental Perception

Parental perception by child age groups is summarized in Table 6. Accuracy of parental perception by child age groups is summarized in Table 7.

Table 6

Parental Perception of Child Weight Status (n=2,775)

	n (%)	Underwt	Child BMI Normal Wt	Ovrwt/Ob	p-value	Weighted Kappa
Perception						
All ages	2775	101	1792	882	<0.001	0.464
Underwt	205 (7.3)	42 (41.6)	155 (8.6)	8 (0.9)		
About Right	2200 (79.3)	59 (58.4)	1619 (90.3)	522 (59.2)		
Overwt/Ob	370 (13.3)	0 (0.0)	18 (1.0)	352 (39.9)		
Children	1323	56	933	334	<0.001	0.351
Underwt	111 (8.4)	25 (44.6)	83 (8.9)	3 (0.9)		
About Right	1131 (85.5)	31 (55.4)	845 (90.6)	255 (76.3)		
Overwt/Ob	81 (6.1)	0 (0.0)	5 (0.5)	76 (22.8)		

Table 6 (cont'd)

	n (%)	Child BMI			p-value	Weighted Kappa
		Underwt	Normal Wt	Ovrwt/Ob		
Pre-teens	827	26	486	315	<0.001	0.503
Underwt	65 (7.9)	10 (38.5)	50 (10.3)	5 (1.6)		
About Right	604 (73.0)	16 (61.5)	431 (88.7)	157 (49.8)		
Overwt/Ob	158 (19.1)	0 (0.0)	5 (1.0)	153 (48.6)		
Teens	625	19	373	233	<0.001	0.556
Underwt	29 (4.6)	7 (36.8)	22 (5.9)	0 (0.0)		
About Right	465 (74.4)	12 (63.2)	343 (92.0)	110 (47.2)		
Overwt/Ob	131 (21.0)	0 (0.0)	8 (2.1)	123 (52.8)		

Note: overestimate accurate underestimate

Table 6 presents the comparison between parental perception of his/her child's weight status and actual weight status as determined by BMI. There was a significant difference in distribution of parental perception overall and across age groups (p-values <0.001). Weighted Kappa was conducted to determine if there was agreement between parental perception of the child's weight status and actual BMI. Overall, there was moderate agreement (Kappa = 0.464) between parental perception of child weight status and actual child BMI, with moderate agreement for the older age group (Kappa = 0.556) and fair agreement for the younger age group (Kappa = 0.351).

Table 7

Accuracy of Parent Perception (n=2,775)

Child Age Group	n (%)
All ages (n=2,775)	
Accurate	2,013 (72.5)
Underestimate	685 (24.7)
Overestimate	77 (2.8)
Children (n=1,432)	1,323 (92.4)
Accurate	946 (71.5)
Underestimate	341 (25.8)
Overestimate	36 (2.7)
Pre-teens (n=869)	827 (95.2)
Accurate	594 (71.8)
Underestimate	212 (25.6)
Overestimate	21 (2.5)
Teens (n=658)	625 (95.0)
Accurate	473 (75.7)
Underestimate	132 (21.1)
Overestimate	20 (3.2)

Note: Accurate = parents' description was consistent with actual BMI; Underestimation = parents' description was a lighter category than actual BMI; Overestimation = parents' description heavier than actual BMI.

Table 7 summarizes parent perception categories by child age group. Overall, 72.5% of parents accurately perceived their child's weight status. Parents of teens had a lower rate of parental underestimation (21.1%) than the youngest age group (24.7%). However, there was no statistically significant association between age groups and parent accuracy ($r_{\text{polychroic}} = -0.052$, 95% CI: -0.105, 0.001). Age groups were not correlated to parental accuracy.

Additional subgroup analysis of only parents of overweight/obese children was conducted. Of the 882 children categorized as overweight/obese, 39.9% of parents had accurate perception of their child's weight status, and 60.1% of parents underestimated their child's

weight status. Of the 387 overweight children, only 15.3% of parents had accurate perception of their child's weight status while 84.7% of parents underestimated the weight status (p-value <0.001). Among 495 obese children, 59.2% of parents had accurate perception of their child's weight status and 40.8% underestimated the weight status (p-value <0.001).

