Reducing Childhood Obesity by Improving Parental Perception of Child Weight Status in a Rural Medical Center

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Abstract

The prevalence of obesity in children and adolescents has increased dramatically in the past 40 years. This escalating crisis has reached epidemic proportions as almost one third of the children are considered overweight or obese in the United States. It is especially concerning that obesity is identified in preschoolers which can be predictive of obesity that extends into adolescence and adulthood. Prior research suggests that many parents were unable to recognize their children as being overweight or obese with some parents perceiving their overweight/obese child as being of normal weight or even underweight. Parents must be able to identify their child's weight status accurately in order to understand the significant health risks associated with obesity. The purpose of this study was to determine if a color coded visual aid intervention used during a primary care appointment improved the accuracy of parental perception of their child's actual Body Mass Index (BMI) status. A body habitus silhouette chart was used to measure parent's perception of their child's body size in a rural medical center. The sample comprised of 51 parents of children ages 3-10, who met criteria for being overweight or obese. Parents were asked to pick which figure most resembled their child on the body habitus silhouette chart. Upon completion of the chart parents were counseled on their child's actual weight status using a color coded BMI chart. All of the parents in the study were incorrect in their perception of their child's BMI status at baseline by underestimating their child's BMI. Fifteen (29%) participants had both baseline and 1 month data and had an improvement in their perceived BMI at 1 month. The differences between perceived and actual BMI were less at 1 month than at baseline. There was a significant difference ($p = 0.01$) between the actual and perceived BMI at baseline (median 36.6, interquartile range 23.7- 43.4) and 1 month (median 13.9, interquartile range 12.1–15.0) in matched participants. The results of this study will be used to develop interventions for parents that begin at an early age and will have an impact on preventing childhood obesity. *Keywords:*

body mass index, childhood obesity, parent perception

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Introduction

The prevalence of obesity in children and adolescents has increased dramatically in the past 40 years. This escalating crisis has now reached epidemic proportions according to data from the 2011-2014 National Health and Nutrition Examination Survey (NHANES) which found that 31.8% of children ages 2-19 are considered to be overweight with 17.2% of them obese (Ogden, Carroll, Kit, & Flegal, 2014). The rate of obesity for children 2-5 was 8.9%, children 6-11 was 17.5%, and adolescents 12-19 was 20.5%, the pattern was the same for males and females (Ogden, Carroll, Fryar & Flegal, 2015). A 2013-2014 NHANES report showed 6.0% of youth ages 2-19 have extreme obesity (Kelly et al., 2013). In 2013, the World Health Organization (WHO) estimated that there were 42 million children worldwide under the age of 5 that were obese. Studies have predicted there will be 60 million overweight or obese children in the world if the trend continues (de Onis, Blossner & Borghi, 2010; Marvicsin & Danford, 2013).

Background on Childhood Obesity

Significant disparities were seen in all ethnic and socioeconomic groups in the prevalence of childhood obesity (Aljunaibi, Abdulle, & Nagelkerke, 2013; Gauthier & Gance-Cleveland, 2015; Taveras, Gortmaker, Mitchell & Gillman, 2008). The Centers for Disease Control and Prevention (CDC) (2014) found that childhood obesity was disproportionately more prevalent in certain populations. Black and Hispanic children had a higher prevalence of childhood obesity than white children (Ogden et al., 2015; Rendall, Weden, Fernandes & Vaynman, 2012). Hispanic children had the highest rate of obesity at 21.9%, followed by black children at 19.5 %, compared to whites at 14.7% (Ogden et al., 2015). Rendall and colleagues found that obesity is seen earlier in Hispanic and black children and the possibility of Hispanic and black children returning to normal weight levels was much lower than that of white children.

The prevalence of obesity in children was also greater in low income families living in rural areas (Johnson & Johnson, 2015; Rockeymoore, Moscetti, & Fountain, 2014). Twenty percent of children ages 2-4 participating in Virginia's nutrition program for women infants and children (WIC) were obese (CDC, 2014). Johnson & Johnson (2015) conducted a systematic review that revealed children that live in a rural area were 26% more likely to be obese than children living in urban areas. As expected black and Hispanic children living in rural areas were far more likely to be overweight or obese than white children (Rockeymoore et al., 2014). Factors that contribute to higher rates of childhood obesity in rural areas are: poor socioeconomic conditions, lack of insurance, transportation, exercise facilities, access to healthy foods and health care, as well as lack of resources such as dieticians, nutritionists and weight management experts (Rockeymoore et al., 2014).

It is especially concerning that obesity is now being found in preschoolers which can be predictive of obesity that extends into adolescence and adulthood. Excessive body weight in childhood has been linked to obesity in adulthood which can have significant short term and long term adverse health problems (Akhtar-Danesh, Dehghan, Morrison, & Fonseka, 2011; Jaballas, Clark-Ott, Clasen, Stolfi, & Urban, 2011; Walling, 2008; West et al., 2008). For example childhood obesity can lead to immediate risks such as Type 2 diabetes, asthma, sleep apnea, and orthopedic problems such as Blount disease or slipped capital-femoral epiphysis, as well as arthritis, fatty liver disease, hypertension, and stroke or heart attack in adulthood (Doolen, Alpert, & Miller, 2009; Walling, 2008; West et al., 2008). Shibli, Rubin, Akons, and Shaoul (2008) revealed that obese infants had more breathing problems and more hospitalizations for asthma than children with normal weight. Obesity in children has also been linked to delays in gross motor skills (Shibli et al., 2008).

A systematic review by Reilly and Kelly (2011) determined that childhood overweight

and obesity could be related to a substantially higher risk of premature mortality in adults especially those with cardiovascular and metabolic morbidities. That risk was even higher for children with extreme obesity (Franks et al., 2010; Kelly et al., 2013). Maximova et al. (2008) reported that obese children may have shorter life expectancies than their parents due to their risk of premature death from breast and colon cancer. Moreover, other researchers proposed that obese children are two times as likely to die before age 55 than those with normal weights (Levi, Segal, St. Laurent, Lang, & Rayburn, 2012). The possibility of children dying at a younger age than their parents is alarming and emphasizes the need to address obesity in the pediatric population now (Marvicsin & Danford, 2013).

In addition to the immediate and long term impact childhood obesity has on health, psychosocial issues are another concern in the obese child or adolescent. The most common psychological problem is depression from the social stigma associated with obesity and being the recipient of bullying which can lead to poor social relationships with peers and low self-esteem, (Brannon, Ahlers-Schmidt, & Harrison, 2009; Jansen et al., 2014; Steglin, 2008). Jansen and colleagues found bullying but also suggest that overweight and especially obese boys often become the aggressor towards other children. These problems often continue in adulthood (Georgiadis, 2013).

Childhood obesity is a major burden to the cost of healthcare (Doolen et al., 2009). The financial implication of overweight and obese children to the United States healthcare system has been estimated to be $190 billion each year (Johnson & Johnson, 2015). The economic strain on our health care systems makes addressing childhood obesity an even more important goal (*Healthy People 2020*, 2014; West et al., 2008).

Obesity is thought to be the result of excessive caloric intake and insufficient energy output (Moore & Bailey, 2013; Wang, Orleans;, & Gortmaker, 2012). Factors that contribute to

excessive weight gain in children and adolescents are: high intake of sugar sweetened beverages, low fruit and vegetable intake, fast food consumption, increased portion size, reduced physical activity and increased sedentary behaviors (Akhtar-Danesh et al., 2011; Rao et al., 2015; Taveras et al., 2008). Stress, especially in the home environment can cause the child or adolescent to overeat (Steglin, 2008). Other risk factors include: prematurity, low birthweight and lack of breastfeeding (Anzman, Rollins, & Birch, 2010).

Lifestyles have changed in the past several decades as many families now eat fast food or prepared foods that are higher in sugar, salt, fat and calories (Steglin, 2008). Restaurants and grocery stores have increased portion sizes of beverages and unhealthy food leading to intake of even more calories (Steglin, 2008). Hu (2013) determined that just 150 extra calories (one soda) a day could lead to excessive weight gain in children. A systematic review by Rao et al. (2015) found that the consumption of sugar sweetened beverages by children and adolescents was associated with the development of obesity as well as lower levels of physical activity.

Physical activity levels have decreased due to their family's sedentary routines and possibly the concern for children's safety when playing outside alone (Steglin, 2008). Increased sedentary behavior can be attributed to obesity due to decreased time spent in physical activity (Zimmerman & Bell, 2010). Sedentary behaviors such as watching television, playing video games and time spent on the computer more than two hours per day appears to be related to an increased prevalence of childhood obesity (Danner, 2008; Georgiadis, 2013). Taveras et al. (2008) and Vallejo, Cortes-Rodriguez and Colin-Ramirez (2015) found that the risk of being overweight or obese increased proportionally with the number of hours of television viewing. Some of children's unhealthy eating habits are thought to be related to the influence from television advertisements on foods that are high in sugar, fat and salt (Danner, 2008; Zimmerman & Bell, 2010). Consumption of a meal while watching television has been linked to increased

risk of childhood obesity (Johnson & Johnson, 2015; Zimmerman & Bell, 2010).