Secondary analysis of socio-demographic and lifestyle factors (child age, child gender, child race, household income, health insurance, TV/Video screen time, and computer use) was conducted. These factors were examined to determine their relationship to accuracy of parental perception. Each factor was considered separately. Of these factors, only child race was significantly related to parental accuracy (p-value = 0.029). When the same analyses were conducted by age group, none of the factors examined were significantly related to parental accuracy (all p-values >0.05). Therefore, in this study, none of the factors associated with an increased risk of obesity were related to accuracy of parental perception.

Research Question #2: Parental Perception and Child Perception of Child's Weight Status

Detailed information regarding child perception is provided in Table 8. Accuracy of child perception is summarized in Table 9. Comparison of parental perception and child perception is summarized in Table 10. Comparison of accuracy of parental perception and accuracy of child perception is summarized in Table 11.

Table 8

Child Perception of Child Weight Status (n=1,387)

		Child BMI			p-value	Weighted Kappa
		Underwt	Normal Wt	Ovrwt/Ob		
Child Perception	n (%)					
Pre-teens and Teens	1387	44	818	525	<0.001	0.414
Underwt	120 (8.7)	17 (38.6)	93 (11.4)	10 (1.9)		
About Right	1031 (74.3)	27 (61.4)	697 (85.2)	307 (58.5)		
Ovrwt/Ob	236 (17.0)	0 (0.0)	28 (3.4)	208 (39.6)		
Pre-teens	791	26	466	299	<0.001	0.343
Underwt	69 (8.7)	6 (23.1)	57 (12.2)	6 (2.0)		
About Right	614 (77.6)	20 (76.9)	396 (85.0)	198 (66.2)		
Ovrwt/Ob	108 (13.7)	0 (0.0)	13 (2.8)	95 (31.8)		
Teens	596	18	352	226	<0.001	0.504
Underwt	51 (8.6)	11 (61.1)	36 (10.2)	4 (1.8)		
About Right	417 (70.0)	7 (38.9)	301 (85.5)	109 (48.2)		
Ovrwt/Ob	128 (21.5)	0 (0.0)	15 (4.3)	113 (50.0)		

Note: overestimate accurate underestimate

Table 8 summarizes the child's perception (ages 8–15 years) of his/her own weight status. Overall, about three-quarters of the study sample considered their weight about right. Few pre-teens (13.7%) considered themselves overweight/obese, and a higher percentage of teens (21.5%) considered themselves overweight/obese. There was a significant difference in distribution of child perception overall and across age groups (p-values <0.001). There was moderate agreement overall (Kappa = 0.414), and fair agreement (0.343) for pre-teens, between child perception of weight status and actual BMI.

Table 9

Accuracy of Child Perception, Ages 8–15 Years (n=1,387)

Child Age Group		n (%)
Pre-teens and Teens (n=1,387)		
	Accurate	922 (66.5)
	Underestimate	410 (29.6)
	Overestimate	55 (4.0)
Pre-teens	(n=791)	
	Accurate	497 (62.8)
	Underestimate	261 (33.0)
	Overestimate	33 (4.2)
Teens	(n=596)	
	Accurate	425 (71.3)
	Underestimate	149 (25.0)
	Overestimate	22 (3.7)

Note: Accurate = children's description was consistent with actual BMI; Underestimation = children's description was a lower category than actual BMI; Overestimation = children's description higher than actual BMI.

Table 9 summarizes accuracy of the child perception categories by age groups. Overall, about two-thirds (66.5%) of the study sample accurately perceived their weight status, with the highest percentage of accuracy (71.3%) among teens. Among the pre-teens, one-third underestimated their weight status, while only one quarter of the teens underestimated their weight status. There was statistically significant association between age groups and child's accuracy of their weight status ($r_{\text{polychroic}} = -0.106$, 95% confidence interval (CI): -0.185, -0.026). This means the age group of the child had a negative relationship with child's perception of his/her own weight status. Pre-teens were more likely to underestimate their weight status than teens.

In a subgroup analysis of overweight/obese children, over 60% underestimated their weight status. A larger proportion (50.0%) of overweight/obese teens in the study sample accurately perceived their weight than the overweight/obese pre-teens (31.8%). Among overweight children, only 20.6% of children had accurate perception of their own weight status while 79.4% of children underestimated the weight status ($p\text{-value} < 0.001$). Among obese children, 53.6% of children had accurate perception of their own weight status and 46.4% underestimated the weight status ($p\text{-value} = 0.206$).

Secondary analysis of socio-demographic and lifestyle factors (child age, child gender, child race, household income, health insurance, TV/Video screen time, and computer use) was conducted. These factors were examined to determine their relationship to accuracy of child perception. Each factor was considered separately. Of these factors, only child age ($p\text{-value} = 0.004$) and health insurance ($p\text{-value} = 0.029$) were significantly related to child accuracy. This analysis was also conducted by age group. For the pre-teens, none of the factors were significantly related to accuracy of perception (all $p\text{-values} > 0.05$). The results were similar for the teens. However, for the teens, health insurance was related, though did not meet criteria for significance ($p\text{-value} = 0.069$).

Table 10

Parent Perception and Child Perception of Child Weight Status (n=1,387)

	n (%)	Parent Perception			p-value	Weighted Kappa
		Underweight	About Right	Overwt/Obese		
Child Perception						
Pre-Teens and Teens	1387	90	1023	274	<0.001	0.466
Underweight	120	29 (32.2)	85 (8.3)	6 (2.2)		
About Right	1031	57 (63.3)	863 (84.4)	111 (40.5)		
Overwt/Obese	236	4 (4.4)	75 (7.3)	157 (57.3)		
Pre-teens	791	63	580	148	<0.001	0.458
Underweight	69	16 (25.4)	50 (8.6)	3 (2.0)		
About Right	614	44 (69.8)	500 (86.2)	70 (47.3)		
Overwt/Obese	108	3 (4.8)	30 (5.2)	75 (50.7)		
Teens	596	27	443	126	<0.001	0.510
Underweight	51	13 (48.2)	35 (7.9)	3 (2.4)		
About Right	417	13 (48.2)	363 (81.9)	41 (32.5)		
Overwt/Obese	128	1 (3.7)	45 (10.2)	82 (65.1)		

Table 10 describes the differences between parental and child perceptions of the child's weight status. There was a significant difference in distribution of child perception and parent perception across age groups (p-values <0.001). Parents and children had the highest percentage of agreement for those children considered about the right weight status (84.4% overall). For all children perceived as overweight or obese children, 57.3% of parents and children had the same perception of the child's weight status. This percentage was higher for teens, whereby 65.1% of parents and children had the same perception. Overall, there was moderate agreement (Kappa = 0.466) between parental perception of child weight status and children's perception of their own weight status, with moderate agreement for both pre-teen (Kappa = 0.458) and teen (Kappa = 0.510) groups.

Table 11

Parental Accuracy and Child Accuracy of Child Weight Status (n=1,387)

	n (%)	Parental Accuracy			p-value	Weighted Kappa
		Accurate	Underestimate	Overestimate		
Child Accuracy						
Pre-teens and						
Teens	1387	1015	332	40	<0.001	0.335
Accurate	922	803 (79.1)	102 (30.7)	17 (42.5)		
Underestimate	410	182 (17.9)	228 (68.7)	0 (0)		
Overestimate	55	30 (3.0)	2 (0.6)	23 (57.5)		
Pre-teens	791	566	204	21	<0.001	0.340
Accurate	497	434 (76.7)	58 (28.4)	5 (23.8)		
Underestimate	261	116 (20.5)	145 (71.1)	0 (0)		
Overestimate	33	16 (2.8)	1 (0.5)	16 (76.2)		
Teens	596	449	128	19	<0.001	0.322
Accurate	425	369 (82.2)	44 (34.4)	12 (63.2)		
Underestimate	149	66 (14.7)	83 (64.8)	0 (0)		
Overestimate	22	14 (3.1)	1 (0.8)	7 (36.8)		

Table 11 compares parental and child accuracy. Over half of all parents and children (n=803) had accurate weight perception. Among the 332 parents who underestimated their child's weight status, two-thirds concurred with the child's underestimation. Overall, there was fair agreement (Kappa = 0.335) between parental accuracy of child weight status and children's accuracy of their own weight status, with fair agreement for both pre-teen (Kappa = 0.340) and teen (Kappa = 0.322) groups. Subgroup analysis was conducted for overweight/obese pre-teens and teens. Overall, almost one-third (29.1%) of parents and pre-teens/teens had accurate perception. A larger percentage (39.8%) of parents and pre-teens/teens underestimated the weight status. Among overweight pre-teens and teens (n=223), 9.9% of parents and pre-teens/teens had accurate perception. About two-thirds of parents and children underestimated the

child's weight status. Among obese pre-teens and teens (n=302), more than 43% (n=131) of parents and children accurately perceived child's weight status.