Infants that have rapid weight gain in infancy may be at higher risk for obesity later in life (Laraway, Birch, Shaffer, & Paul, 2010; Vasylyeva et al., 2013; Warschburger & Kroller, 2012). Gestational diabetes or excessive weight gain in utero are also predictors of obesity later in life (Anzman et al., 2010). Over nutrition during preschool years may also lead to future obesity (Hager et al., 2012). BMI is thought to be fixed by the time adolescence is reached (Doolen et al., 2009; Hudson, McGloin, & McConnon, 2012). Children have a 50% chance of being obese if one parent is obese, that risk is much greater if both parents are obese (Cochran, Neal, Cottrell, & Ice, 2012; Mamun, Mc Dermott, O'Callaghan, Najman & Williams, 2008).

Another contributor to childhood obesity is low health literacy and numeracy which presents further barriers as parents may be unable to perceive their child as being obese, do not understand the effect of obesity on their child's health, have difficult reading food labels or understanding handouts on nutrition and are unable to identify appropriate portion sizes (Garrett-Wright, 2011; Sanders, Shaw, Guez, Baur, & Rudd, 2009; White et al., 2013). Sanders, Federico, Klass, Abrams, and Drever (2009) found that parents with low literacy were linked to poorer health outcomes in their children.

History of BMI

The origin of BMI dates back to the early 1800's when Adolphe Quetelet, a statistician in Belgium collected data on human growth (Eknoyan, 2008). He created the Quetlet Index of Obesity after studying the ratio of weight to height (Palmer, 2014). In the early 1900's, Louis Dublin another statistician who worked for Metropolitan Life found that overweight policyholders had more claims for death benefits and those that maintained lower weights lived longer (Eknoyan, 2008). Overweight patients were also more likely to develop diabetes, hypertension and heart disease (Eknoyan, 2008). Using this information, Dublin devised tables

for men and women of desired or ideal weights that became the standard for insurance companies as well as the medical field (Palmer, 2014). In 1972, Ancel Keys confirmed the validity of the Quetelet Index while doing research on obesity and changed the name to BMI to indicate risk for obesity (Palmer, 2014).

Definition of terms

Body mass index: a person's weight in kilograms divided by the square of height in meters to determine level of body fat. It is a screening tool that is often used to determine if a person is underweight, normal weight, overweight or obese on a growth chart that is specific for age and gender.

Extreme obesity: a medical condition with high body mass. It means they have an increased risk for future adverse health outcomes and have a BMI above the 99th percentile (Flegal et al., 2009). It is frequently calculated as 120% of the 95th percentile to allow better accuracy to define extremely high BMI's and monitor clinical changes.

Health literacy: a person's ability to understand and use health information to meet individual and family health needs.

Health numeracy: a person's ability to use numbers to do calculations in everyday life and understand portion size, food labels, tables, graphs or growth charts.

Obese: a medical condition in which excess body adiposity has accumulated to the extent that it may have an adverse effect on a person's health. It means a child is severely overweight and has a BMI that is at or above the 95th percentile.

Overweight: having excess adiposity for a particular height. It means a child is between the 85th and 94th percentile, a weight that is not considered healthy and can lead to obesity.

Screen time: time spent using a device such as a computer, television, or game console. Excessive screen time often leads to increases snacking, being influenced by television

advertisements for unhealthy foods and takes away from time that could be spent being physically active.

Review of Literature

The strategy used for the literature review included searching the following databases: CINAHL, MEDLINE and PubMed. The keywords searched were childhood obesity, overweight, parental perception, physical activity, sedentary behavior, diet modification, rural health, and health literacy. CINAHL returned 102 citations; MEDLINE yielded 89 citations, and PubMed produced 90 citations. Additional articles were identified via the ancestry approach. Inclusion criteria were any study that listed childhood obesity, parental perception, body mass index and health literacy. Exclusion criteria were studies that did not address physical activity or diet modification in childhood obesity and studies that did not have an abstract in English. The search was limited to studies published in the past 10 years. Randomized clinical trials were included while non-randomized comparison cohort studies, case studies, research letters and, editorials were excluded. The number of potentially relevant studies in the initial search was 281. Two hundred studies were excluded due to irrelevant titles. After reviewing the remaining titles, 31 did not meet the inclusion criteria according to abstract. Fifty studies met inclusion with 31 additional articles added after reviewing reference lists. The number of studies included in final review was 81 which included 13 random controlled trials and 7 systematic reviews (see Appendix A).

Parental perception of weight status. Prior research suggests that many parents were unable to recognize their children as being overweight or obese. In fact, some parents even perceived their child as being of normal weight or even underweight. Parents must be able to identify their child's weight status accurately in order to understand the significant health risks associated with obesity. There appears to be a mismatch between parents' perception of their

child's weight status and their actual BMI (Doolen et al. 2009; McKee, Long, Southward, Walker, & McCown, 2015). Several studies determined that more than half of parents were likely to be incorrect in estimating the weight of their overweight and obese children (Brannon et al., 2009; Cochran, et al., 2012; De La O et al., 2009; Rietmeijer-Mentnik, Paulis, van Middelkoop, Bindels , & van der Wouden, 2013). A study by Hager et al. (2012) revealed that parents were wrong over 70% of time as they viewed their heavy toddler as being normal weight. Children that were overweight were frequently perceived by parents as being of normal weight or even underweight (Brannon et al., 2009; Garrett-Wright, 2011; Juliusson, Roelants, Markestad & Bjerknes, 2011, West et al., 2008). Mckee et al. (2015) found that 84% of parents of kindergarteners classified them as being at a healthy weight but only 28% were at a healthy weight. Most of the children that were classified as being overweight were actually considered to be obese (Jones et al. 2011). Parents' estimation of weight status was less accurate with younger children and more accurate with adolescent children (Hudson et al., 2012; Mamun et al., 2008; Reitmeijer-Mentink et al., 2013; Towns & D'Auria, 2009). A study by the British Journal of General Practice discovered that most parents were only able to recognize obesity in their child if their BMI was above the 99th percentile (Katz, 2015).

Demographic factors and parental perception of weight. Hudson et al. (2012); Manios, Kondaki, Kourlaba, Vasilopoulou, and Grammatikaki (2008); West et al. 2008). determined that mothers underestimated the weight status of their sons more often than their daughters. West et al. (2008) discovered that black parents misjudged their child's weight twice as often as white parents. Parents that were overweight or obese themselves also had a higher percentage of inaccuracy in recognizing their child's actual weight status (Mamun et al. 2008). Cochran et al. (2012) concluded that parents in rural areas were more likely to be incorrect in judging their child's weight status. The same was true for low-income mothers of overweight

preschoolers (Hansen, Duncan, Tarasenko, Dei Yan, and Zhang, 2014; Hudson et al., 2012). Lower education which is often related to low health literacy, was a factor in inaccurate parental perception (Garrett-Wright, 2011; Manum et al., 2008; Sanders et al., 2009). Low health literacy makes it more difficult for parents to understand the health risks associated with obesity or make changes (Garrett-Wright, 2011). Doolen et al. (2009) noted that the more education a parent had the more accurate their perception of the child's weight status. This was also true for parents of middle to high income brackets (Hudson et al., 2011; Katz, 2015).

Societal norms and perceptions of weight. Jullison et al. (2011) and Luttikhuis, Stolk, and Sauer (2010) found that a child being overweight is becoming the norm because it is so common in today's society. Hanson et al. (2014) and Katz (2015) believe that many of the incorrect perceptions related to body weight are due to a change in social norms making obesity harder to recognize. This may explain why so many parents find it hard to identify their child as being overweight (Chaparro, Langellier, Kim & Whaley, 2011). It is a misconception by parents that their child is healthy and thriving if they have large or even excessive weight gains (Doolen et al., 2009; Juliusson et al., 2011). Chaparro et al. (2011) found obesity to be prevalent with American Indians, Alaskan natives and Hispanics where cultural belief exists that being chubby is healthy. According to Jones et al. (2011) many parents did not understand the definition of overweight or obesity. This has become even more difficult as the definitions from CDC changed from BMI greater than 95% being overweight to now being considered obese and BMI of 85% and above changed from being at risk to now being described as overweight. Hansen et al. (2014) discovered that many parents did not understand how to read a growth chart or trust them while others viewed them as invalid due to ethnic bias.

Visual aids and parental perception of weight. Studies by Oettinger et al. (2009) found that perception of weight status improved with the use of color coded BMI charts especially

among parents with low literacy and numeracy. It can be difficult for a parent to comprehend that being in a lower percentile for weight is a positive thing when being in the top percentile is the goal in almost everything else (Laraway et al., 2010). A study by Jones et al. (2011) determined that parents do not rely on clinical data but instead base their perceptions on other children to compare their child's weight. Hanson et al. (2014) referred to the theory of social comparison where individuals compare themselves to others instead of specific criteria for weight.

Perception of weight and future health status. Doolen et al. (2009) and Luttikhuis et al. (2010) Towns and D'Auria (2009) concluded that very few parents of overweight children were concerned about them being overweight in the future. Many parents felt that their child would grow out of their obesity and were not concerned about the consequences (Hudson et al., 2010; Jaballas et al., 2011; Jones et al., 2011). Mathieu, Drapeau and Tremblay (2010) found a lower level of concern about weight status by parents that did not recognize an unhealthy body weight in their child. Some parents were skeptical of the emphasis the media has placed on the problem of obesity and expressed concern about disordered eating as a result of so much focus on being overweight or obese (Jones et al, 2011). Others recognize that their child is overweight or obese and were concerned about a potential health risk but felt that nothing could be done because obesity runs in the family (Sylvetsky-Meni, Gillepsie, Hardy, and Welsh, 2015).