Research Question #3: Parental Perception in Relation to Health Professionals' Comment

Table 12 describes the accuracy of parental perception by age groups in relation to comments from a health professional.

Table 12

Accuracy of Parent Perception and Comment from Health Professional (n=2,774)

		Accuracy of Parent Perception			
		n (%)	Accurate	Underestimate	Overestimate p-value
Health Professional Comment					
All ages		2774	2012	685	77 0.091
Yes	294 (10.6)	227 (11.3)	63 (9.2)	4 (5.2)	
No	2480 (89.4)	1785 (88.7)	622 (90.8)	73 (94.8)	
Children					
		1323	946	341	36 0.098
Yes	82 (6.3)	52 (5.5)	29 (8.5)	1 (2.8)	
No	1242 (93.8)	894 (94.5)	312 (91.5)	35 (97.2)	
Pre-teens					
		826	593	212	21 <0.001
Yes	108 (13.1)	97 (16.4)	11 (5.2)	0 (0.0)	
No	718 (86.8)	496 (83.6)	201 (94.8)	21 (100.0)	
Teens					
		625	473	132	20 0.949
Yes	104 (16.6)	78 (16.5)	23 (17.4)	3 (15.0)	
No	521 (83.4)	395 (83.5)	109 (82.6)	17 (85.0)	

There were no significant differences between distribution of parent accuracy and comments about child's overweight from a health professional overall. However, for pre-teens, comments from a health professional were related to the accuracy of parental perception (p-value

<0.001). Overall, few parents (10.6%) recalled a comment from a health professional; the low recall did not vary by accuracy of perception. The percentage of parents reporting that the health professional had not mentioned their child was overweight was highest (93.8%) for children and lowest (83.4%) for teens. Subgroup analysis of 881 overweight/obese children resulted in a majority of parents (n=622, 70.6%) recalling that their child's health professional had not mentioned that their child was overweight or obese. Of the remaining 29.4% (n=259) of parents who reported that a health professional had mentioned that their child was overweight or obese, 78.0% (202) accurately perceived their child's weight status.

Among overweight children of all ages (n=386), a majority of parent (n=334, 86.5%) recalled that their child's health professional had not mentioned overweight or obese. Of the remaining 13.5% (n=52) of parents who reported the health professional's comment, 46.2% accurately perceived their child's weight status. Among obese children of all ages (n=495), fewer parents reported that their child's health professional had not mentioned overweight/obese (n=288, 58.2%). Of the remaining 41.8% (n=207) of parents who reported the health professional's comment, 86.0% (n=178) accurately perceived their child's weight status.

Discussion

Utilizing NHANES 2011-2012, the present study aimed to determine the accuracy of parental perception of their child's weight status, to compare parent and child perception of the child's weight status, and to examine if comments from the child's health professional about the child's weight were associated with the accuracy of the parent's perception.

The main findings were that approximately one-quarter of parents underestimated his/her child's weight status. There was fair agreement (weighted kappa = 0.475) between parent and

child perception of the child's weight status. There was no association between comments on child's weight status by the child's health professional and parents' accuracy.

Overall overweight/obesity rates for this study sample reflected national childhood overweight/obesity rates which differed by age group. The youngest age group had the lowest percentage with about one-quarter in the overweight/obese category. For both pre-teens and teens, over one-third were overweight/obese. As expected, for the overall study sample (ages two to 15 years), all socio-demographic and lifestyle factors that were examined, except child gender, were associated with weight status categories.