Perception of weight and behavior changes. Some parents believe that children's different body shapes should be considered in judging weight and that they will change and get thinner as they age (Jones et al., 2011). Parents of overweight or obese children frequently use the term solid or big boned to describe their child but not overweight (Warschburger & Kroller, 2009). Mothers frequently misclassify their child as normal rather than overweight because they do not want to acknowledge that there is a problem (Akhtar-Danesh et al., 2010; Manios et al.

2008). The fact that their child has a socially undesirable and stigmatizing condition is difficult for many parents to admit (Hansen et al, 2014; Mamun et al., 2008). Parents may fear being blamed or made to feel guilty for their child being overweight (Akhtar-Danesh et al., 2011; Doolen et al., 2009). Other parents do not acknowledge that their child is overweight because they would have to admit their own weight problems (Towns & D'Auria, 2009).

Perception of weight and feeding behaviors. Laraway et al. (2010) found that parents frequently describe their child as a picky eater even though their weight is in the normal range. Incorrect body weight identification can result in unhealthy feeding behaviors (Hager et al., 2012). These negative perceptions can lead to parents pressuring the child into overeating (Laraway et al., 2010). Parents place their children at risk of obesity when they require the child to eat everything on their plate or use food as a reward for good behavior (Hernandez, Cheng, Thompson, & Serwint, 2012). Laraway et al. (2010) found that infants and small children were frequently given inappropriate nutrition by parents when they introduced solids and table food too early. The stage is often set for obesity during the early years of a child's life by overfeeding (Akhtar-Danesh et al., 2011).

Parents that misjudge their child's weight status may disregard important health information from the child's health care provider (Aljunaibi et al., 2013). Parents are not likely to view an intervention as relevant to their family if they do not perceive their child as overweight (Chaparro et al., 2011; Luttikhuis et al., 2010). Lack of perception by parents hinders early detection as well as preventative measures of behavioral changes towards a healthier lifestyle (Hernandez, Cheng, & Serwint, 2010; Hudson et al., 2011; Vallejo et al., 2015). Parents are less likely to be motivated about making any lifestyle changes if they do not perceive their child as being overweight or obese (Sylvetsky-Meni et al. 2015; Tompkins, Seablom, & Brock, 2015).

Prevention of Childhood Obesity

Hernandez et al. (2012) found children that were overweight at age two could be experience poor health throughout their lifetime. Similarly, Duncan, Hansen, Wang, Yan, and Zhang (2015) and Taveras (2008) recommended that obesity prevention start in preschool or earlier as children are being identified as overweight even before they start kindergarten. Effort towards prevention of childhood obesity should be focused on the preschool children before the onset of obesity (Cheung, Cunningham, Naryan, & Kramer, 2016). Recognizing childhood obesity and making changes during the preschool years may prevent problems with overweight later on in life (Luttikhius et al., 2010; McKee et al., 2015).

Prevention can start even earlier according to Anzman et al. (2010) who discovered that mothers can affect their child's acceptance of food later on by the foods they eat during pregnancy. New parents need to be educated about normal infant growth to prevent over nutrition and future weight problems (Laraway et al., 2010). This is a critical time period when food preferences and eating habits are formed and may become lifelong habits (Levi et al. 2012; McKee et al., 2015; Warschburger & Kroller, 2009). Parents have the ability to control a young child's eating environment (Anzman et al., 2010. This underscores the need for interventions in the preschool years (Marvicsin & Danford, 2013).

Summary

Preventing childhood obesity will allow future generations to be healthier and live longer (Steglin, 2008). The review of existing scientific literature supports the need for more research to address the growing problem of childhood obesity specifically to determine if parents' perception of their child's weight status is accurate.

Study Question

Does the use of a color coded visual aid intervention used during a primary care appointment improve the accuracy of parents' perception of their children's BMI status?

Theoretical Framework

The Health Belief Model ([HBM) is one of the oldest health behavior theories. This model was created by social psychologists over 60 years ago at the U.S. Public Health service while studying peoples' behavior toward screening programs for tuberculosis (Carpenter, 2010). Initially the HBM was developed to explain and predict people's behavior in relation to their health on whether or not they seek health services (Carpenter, 2010). Later, the HBM was used to better understand peoples response to an illness, treatment or lifestyle changes (Glanz, Rimer, & Viswanath, 2008).

The HBM is based on the idea that a person's behavior is determined by how they view or perceive a disease and the best approach to avoid or lower the risk (Carpenter, 2010). The literature review showed that perception can be influenced by many different factors such as age, gender, ethnicity, socioeconomic class and education (Glanz, Rimer & Viswanath, 2008). This framework can be used to create interventions involving health education as well as promoting healthy lifestyles (Carpenter, 2010). The HBM framework (see Appendix B) consists of four original constructs; perceiving susceptibility, perceived severity, perceived benefit and perceived barriers with cues to action being added along with several others amendments (Glanz et al., 2008).

The HBM served as the theoretical framework for this study as it could be applied to the rural underserved community that has increased risk factors and high rates of childhood obesity Reducing childhood obesity using the framework of HBM starts with parents recognizing that their child is overweight or obese (susceptibility). Parents must also understand the significant consequences of childhood obesity (severity). Next they have to decide on the

usefulness of adopting a new behavior to avoid or reduce the risk (benefits). Then parents have to consider what would prevent them from making a change (barriers). Lastly what triggers would motivate them to make a change (cues to action).

The first component of the HBM framework, susceptibility was explored in this project by assessing parental perception using the body habitus silhouette chart and communicating to parents their child's actual weight status with color coded BMI chart with the goal of improving parental perception. The second component severity and third benefits was carried out with counseling on the potential health risks associated with childhood obesity and how making behavior changes now will lead to a lifetime of improved health by sharing a handout that lists target behaviors and suggestions on ways to implement changes. Barriers the fourth component, was achieved by having parents complete the health habit questionnaire to determine where changes need to be made and the factors that they need to address if parents are ready to make behavior changes. Cues to action, promoting healthy behavior changes would result from being made aware of the other components along with support and encouragement from the provider.

Methods

A pre - post design was used for the study. Data collection occurred at the time of the child's well visit to assess the parent's perception of their child's weight status. The same data was collected again one month later and the results compared.

Setting

The study was conducted in a pediatric outpatient clinic in Southside, Virginia. This rural federally qualified health center provides medical care to the uninsured as well as the underinsured. The pediatric clinic is staffed by a pediatrician and a pediatric nurse practitioner

assisted by two licensed practical nurses. On average, 40 patients are seen a day in the clinic and approximately 70% of them are 10 years of age or less. The majority of the families have low socioeconomic status with parents that have low health literacy. The patient population consists of 30% African American, 60% Caucasian, and 9% Hispanic. Eighty percent of the patients are covered by Medicaid, 15% have private insurance, and 5% are self-pay with a sliding scale.

Description of Sample

The convenience sample consisted of overweight or obese children measured by a BMI exceeding 84% who were between the ages of 3-10. The participants were the parents or legal guardians of the patient brought in for a well visit. They were given a flyer at the reception desk and invited to participate in the study (see Appendix C).

Inclusion Criteria

The primary caretaker of a child who met the criteria of being at risk and currently being followed at a federally qualified health center in a rural underserved area of Southside Virginia were eligible for inclusion in this study. Patients that met criteria for inclusion were identified by their BMI using their height and weight at the time of their visit. The patients were not contacted before the visit.

Exclusion Criteria

Any child who was being actively treated for obesity was excluded from the study. Parents who were unable to read, write, or speak English were also excluded.

Intervention

The body habitus silhouette charts (see Appendix D and E) and the "Big Five" health habits questionnaire (see Appendix F) were used to determine parental perception and health habits that may be contributing to their overweight status. A color coded visual aid BMI tool (see Appendix G) was used to increase parental awareness of their child's actual weight status.

Demographics were collected for each patient and BMI was recorded on the demographic record at the initial visit (see Appendix H). Parents were presented a chart with silhouettes of children of specific age and gender for them to pick the one they thought best represented their child's weight status. The body habitus silhouette chart showed the provider how the parent perceived their child's weight status and if there was a disconnect between the parent's perception of their child's weight and the child's actual weight status. The parents were also given a questionnaire consisting of five questions to assess their child's health habits.

Parents were counseled on their child's actual weight status using a color coded BMI chart. This simple intervention was used to facilitate a better understanding of BMI by parents and start a discussion with parents on ways to help their child adopt better eating habits and an active lifestyle. Parents were given a one-page handout from a study called "Steps to Growing Up Healthy" by Gorin et al. (2014) that lists behavioral targets and suggestions on how to implement lifestyle changes (see Appendix I). The culturally sensitive script that was used during counseling can be found in Appendix J.

Procedure

A flyer was placed at the front desk explaining the study. If a parent chose to participate the clinician explained the study details and then the parent or legal guardian was asked to sign a consent form (see Appendix K). Parents were provided with a clipboard containing the body habitus silhouette chart and questionnaire for them to fill out while they were in the exam room. Parents were asked to answer the questionnaire on their child's health habits and pick which silhouette they thought best represented their child's weight status. A demographic chart was used to record demographic information along with height, weight, and BMI. Height and weight measurements were obtained by nursing staff trained using standard anthropometric technique.

Height was measured to the nearest 0.1 cm without shoes and weight to the nearest 0.1 kg on a calibrated digital scale in light clothing. The BMI was calculated by weight in kilograms divided by height in meters squared. The percentiles were determined using growth charts from the CDC to classify the patient as overweight, obese or extreme obesity. At the conclusion of the health care appointment the provider explained to the parent their concern about potential health problems based on child's weight. The provider used a color coded BMI chart that had the child's BMI plotted according to age and gender to communicate to the parent their child's actual weight status. Parents were given a copy of the BMI chart to keep so they could monitor their child's progress. BMI was recorded and parents completed the body habitus silhouette chart again at their child's follow-up visit one month later to determine if their perception of their child's weight status was more accurate.

Measures

The body habitus silhouette chart is a tool used to determine a parents' visual perception of the child weight status. The body habitus silhouette chart was designed by Scott Millard (Eckstein et al., 2006). The chart has been validated in numerous studies over the past 12 years (Warschburger & Kroller, 2009). The chart consists of seven figures that are age and gender specific and represent BMI percentiles. Originally the middle figure represented the 50^{th} percentile, but no BMI percentiles were assigned to the other figures. Recent studies have assigned percentiles to the other figures in a variety of increments as well as reversing their order. In this study the silhouette figures were arranged in descending order with the first figure representing the 95^{th} percentile, the next two figures represented the 85^{th} percentile and 75^{th}, the figure in the middle represented the 50^{th} percentile, the next two figures were the 25th and 10^{th} percentiles, with the last figure representing the 5^{th} percentile. The child's BMI was used for comparison between actual weight status and parental perception of child's weight using the

figure that the parent chose on the body habitus silhouette chart.

The health habits questionnaire is comprised of five questions to determine the child's health habits. The "Big Five" questionnaire was developed by Dr. Goutham Rao, a nationally recognized expert on childhood obesity and the American Medical Association Expert Committee on childhood obesity (Barlow, 2007). The questionnaire has been validated through prior use and publications. The health habits questionnaire asks about consumption of sugar sweetened beverage and fast food, the amount of screen time and physical activity, as well as how often the family sits down and eats together, these factors have all been linked to childhood obesity. Each question has a point value assigned to each answer. Lower scores means higher risk of obesity.

The health habits questionnaire will show the provider which lifestyle changes need to be addressed at future visits. A color coded BMI chart was used to counsel parents on their child's actual weight status. The BMI chart is from the CDC and has been colored to match the colors of a traffic light; green for normal weight, yellow for overweight and at risk of obesity, and red means obese. It is a visual aid to help parents with low health literacy and numeracy better understand their child's weight status.

Population

Fifty-one participants were recruited and met inclusion and exclusion criteria. Based on BMI of the patients, 45% were overweight and 55% were obese, 19% were extremely obese. The distribution of overweight patients was 13 females and 10 males; there were 13 females and 15 males with obese status. Three of the females and seven males were considered extremely obese.

Data analysis

Data collection occurred over a 12 week period starting on April 1, 2017. The data from the body habitus silhouette and questionnaires were collected and analyzed using SPSS data

analysis software, Version 23. Means, standard deviations, medians and interquartile ranges (IQR) for variables were calculated. A Wilcoxon matched pairs test was used to determine if there was an improvement in the difference between actual BMI and perceived BMI from baseline to one month later.

Protection of Human Subjects

This proposal was submitted to the University of Virginia Institutional Review Board (IRB) Social Behavioral Sciences (SBS) for review and approval prior to the intervention beginning and subsequent data collection. Parents were informed of the purpose of the study, procedures involved, and benefits of the study. Parents that agreed to participate in the study were asked to sign a consent form. The consent form explained that the parents were not obligated to participate in the study, they could withdraw at any time, and refusal to participate or withdrawing from the study would not affect the health care services for their child. Parents were informed that no compensation would be offered and any information obtained during the study would be kept confidential and destroyed at the end of the study.

Results

Fifty-one parents completed the questionnaire and body habitus silhouette chart for their child at baseline. Of the children in the study 26 (51%) were female and 25 (49%) were male aged between 3-10 years of age. The mean age of patients was 6.4 years (*SD* = 2.4) and the median was 7 years. Six (11.8%) patients were black and the remainder were white (88.2%). The largest group was 4 year olds with (*n* = 10) participants. At baseline the mean BMI was 94.0% (*SD* = 5.28) and the median was 97%. One month later the mean BMI was 94.5% (*SD* = 5.64) and the median was 97%.

Forty-seven (92%) of the parents perceived their child as in the normal weight range of 50th to 75th percentile. Twenty-nine (57%) parents chose the 50 percentile and 18 (35%) parents

chose the 75th percentile. Two (4%) of the parents believed that their child was in the overweight range at the 85th percentile. Another two (4%) parents even perceived their child as being in the 25th percentile for weight. None of the parents chose a silhouette that was heavier than their child's BMI. The mean perceived BMI at baseline was 59.2 % (*SD* = 14.5) and the median was 50%. One month later the mean perceived BMI was 80.3% (*SD* = 5.15) and the median was 85%.

Only 21.6% (*n* = 11) of the parents returned in 4 weeks. Four more parents returned within a 5 week period. Participants did not return due to missed appointments, rescheduling issues and transportation problems, only 29.4 % (*n* = 15) parents that completed the body habitus silhouette chart at one month. All individuals who completed one month data had an improvement in their perceived BMI. The differences between actual and perceived BMI were less at one month than at baseline (see Appendix L). There was a significant difference ($p = 0.01$) between the actual and perceived BMI at baseline (median 36.6, interquartile range 23.7 - 43.4) and one month later (median 13.9, interquartile range 12.1 – 15.0) in matched participants.

Points on the health habits questionnaire were totaled and subtracted from 100. The mean was 44 (*SD* = 9.7). Higher scores were usually associated with a lower BMI and less risk while those with lower scores were mostly associated with higher BMI's in the obese or extremely obese range placing them at greater risk.

Discussion

This study examined the relationship between a parent's perception of their child's weight and the child's actual BMI. The parents' perception, as indicated by the silhouette they chose that best represented their child, did not correspond with their child's actual BMI at baseline or at the one- month follow-up. However, after an educational intervention, there was an

improvement in the difference between the perceived and actual BMI. A few of the parents of children with higher BMIs chose a silhouette that indicated a slightly higher BMI but none chose the correct silhouette that corresponded with their child's actual BMI. This supports previous findings that parents frequently do not accurately perceive their child's weight status and underestimate their child's weight (Parry, Netuveli, Parry, & Saxena, 2008; Rietmeijer-Mentink et al., 2013). Parents must be able to recognize their child's weight status accurately in order to understand the significant health risks their child may face as a result of being overweight or obese. When parents' perception of their children's weight is incorrect they may have poorer health outcomes (Jones et al, 2011). Often parents may have difficulty correctly assessing the eating habits and physical activity of their child and these negative perceptions can lead to pressuring the child into overeating (Laraway et al., 2010). Aljunaibi et al. (2013) found that parents that misjudge their child's weight status may disregard important health information from the child's health care provider. Researchers agree that inaccurate perception by parents hinders early detection as well as preventative measures of behavioral changes towards a healthier lifestyle (Hudson et al., 2011; Vallejo et al., 2015).

Most of the parents were surprised when shown the color coded BMI chart of their child's weight and height plotted by age and gender. All of the parents that returned with their child were asked to complete the body habitus silhouette chart again to see if their perception had become more accurate. Of those parents, all had a changed perception more in alignment with their child's weight status but none of them chose the correct figure for their child's actual weight status. The data was consistent with what previous studies have shown that a parent's perception of their child's weight status often incorrect. This study showed that the educational intervention helped parents with BMI perception one month later after counseling. Parents are more likely to recognize the need for change in health habits if they have an accurate perception

of their child's weight status (Perrin, Skinner, & Steiner, 2012; Sylvetsky-Meni et al., 2015).

The data from the study indicates that the health habits questionnaire may be predictive of patients being at risk of overweight or obese. The questionnaire will show the provider which health habits may be related to the child being obese. Providers can use the questionnaire as a guide to identify lifestyle changes that need to be addressed at future visits.

The results of this study will be used to develop interventions for parents that begin at an early age and may have a positive impact on preventing childhood obesity. Intervention strategies include educational classes on nutrition, improving parent health literacy, additional resources for physical activities, and better access to healthy foods. Primary care providers cannot reduce childhood obesity alone; it must be a community effort that includes: schools, preschools, churches, civic organizations, youth groups, and parks and recreation departments.