Accuracy of Parental Perception

About two-thirds of the children in this study sample were of normal weight. However, a larger majority of parents (79.3%) considered their children to be of normal weight. Only 13.2% of parents considered their children to be overweight/obese. This is in sharp contrast to the 31.8% of children with a BMI in the overweight/obese category. Overall, for the entire study sample, 72.5% of parents accurately perceived their child's weight status, while 24.7% underestimated and 2.8% overestimated. These results were consistent with the two previous NHANES surveys (2007-2008, 2009-2010) in which 73.7% of parents had accurate perception of their child's weight status, while 25.2% of parents underestimated, and only 1.1% overestimated (Chen et al., 2014).

Accurate parental weight perception was particularly important for overweight/obese children. In the subgroup of overweight/obese children in this study sample, nearly 60% of parents underestimated the child's weight status. These parents responded the child being normal weight even though the child was overweight/obese. Parents of overweight children were most likely to underestimate their child's weight status (Lundahl et al., 2014; Tschamler et al., 2010).

In the two previous NHANES surveys, only about 20% of parents of overweight children had accurate perception, and nearly three-quarters of parents of obese children had accurate perception (Chen et al., 2014). In this study, similar to the previous NHANES surveys, 15% of parents of overweight children accurately perceived the child's weight status while about 60% of parents of obese children had accurate perception. Even though the parental accuracy was constructed based on a combined category of 'overweight/obese' according to the NHANES survey question, these results suggest that parental misperception for overweight children may be higher than in obese children. Although a small number, nearly 1% of parents reported their overweight/obese child's weight as underweight. Since the parent perception question in the 2011-2012 NHANES survey combined the overweight/obese categories, the author proposed that this small number of parents may have had children that were just above the cut-off for overweight, and therefore, their parents did not perceive any excess weight and instead believed their child to be underweight.

Several factors associated with increased risk for childhood obesity (child age, child gender, child race, household income, health insurance, TV/Video screen time, and computer use) were examined for association with accuracy of parental perception. None of these risk factors were significantly associated with accuracy of parental perception. This confirmed the author's hypothesis that parental underestimation of weight status occurs regardless of any socio-demographic or lifestyle factors.

Accuracy of Child Perception

More pre-teens and teens were prone to underestimation than their parents. Overall, about one-third of the pre-teens and teens surveyed were overweight or obese. However, nearly three-quarters of them considered their weight about right. The overall rate of child underestimation

(29.6%) was higher than parental underestimation (24.7%). Pre-teens in the study sample were more likely to underestimate their weight status than teens. About one-third of pre-teens underestimated their weight status compared to one-quarter of teens.

These results were consistent with other studies. Chen and colleagues (2014) reported that 27.3% of children underestimated their weight status. Misperception of weight status was more common among overweight than obese youth. A much larger number (nearly 75%) of overweight children underestimated their weight status. However, more than half of obese children accurately estimated their weight status (Chen et al., 2014). Similar to NHANES 2007-2010, a large number (~80%) of overweight pre-teens and teens in the present study underestimated their weight status while a little more than half of obese pre-teens and teens underestimated their weight status.

Agreement Between Parent and Child Perception

Parents and children ought to agree on perception in order to work together to help the child achieve a healthy weight. In this study, slightly more than half of the parents and children had the same perception for overweight/obese children. For teens, almost two-thirds of parents and children had the same perception. Since parental perception tended to improve as the child grows older (Lundahl et al., 2014), the author expected the higher agreement among teens and their parents.

Subgroup of overweight/obese pre-teens and teens revealed that about one-third of parents and children accurately perceived the child's weight status. However, nearly 40% of parents and pre-teens/teens underestimated the child's weight status. In this study, agreement between parent and child perception occurred most often in the underestimation category of weight status of overweight/obese children. While there was no study available to compare these

results, this study found the underestimation by parent and child was greater for overweight than obese pre-teens and teens. This result suggests that an intervention should emphasize improving both parent and child perception not only for obese children, but also for overweight children and those at risk of overweight.

Public Health Implications

Parents and health professionals should work together to reduce childhood obesity. Pediatricians are well placed to counsel parents about their child's weight management. A survey of members of the American Academy of Pediatrics confirmed that pediatricians considered their role as important for preventing childhood overweight/obesity (Klein et al., 2010). However, pediatricians reported that they did not have adequate tools or sufficient time to effectively counsel families about weight loss strategies (Klein et al., 2010). An enhanced pediatrician's tool kit that includes a rapid assessment tool for physical activity, nutrition, and weight counseling, such as discussed by Perrin and colleagues (2010), could enable health professionals to more efficiently discuss weight status with families, and more effectively provide weight management counseling.

Moreover, parents reported that pediatricians were respected as important sources of information about weight management (Hernandez et al., 2010; Puhl et al., 2010). However, in the present study, an overwhelming majority of parents (89.4%) did not recall a conversation with their child's health professional about their child's overweight status. In addition, many parents of overweight/obese children did not report comments from a health professional about their child's excess weight. In this study sample, only 29.4% of parents of overweight/obese children reported that a health professional had mentioned that their child was overweight. This was consistent with other studies in which 22.4 % of parents of overweight children and 58% of

parents of severely obese children reported having been told by a health professional that their child had excess weight (Perrin et al., 2012). Other studies also concluded that most parents did not report conversations about excess weight with their child's health provider (Hernandez et al., 2010; Perrin et al., 2012).

The absence of a pediatrician's comment on their child's weight status has been identified as one of the strongest predictors of parental misclassification of their child's weight (Hernandez et al., 2010; Lundahl et al., 2014). On the other hand, parents reporting the conversation with health professionals seem to better identify their child's weight status. In this study, of those parents reporting a comment from a health professional, over three-quarters accurately perceived their child's weight status.

Health professionals should be discussing child growth and weight status for all children. Given the health concerns related to childhood overweight/obesity, it is important for health professionals to identify and discuss excess weight, especially in younger children. Overall, only 10.6% of parents in this study reported any comment from a health professional about their child's weight. This percentage was the lowest (6.3%) for young children and the highest for teens (16.6%). For the overweight/obese subgroup, 29.4% of parents recalled that a health professional had mentioned their child's excess weight. The percentage was lowest for children (26.6), then teens (35.1%), and highest for pre-teens (38.2%). Educating parents that excess weight can emerge in young children could have the greatest impact on preventing obesity in pre-teen, teen and adult years (Hernandez et al., 2010).

Limitations

There were several limitations to this present study. In the NHANES survey question for parental perception of child's weight, the parents' response for overweight and obese children

were grouped together. Therefore, the author could not examine parental response for overweight and obese children separately. Several studies have suggested that parental perception is more accurate for obese children than for slightly overweight children. Furthermore, interventions for parents and families would differ for someone with the BMI in 80-85th percentile versus the BMI greater than 95th percentile. The adult proxy was not identified. Therefore, in the analyses, the author could not separate maternal perception from other proxy adults. Some parental socio-demographic information was not included in the NHANES survey. Race and parent education level are two important risk factors associated with childhood obesity and could affect accuracy of parental perception. Lastly, the data collected through self-reporting could be affected by recall or social desirability bias. For example, physical activity could be unintentionally over-reported, and screen time information could be unintentionally under-reported.

Conclusions

Childhood obesity rates have increased steadily for over 40 years. Efforts to reduce childhood obesity could be more effective if they target parents who have the largest influence on their child's eating habits and physical activity levels. Parental action to address their child's overweight/obesity status begins with the parent realizing that the child has excess weight. The author found that the parental underestimation of child's weight status was prevalent in US population based on NHANES 2011-2012. This high rate of underestimation existed regardless of child age, gender, and household income levels. Literature suggested that reasons for parental underestimation included lack of awareness of negative health consequences, belief that children outgrow excess weight, fear of stigmatizing their child, and changing social norms regarding what image constitutes a healthy weight. Obesity prevention or weight reduction interventions should endeavor to address parental misperceptions of child weight status. Although health

professionals are well placed to assist parents in identifying excess weight in their child, this study showed that parents do not recall having conversations with their child's health professional about their child's weight gain. Improved communication between health professionals and parents of overweight/obese children about the child's excess weight may assist parents to attain accurate perception of their child's weight status.