Limitations

One weakness of this study was the small sample size as it may not be a true representation of the population and therefore cannot be generalized to other populations. There were no Hispanic participants in the study and even though they make up 9% of the patients at the clinic. Black families represent 30% of the clinic's population yet only 1% (n = 6) black parents with their children chose to participate in the study. According to West et al. (2008) black parents were twice as likely as whites to misjudge their child's weight. Hispanic and black parents may not have understood the study due to low health literacy or because they did not perceive their child as being overweight or obese. It is possible that some parents with overweight or obese children may not have chosen to participate in the study because they were aware of their child's obesity but not interested in addressing the problem. Use of self-report questionnaires can lead to inaccuracy if parents do not answer the questions truthfully, which may reduce the validity of the study. The parental bias may be due to parent's hesitation to label

their child as overweight or obese. The participants were not just mothers but also grandparents with guardianship and they may have had different responses due to their age and background.

Noncompliance in the pediatric population is an ongoing problem for the rural clinic in this study. The high attrition rate may have influenced the results therefore measuring the accuracy of parental perception of child's weight status before and after counseling provided limited data. In retrospect, more time should have been allowed for patients to return or have parents complete the second questionnaire during the initial visit after counseling to determine if the perception of their child's actual weight had improved. Also obtaining a larger and more ethnically diverse sample of participants that would allow for dropouts might have provided more strength to the study.

Strengths

One strength of the intervention was the use of a simple communication tool that did not require a lot of time to implement. The intervention does not stigmatize obesity and only served to help parents realize their perception of their child's weight was inaccurate. Lower education, which is often related to low health literacy and numeracy, was reported as a factor in inaccurate parental perception (Hudson et al., 2012). Low health literacy makes it difficult for parents to understand the health risks associated with obesity or make changes (Garrett-Wright 2011). Studies by Oettinger et al. (2009) and Perrin et al. (2010) found that perception of weight status improved with the use of color coded BMI charts especially among parents with low literacy and numeracy. A visual aid such as the color coded BMI chart makes it easier for patients with low health literacy and numeracy to understand their child's weight status and the need to adopt a healthier lifestyle. Several parents admitted that they did not understand the BMI chart that was shared with them during previous well visits, but the color coded graph helped them see that being in the highest percentiles was not healthy. Perrin et al. (2010) found that counseling on

weight status and healthy behaviors by pediatric residents using the tool has been linked to improved perception by parents as well as dietary and physical activity changes. Parental perception did improve enough to show some statistical significance in the study. Further research is needed to determine if this simple intervention can impact parental perception and promote change in health habits that will lead to a decrease in childhood obesity.

Implications for Practice

The HBM can be used for future interventions involving health education as well as promoting healthy lifestyles. Current practice guidelines from American Academy of Pediatrics and the American Medical Association Expert Committee call for the health care provider to identify overweight or obese children by measuring height, weight and BMI at least once a year along with appropriate laboratory studies (Rao et al., 2008). West et al. (2008) suggest maintaining these current guidelines with additional steps in practice such as helping change parents perception of their children's weight status with routine monitoring of BMI at each visit to monitor growth patterns and increase parent's awareness. Parental perception (susceptibility) is an important first step to making changes towards a healthier lifestyle. Parental perception of their child's overweight status is often low despite the increased attention from the media about this public health concern (Mitchell, Wake, Canterford, & Williams, 2008). McKee et al. (2015) believes that in order to eliminate the disconnect in parental perception that parents must be able to comprehend what a healthy weight looks like. The color coded BMI chart is useful in explaining a child's weight status to the parent during health encounters in the pediatric clinic.

Programs may not be successful if parents do not recognize their children's true weight status and the health risks (severity) associated with being overweight or obese (Doolen et al., 2009; Garett-Wright, 2011; Manios et al., 2008). Parents of children that have a BMI greater than 84% should be made aware of their child's risk of health problems related to childhood

obesity and be treated with regular follow up. Primary care is the ideal setting to address the problem of childhood obesity since the APNs scope of practice covers health promotion, assessment, screening, and health promotion through education, advocacy, outcome evaluation and referrals to other professionals (Jordan-Welch, 2010).

APNs interact often with parents of overweight or obese children and examine their child's health behaviors (barriers) to determine which areas need attention (Rubenstein, 2012). The health habits questionnaire has also been implemented in the well child visit protocol. Young children are seen approximately ten times during the first two years of life for their regular well visits which provides numerous opportunities for APN's to spend a few minutes at the end of each visit to counsel patients and their families on making healthy choices (Gorin, 2014).

Understanding the evidence that many factors can influence parents' inaccurate perception of the child's weight status and that a shift in perception has to occur before the parent can consider making changes in the child's health behaviors will help the APN develop interventional strategies that focus on specific behaviors such as: decreasing their child's intake of a sugar sweetened beverage and replacing it with water, limiting television and computer time to one hour or less per day and engaging in a minimum of 60 minutes of moderate to vigorous exercise most days of the week (Rao, 2008).

The health care provider should stress to the parents that that BMI is just a measure to predict potential health problems and a chance to make positive changes (benefits) in their child's health (Katz, 2015). APNs can play a significant role in preventing obesity through health promotion as they already have a relationship with their patient and family and can provide ongoing management for the obese child (Rubenstein, 2012, Vine, Hargreaves, Briefel, & Orfield, 2013).

Warschburger and Kroller (2012) found that parental recognition of overweight status that was creating health problems was very influential in making behavior changes (cues to action). The study by Warschburger and Kroller showed that parental perception is an integral part of health promotion. Recognition by parents that their child is overweight or obese and at risk of health problems parents is necessary when implementing any intervention (De La O et al., 2009). Motivational interviewing can allow the APN to assess the parents' readiness to change and explore any barriers that need to be addressed that would hinder making such a change. APN's have the unique opportunity to collaborate with and empower parents to use their influence to help their child develop healthy habits. This can be accomplished through anticipatory guidance and counseling based on identified risk factors. To avoid stigmatizing the child, behavioral lifestyle interventions should be family focused (Heinberg et al., 2010). A family's readiness to change environment and lifestyle is determined by parental perception (De La O et al., 2009; Hager et al., 2012; Towns & D'Auria, 2009). A study by Towns and D'Auria (2009) found that informing parents about their child's BMI and the associated health risks appeared to be a motivating factor for parents to help their child make lifestyle changes. The probability that a child will make long lasting changes in diet and physical activity has been found to increase when the family approach is used (Jordan-Welch, 2010).

Reducing the proportion of overweight and obese children is a national health goal for Healthy People *2020* (U. S. Department of Health and Human Services, 2014). Patients at PATHS have been encouraged to join the initiative between Virginia Tech and the local Parks and Recreation Department to reduce childhood obesity. This program consists of 12 two hour sessions that focus on the parent and child being more physically active and developing healthy eating habits. Patients that are classified as obese are referred to a nutritionist for education that will ensure adequate growth and development while slowing the weight gain. Being physically

active and eating well is important regardless of ones' weight because they promote good health. This project presents a simple intervention designed to increase parent's perception of their child's BMI status.

Conclusion

The literature and findings from this study confirm the frequent misperception by parents of their child's weight status compared to their actual BMI. The study showed that the educational intervention helped parents with BMI perception one month later after counseling. Accurate perception of their child's weight status by parents is the first step in addressing the epidemic of childhood obesity. Early identification is critical as parents that do not recognize their child as being overweight or obese are not likely to be motivated to make lifestyle changes. By intervening early, we may be able prevent these patients from a lifetime of health problems associated with obesity.

Products of DNP project

One of the products will be the DNP Project Report. A poster on the risks of childhood obesity will be submitted for the National Nurse Practitioner Symposium in July 2018. The completed study will lead to a manuscript suitable for publication and submission to a journal such as Nurse Practitioner Perspective.

References

Akhtar-Danesh, N., Dehghan, M., Morrison, K. M., & Fonseka, S. (2011). Parents' perceptions and attitudes on childhood obesity: A Q-methodology study. *Journal of the American Academy of Nurse Practitioner, 23,* 67-75.

Aljunaibi, A., Abdulle, A., & Nagelkerke, N. (2013). Parental weight perceptions: A cause for concern in the prevention and management of childhood obesity in the United Arab Emirates. *PLOS One 8*(3):e59923. Doi:10.1371/journal.pone.0059923

Anzman, S. L., Rollins, B. Y., & Birch, L. L. (2010). Parental influence on children's early eating environments and obesity risk: Implications for prevention. *International Journal of Obesity, 34,* 1116-1124.

Barlow, S. E. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. *Pediatrics, 120,* 164-192.

Brannon, J. G., Ahlers-Schmidt, C. R., & Harrison, M. (2009). Perceptions of child weight status by parents of children on Medicaid. *Kansas Journal of Medicine, 2*(4), 78-86.

Carpenter, C. J. (2010). A meta-analysis of the effectiveness of health belief model variables in predicting behavior. *Health Communication, 25*(8), 661-669.

Centers for Disease Control and Prevention (2017). Childhood Obesity facts 2011-2014. Retrieved from https://www.cdc.gov/obesity/data/childhood.html

Chaparro, M. P., Langellier, B. A., Kim, L. P., & Whaley, S. E. (2011). Predictors of accurate maternal perception of their preschool child's weight status among Hispanic WIC participants. *Obesity Journal, 19*(10), 2026-2030.

Cheung, P., Cunningham, A. A., Naryan, V., & Kramer, M. R. (2016). Childhood obesity incidence in the United States: A systematic review. *Childhood Obesity, 12*(1), 1-11.

Cochran, J. D., Neal, W. A., Cottrell, L. A., & Ice, C. L. (2012). Parental perception of their child's weight status and associated demographic factors. *Online Journal of Rural Nursing and Health Care, 12*(2), 11-29.

Danner, F. W. (2008). A national longitudinal study of the association between hours of TV viewing and the trajectory of BMI growth among US children. *Journal of Pediatric Psychology, 33*(10), 1100-1107.

De La O, A., Jordan, K. C., Ortiz, K., Moyer-Mileur, L. J., Stoddard, G., Friedrichs, M., … Mihalopoulos, N. L. (2009). Do parents accurately perceive their child's weight status? *Journal of Pediatric Health Care, 23*(4), 216-221.

De Onis, M., Blossner, M., & Borghi, E. (2010). Global prevalence and trends of overweight and obesity among preschool children. *American Journal of Clinical Nutrition, 92*(5), 1257-1264.

Doolen, J., Alpert, P. T., & Miller, S. K. (2009). Parental disconnect between perceived and actual weight status of children: A metasynthesis of the current research. *Journal of the American Academy of Nurse Practitioners, 21*, 160-166.

Duncan, D. T., Hansen, A. R., Wang, W., Yan, F., & Zhang, J. (2015). Change in misperception of child's body weight among parents of American preschool children. *Childhood Obesity, 11*(4), 384-393.

Eckstein, K. C., Mikhail, L. M., Ariza, A. J., Thomson, J. S., Millard, S. C., & Binns, H. J. (2006). Parents perceptions of their child's weight and health. *Pediatrics, 117*(3), 681-690.

Eknoyan, G. (2008). Adolphe Quetelet (1796 - 1874) – the average man and indices of obesity. *Nephrology Dialysis Transplantation, 23*, 47-51.

Flegal, K. M., Wei, R., Ogden, C. L., Freedman, D. S., Johnson, C. L., & Curtin, L. R. (2009). Characterizing extreme values of body mass index - for - age by using the 2000 Centers for Disease Control and Prevention growth charts. *American Journal of Clinical Nutrition 90*, 1314-1320.

Franks, P. W., Hanson, R. L., Knowler, W. C., Sievers, M. L., Bennett, P. H., & Looker, H. C. (2010). Childhood obesity, other cardiovascular risk factors and premature death. *The New England Journal of Medicine, 362*(6), 485-493.

Garrett-Wright, D. (2011). Parental perception of preschool child body weight. *Journal of Pediatric Nursing, 26*, 435-445.

Gauthier, K. I., & Gance-Cleveland, B. (2015). Hispanic parental perceptions of child weight in preschool-aged children: An integrated review. *Childhood Obesity, 11*(5), 549-559.

Georgiadis, M. (2013). Motivating behavior change: A content analysis of public service announcements from the Let's Move! Campaign. *Elon Journal of Undergraduate Research in Communications, 4*(1)1-12. Retrieved from http://wwww.studentpulse.com/a?id=791

Glanz, K., Rimer, B. K., & Viswanath, K. (2008). Health behavior and health education: Theory, research, and practice. 4th ed. (pp. 45-51). San Francisco, CA: Josesey-Bass.

Gorin, A. A., Wiley, J., McCauley Ohannessian, C., Hernandez, D., Grant, A., & Cloutier, M. M. (2014). Steps to growing up healthy: A pediatric primary care based obesity prevention program for young children. *BMC Public Health, 14*, 72-82.

Hager, E. R., Candelaria, M., Latta, L. W., Hurley, K. M., Wang, Y., Caulfield, L. E., & Black, M. M. (2012). Maternal perceptions of toddler body size. *Archives of Adolescent Medicine, 166* (5), 417-422.

Hansen, A. R., Duncan, D. T., Tarasenko, Y. N., Yan, F., & Zhang, J. (2014). Generational shift

in parental perceptions of overweight among school-aged children. *Pediatrics, 134*(3), 481-488.

Healthy People 2020: National Health Promotion and Disease Prevention Objectives (2014). U.S. Department of Health and Human Services, Washington, DC. Retrieved from http://www.healthypeople.gov/2020/topics-objectives/topic/physical-activity/objectives.

Heinberg, L. J., Kutchman, E. M., Berger, N. A., Lawhun, S. A., Cuttler, L., Seabrook, R. C., & Horwitz, S. M. (2010). Parent involvement is associated with early success in obesity treatment. *Clinical Pediatrics, 49*(5), 457-465.

Hernandez, R. G., Cheng, T., & Serwint, J. R. (2010). Parents' healthy weight perceptions and preferences regarding obesity counseling in preschoolers: Pediatricians matter. *Clinical Pediatrics, 49*(8), 790-798.

Hernandez, R. G., Thompson, D. A., Cheng, T. L., & Serwint, J. R. (2012). Early-Childhood Obesity: How Do Low-Income Parents of Preschoolers Rank Known Risk Factors *Clinical Pediatrics, 5*(7), 663-670.

Hu, F. B. (2013). Resolved: There is sufficient scientific evidence that decreasing sugar-sweetened beverage consumption will reduce the prevalence of obesity and obesity-related diseases. *Obesity Review, 14*(8), 606-619.

Hudson, E., McGloin, A., & McConnon, A. (2012). Parental weight (mis)perceptions: Factors influencing parents' ability to correctly categorize their child's weight status. *Maternal Child Journal, 16*, 1801-1809.

Jaballas, E., Clark-Ott, D., Clasen, C., Stolfi, A., & Urban, M. (2011). Parents' perceptions of their children's weight, eating habits and physical activities at home and at school. *Journal of Pediatric Health Care, 25*(5), 294-301.

Jansen, P. W., Verlinden, M., Dommisse-van Berkel, A., Mieloo, C. L., Raat, H., Hofman, A., ...Tiemier, H. (2014). Teacher and peer reports of overweight and bullying among young primary school children. *Pediatrics, 134*(3), 473-480.

Johnson, J. A., & Johnson, A. M. (2015). Urban-rural differences in childhood and adolescent obesity in the United States: A systematic review and met-analysis. *Childhood Obesity, 11*(3), 233-241.

Jones, A. R., Parkinson, K. N., Drewett, R. F., Hyland, R. M., Pearce, M. S., & Adamson, A. J. (2011). Parental perceptions of weight status in children: The Gateshead Millennium study. *International Journal of Obesity, 35*, 953-962.

Jordan-Welch, M. (2010). End the epidemic of childhood obesity…one family at a time. *American Nurse Today, 5*(12), 1-7.

Juliusson, P. B., Roelants, M., Markestad, T., & Bjerknes, R. (2011). Parental perception of overweight and underweight in children and adolescents. *Acta Paediatrica, 100*, 260-265.

Katz, D. (2015). Oblivobesity: Looking over the overweight that parents keep overlooking. *Childhood Obesity, 11*(3), 225-226.

Kelly, A. S., Barlow, S. E., Rao, G., Inge, T. H., Hayman, L. L., Steinberger, J., …Daniels, S. R. (2013). Severe obesity in children and adolescents: Identification, associated health risks, and treatment approaches. *Circulation, 128*, 1-25.

Laraway, K. A., Birch, L. L., Shaffer, M. L., & Paul, I. M. (2010). Parent perception of healthy infant and toddler growth. *Clinical Pediatrics, 49*(4), 343-349.

Levi, J., Segal, L. M., St. Laurent, R., Lang, A., & Rayburn, J. (2012). *F as in fat: How obesity threatens America's future.* Project Report. Princeton, N. J: Trust for America's Health/Robert Wood Johnson Foundation.

Luttikhuis, H., Stolk, R., & Sauer, P. (2009). How do parents of 4-5 year-old children perceive

the weight of their children? *Acta Paediatrica, 99*, 263-267.

Mamun, A. A., McDermott, B. M., O'Callaghan, M. J., Najman, J. M., & Williams, G. M. (2008). Predictor of maternal misclassifications of their offspring's weight status: A Longitudinal study. *International Journal Obesity, 37*, 1140-1146. doi:10.1038/ijo.2012.182

Manios, Y., Kondaki, K., Kourlaba, G., Vasilopoulou, E., & Grammatikaki, E. (2008). Maternal perceptions of their child's weight status: The GENESIS study. *Public Health Nutrition, 12*(8), 1099-1105.

Marvicsin, D., & Danford, C. A. (2013). Parenting efficacy related to childhood obesity: Comparison of parent and child perceptions. *Journal of Pediatric Nursing, 28,* 422-429.

Mathieu, M., Drapeau, V., & Tremblay, A. (2010). Parental misperception of their child's body weight status impedes the assessment of the child's lifestyle behaviors. *International Journal of Pediatrics, 306703*, 1-9.

Maximova, K., McGrath, J. J., Barnett, T., O'Loughlin, J. O., Paradis, G., & Lambert, M. (2008). Do you see what I see? Weight status misperception and exposure to obesity among children and adolescents. *International Journal of Obesity, 32*, 1008-1015.

McKee, C., Long, L., Southward, L. H., Walker, B., & McCown, J. (2015). The role of parental misperception of child's body weight in childhood obesity. *Journal of Pediatric Nursing*, 1-8.

Mitchell, R., Wake, M., Canterford, L., & Williams, J. (2008). Does maternal concern about children's weight affects children's body size perception at the age of 6.5?: A community –based study. *International Journal of Obesity, 32*, 1001-1007.