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Appendices

- A. CITI Training Certificates
- B. IRB Exemption Approval
- C. Competencies Checklists
- D. Concentration Competencies Summary

Appendix A: CITI Training Certificates**COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)
RESPONSIBLE CONDUCT OF RESEARCH & COI CURRICULUM COMPLETION REPORT**
Printed on 08/20/2014

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CONFLICTS OF INTEREST AND COMMITMENT

COURSE/STAGE: Basic Course/1
PASSED ON: 06/26/2014
REFERENCE ID: 13329068

ELECTIVE MODULES	DATE COMPLETED	SCORE
Conflicts of Interest (RCR-Biomed)	06/25/14	5/6 (83%)
Part II (WSU) - Financial Conflicts of Interest in Research	06/26/14	1/1 (100%)

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiler Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

Collaborative Institutional
Training Initiative
at the University of Miami

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)**HUMAN RESEARCH CURRICULUM COMPLETION REPORT**

Printed on 08/20/2014

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COURSE/STAGE: Basic Course/1
PASSED ON: 07/17/2014
REFERENCE ID: 13329067

REQUIRED MODULES	DATE COMPLETED	SCORE
Recognizing and Reporting Unanticipated Problems Involving Risks to Subjects or Others in Biomedical Research	06/30/14	5/5 (100%)
Cultural Competence in Research	06/30/14	5/5 (100%)
Students in Research	07/02/14	10/10 (100%)
History and Ethical Principles - SBE	06/26/14	5/5 (100%)
Defining Research with Human Subjects - SBE	06/26/14	5/5 (100%)
The Regulations - SBE	07/03/14	5/5 (100%)
Assessing Risk - SBE	07/03/14	5/5 (100%)
Informed Consent - SBE	07/03/14	5/5 (100%)
Privacy and Confidentiality - SBE	07/06/14	5/5 (100%)
Research with Prisoners - SBE	07/06/14	4/4 (100%)
Research with Children - SBE	07/07/14	4/4 (100%)
Research in Public Elementary and Secondary Schools - SBE	07/07/14	4/4 (100%)
International Research - SBE	07/07/14	3/3 (100%)
Internet Research - SBE	07/16/14	5/5 (100%)
Research and HIPAA Privacy Protections	07/16/14	5/5 (100%)
Vulnerable Subjects - Research Involving Workers/Employees	07/17/14	4/4 (100%)
Conflicts of Interest in Research Involving Human Subjects	07/17/14	3/5 (60%)
Wright State University	06/26/14	No Quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
 Professor, University of Miami
 Director Office of Research Education
 CITI Program Course Coordinator

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)**HUMAN RESEARCH CURRICULUM COMPLETION REPORT**

Printed on 08/20/2014

LEARNER Florence Walusimbi (ID: 4226567)
PHONE 937-258-5547
EMAIL florence.walusimbi@wright.edu
INSTITUTION Wright State University
EXPIRATION DATE 06/25/2017

EXEMPT OTHERS

COURSE/STAGE: Basic Course/1
PASSED ON: 06/26/2014
REFERENCE ID: 13329069

REQUIRED MODULES	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction	06/26/14	3/3 (100%)
History and Ethical Principles - SBE	06/26/14	5/5 (100%)
Defining Research with Human Subjects - SBE	06/26/14	4/5 (80%)
Wright State University	06/26/14	No Quiz

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Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

Collaborative Institutional
Training Initiative
at the University of Miami

Appendix B: IRB Exemption Approval

Office of Research and Sponsored Programs
201J University Hall
3640 Col. Glenn Hwy.
Dayton, OH 45435-0001
(937) 775-2425
(937) 775-3781 (FAX)
e-mail: rsp@wright.edu

DATE: November 26, 2014

TO: Florence Walusimbi, PI, Graduate Student
Community Health
Miryong Lee, Ph.D., Faculty Advisor

FROM: Julie Carstens, M.P.A. *JMC*
Director of Compliance, WSU-IRB

SUBJECT: SC# 5702

'Parental Perception of Childhood Obesity in National Health and Nutrition Examination Survey (NHANES) 2011-2012'

At the recommendation of the IRB Chair, your study referenced above has been determined to meet Federal exemption criteria 45 CFR 46.101(b)(4). **Please note that any change in the protocol must be reviewed by the IRB, as the project may no longer be exempt.**

Please note if your research is being conducted at a facility other than Wright State University, you must have approval from that facility in order to proceed.

This action will be reported to the Full Board at their next scheduled meeting.

If you have any questions or require additional information, please call Jodi Blacklidge, Program Facilitator at 775-3974.

Thank you!