Moore, K., & Bailey, J. H. (2013). Parental perspectives of a childhood obesity intervention in

Mississippi: A phenomenological study. *The Qualitative Report, 18* (96), 1-22. Retrieved from http://www.nova.edu/ssss/QR/QR18/mooore96.pdf

Oettinger, M. D., Finkle, J. P., Esserman, J. D., Whitehead, L., Spain, T. K., Pattishall, S. R., Rothman, R. L., & Perrin, E. M. (2009). Color-coding improves parental understanding of body mass index charting. *Academic Pediatrics, 9*(5), 330-338.

Ogden, C. L., Carroll, M. D., Kit, B. K., & Flegal, K. M. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *Journal of the American Medical Association, 311*(8), 806-814.

Ogden, C. L., Carroll, M. D., Fryar, C. D., & Flegal, K. M. (2015). Prevalence of obesity among adults and youth: United States, 2011-2014.NCHS data brief, no 219. Hyattsville, MD: National Center for Health Statistics.

Palmer, S. (2014). Assessing weight status – Is BMI the best tool? *Today's Dietitian, 16*(1), 30-34.

Parry, L. L., Netuveli, G., Parry, J., & Saxena, S. (2008). A systematic review of parental perception of overweight status in children. *Journal of Care Management, 31*(3), 253-268.

Perrin, E. M., Jacobson Vann, J.C., Benjamin, J. T., Cockrell Skinner, A., Wegner, S., & Ammerman, A. S. (2010). Use of a pediatrician toolkit to address parental perception of children's weight status, nutrition and activity behaviors. *Academic Pediatrics, 10*(4), 274-281.

Perrin, E. M., Cockrell Skinner, A., & Steiner, M. J. (2012). Parental recall of doctor communication of weight status. *Archives of Pediatric & Adolescent Medicine, 166*(4), 317-322.

Rao, G. (2008). Childhood obesity: Highlights of AMA expert committee recommendations.

American Family Physician, 78(1), 56-63.

Rao, G., Kirley, K., Weiss-Coleman, R., Inman, J. J., Bauer, V., Zhou, Y., & Hledin, V. (2015). Consumption patterns of sugar-sweetened carbonated beverage among children and adolescents. *Current Cardiovascular Risk Reports, 9*, 16-34.

Reilly, J. J., & Kelly, J. (2011). Long-term impact of overweight and obesity in childhood and adolescence morbidity and premature mortality in adulthood: systematic review. *International Journal of Obesity, 35*, 891-898.

Rendall, M. S., Weden, M. M., Fernandes, M., & Vaynman, I. (2012). Hispanic and black US children's path to high adolescent obesity prevalence. *Pediatric Obesity, 7*, 423-435.

Rietmeijer-Mentink, M., Paulis, W. D., van Middelkoop, M., Bindels, P. J. E., & van der Wouden, J. C. (2013). Difference between parental perception and actual weight status children: A systematic review. *Maternal and Child Nutrition, 9*, 3-22.

Rockeymoore, M., Moscetti, C., & Fountain, A. (2014). Rural childhood obesity prevention toolkit. Retrieved from http://www.rwjf.org/en/library/research/2014/10/rural-childhood-obesity-prevention-toolkit.html

Rubenstein, C. D. (2012). Faculty and staff development strategies to prevent childhood obesity. *American Journal of Maternal Child Nursing, 37*(6), 385-391.

Sanders, L. M., Federico, S., Klass, P., & Dreyer, B. (2009). Literacy and child health: A systematic review. *Archives of Pediatrics and Adolescent Medicine, 163*(2),131-140.

Sanders, L.M., Shaw, J.S., Guez, G., Baur, C., & Rudd, R. (2009. Health literacy and child health promotion: Implications for research, clinical care, and public policy. *Pediatrics, 124*, 306-314. doi:10.1542/peds.2009-1162G.

Shibli, R., Rubin, L., Akons, H., & Shaoul, R. (2008). Morbidity of overweight ($\geq 85^{th}$ percentile)

in the first 2 years of life. *Pediatrics, 122*(2), 1-14.

Stegelin, D. A. (2008). Children, teachers, and families working together to prevent childhood obesity: Intervention strategies. *Dimensions of Early Childhood, 36*(1), 8-16.

Sylvetsky-Meni, A. C., Gillepsie, S. E., Hardy, T., & Welsh, J. A. (2015). The impact of parents' categorization of their own weight and their child's weight on health lifestyle promoting beliefs and practices. *Journal of Obesity, 307381*, 1-7.

Taveras, E. M., Gortmaker, S. L., Mitchell, K.F., & Gillman, M. W. (2008). Parental perceptions of overweight counseling in primary care: The roles of race/ethnicity and parent overweight. *Obesity Journal, 16*(8), 1794-1801.

Tompkins, C. L., Seablom, M., & Brock, D. W. (2015). Parental perception of child's body weight: A systematic review. *Journal of Child and Family Studies, 24*(5), 1384-1391.

Towns, N., & D'Auria, J. (2009). Parental perceptions of their child's overweight: A Integrative review of the literature. *Journal of Pediatric Nursing, 24*(2), 115-130.

Vallejo, M., Cortes-Rodriguez, B. A., & Colin-Ramirez, E. (2015). Maternal underestimation of child's weight status and health behaviors as risk factors for overweight in children. *Journal of Pediatric Nursing, 30,* 29-33.

Vasyleva, T. L., Barche, A., Chennasamudram, S. P., Sheehan, C., Singh, R., & Okogbo, M. E. (2013). Obesity in prematurely born children and adolescents: Follow up in pediatric clinic. *Nutrition Journal, 12,* 150-157.

Vine, M., Hargreaves, M. B., Briefel, R.R., & Orfield, C. (2013). Expanding the role of primary care in the prevention and treatment of childhood obesity: A review of clinic and community-based recommendations and interventions. *Journal of Obesity, 172035*, 1-17.

Walling, A. D. (2008). Are parents' perceptions of the child's weight accurate? *American Family Physician, 77*(12), 1746-1258.

Wang, Y. C., Orleans, C. T., & Gortmaker, S. L. (2012). Reaching the Healthy People Goals for Reducing Childhood Obesity: Closing the Energy Gap. *American Journal of Preventive Medicine, 42*(5), 437-444.

Warschburger, P., & Kroller, K. (2009). Maternal perception of weight status and health risks associated with obesity in children. *Pediatrics, 124*(1), 1-14.

Warschburger, P., & Kroller, K. (2012). Childhood overweight and obesity: Maternal perceptions of the time for engaging in child weight management. *BMC Public Health, 12*, 295-303.

West, D. S., Raczynski, J. M., Phillips, M. M., Bursac, Z., Gauss, C. H., & Montgomery, B. E. E. (2008). Parental recognition of overweight in school-age children. *Journal of Obesity, 16* (3), 630-636.

White, R.O., Thompson, J. R., Rothman, R. L., McDougald Scott, A. M., Heerman, W.J., Sommer, E.C., & Barkin, S.L. (2013). A health literate approach to the prevention of childhood overweight in obesity. *Patient Education and Counseling*, *93*(3), 612-618.

Zimmerman, F. J., & Bell, J. F. (2010). Association of television content type and obesity in children. *American Journal of Public Health, 100*(2), 334-340.