Enclosure

Appendix C: Competencies Checklists

Tier 1 Core Public Health Competencies

Domain #1: Analytic/Assessment Skills
Identifies quantitative and qualitative data and information (e.g., vital statistics, electronic health records, transportation patterns, unemployment rates, community input, health equity impact assessments) that can be used for assessing the health of a community
Uses information technology in accessing, collecting, analyzing, using, maintaining, and disseminating data and information
Selects valid and reliable data
Identifies gaps in data
Describes public health applications of quantitative and qualitative data
Uses quantitative and qualitative data
Describes how evidence (e.g., data, findings reported in peer-reviewed literature) is used in decision making
Domain #2: Policy Development/Program Planning Skills
Identifies current trends (e.g., health, fiscal, social, political, environmental) affecting the health of a community
Domain #3: Communication Skills
Identifies the literacy of populations served (e.g., ability to obtain, interpret, and use health and other information; social media literacy)
Conveys data and information to professionals and the public using a variety of approaches (e.g., reports, presentations, email, letters)
Communicates information to influence behavior and improve health (e.g., uses social marketing methods, considers behavioral theories such as the Health Belief Model or Stages of Change Model)
Domain #4: Cultural Competency Skills
Describes the diversity of individuals and populations in a community
Describes the ways diversity may influence policies, programs, services, and the health of a community
Domain #6: Public Health Sciences Skills
Describes the scientific foundation of the field of public health
Describes how public health sciences (e.g., biostatistics, epidemiology, environmental health sciences, health services administration, social and behavioral sciences, and public health informatics) are used in the delivery of the 10 Essential Public Health Services
Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making
Recognizes limitations of evidence (e.g., validity, reliability, sample size, bias, generalizability)
Domain #8: Leadership and Systems Thinking Skills
Describes the ways public health, health care, and other organizations can work together or individually to impact the health of a community
Contributes to development of a vision for a healthy community (e.g., emphasis on prevention, health equity for all, excellence and innovation)
Describes needs for professional development (e.g., training, mentoring, peer advising, coaching)

Public Health Management Competencies
Have a knowledge of strategy and management principles related to public health and health care settings
Be capable of applying communication and group dynamic strategies to individual and group interaction
Know effective communication strategies used by health service organizations
Have an understanding of organizational theory and how it can be utilized to enhance organizational effectiveness
Have a knowledge of leadership principles
Know change management principles
Have a knowledge of successful program implementation principles
Have a knowledge of strategies used for monitoring, evaluating, and continuously improving program performance
Be capable of applying decision-making processes
Have a knowledge of systems thinking principles
Have an awareness of strategies for working with stakeholders to determine common and key values to achieve organizational and community goals
Know strategies for promoting teamwork for enhanced efficiency
Have an understanding of effective mentoring methods
Be able to assess and resolve internal and external organizational conflicts
Be able to use negotiation techniques
Be able to determine how public health challenges can be addressed by applying strategic principles and management-based solutions
A knowledge of the finance and accounting skills needed for operational management, performance assessment, and forecasting
The ability to develop a departmental budget
A knowledge of ethical principles relative to data collection, usage, and reporting results
An awareness of ethical standards related to management
A knowledge of ethical standards for program development
The ability to write grants to secure external funding

Appendix D: Concentration Competencies Summary

The Culminating Experience (CE) built on my Practice Placement (PP) that was the analysis of data related to parental perception of childhood obesity collected through the SOAR-Net network of pediatric offices in SW Ohio. The CE is applied epidemiology, using existing nationally representative data from NHANES 2011-2012. The CE required that I complete the CITI Training in Responsible Conduct of Research and Conflicts of Interest Curriculum (2 modules), Human Research Curriculum Exempt Others (4 modules), and Human Research Social/Behavioral Investigator (18 modules). These sessions built on previous coursework and were informative. Through the CE, I enhanced my knowledge of ethical principles relative to data collection, usage, and reporting results.

I feel I have had a thorough exposure to all aspects of public health research – data collection, analysis, and dissemination – and how results are incorporated into future health planning. In addition, through the literature review, I understand how qualitative and quantitative analyses complement each other and strengthen public health programming. The CE complimented my coursework and provided me with knowledge, skills, and abilities to enter the public health field. When in a leadership role, I will be able to understand and apply quantitative statistical analytical skills to other domains, e.g. financial management.