Appendix A

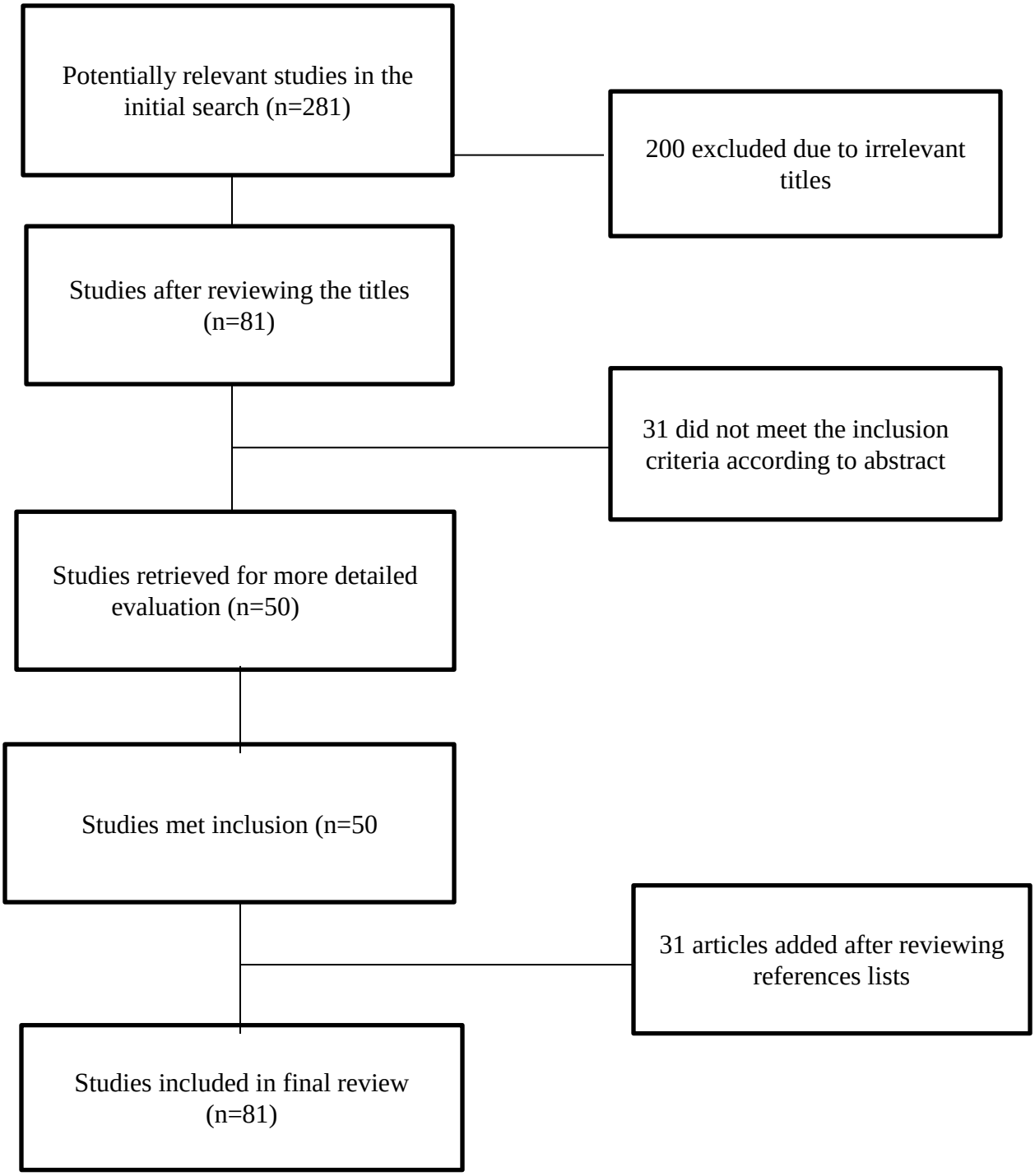
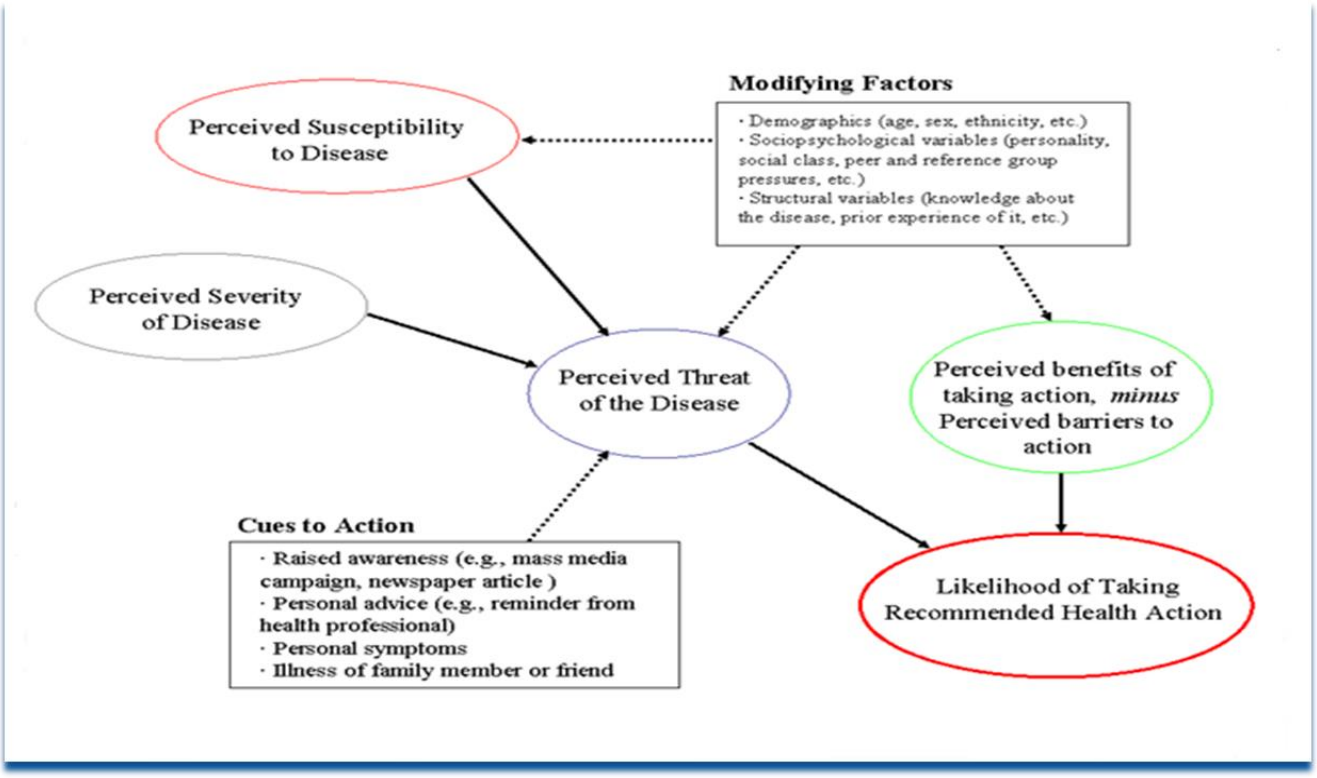


Figure 1: PRISMA Flow Chart

Appendix B

Health Belief Model



Source: https://www.med.uottawa.ca/sim/data/BehaviorChange_e.htm

Appendix C

What Is Your Child's Weight Status?

If your child has a BMI greater than 84%, there is a short educational study currently accepting patients. If you are interested, please let your nurse know or speak with Christy Robinson, your provider during your child's checkup. The study will only take 5-10 minutes of your time to answer the questionnaires. Your answers will be kept confidential and will not affect your child's medical care. Your participation is voluntary. No compensation will be provided for your participation. Your provider will discuss your child's weight status during their check up and provide educational materials to help your child maintain a healthier lifestyle if you decide to participate.

Appendix D

Boys body habitus silhouette

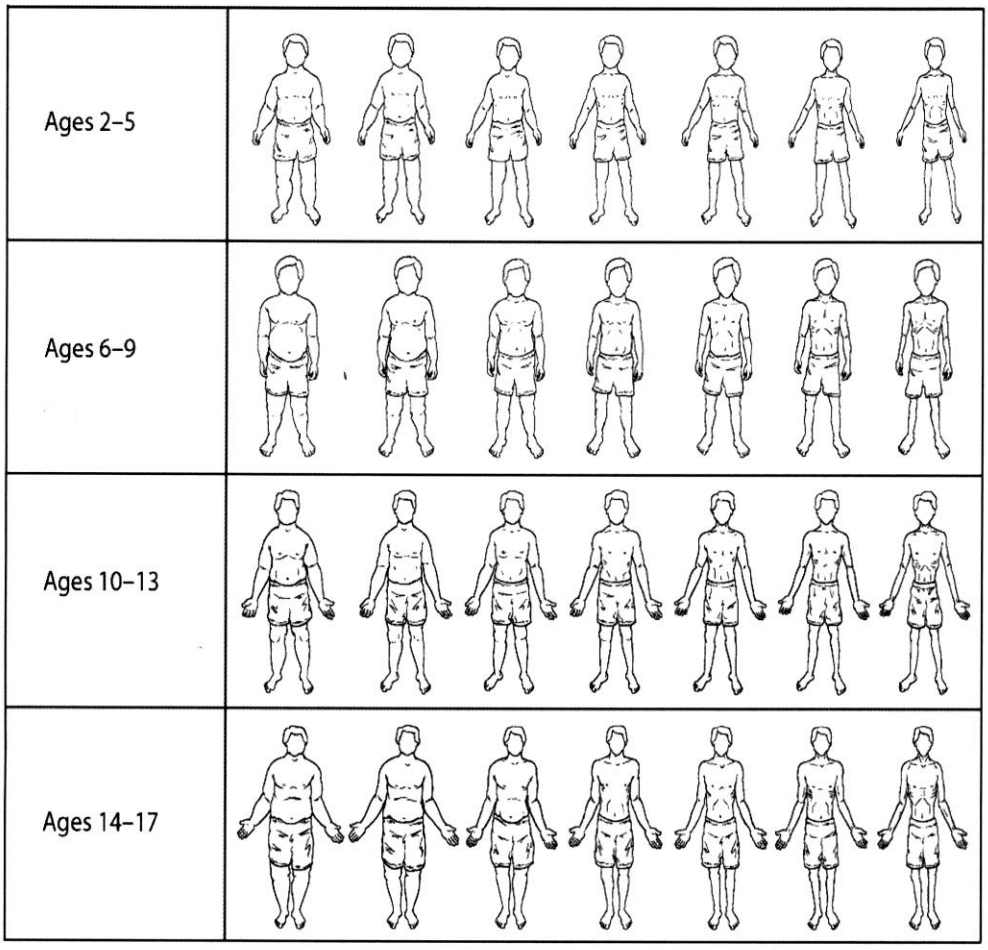


FIGURE 1
Gender– and age-range–specific sketches for boys. In analysis, sketch 7 on left (heaviest) and sketch 1 on right (lightest). (© 2003 Scott Millard.)

Source: Eckstein, K. C., Mikhail, L. M., Ariza, A. J., Thomson, J. S., Millard, S. C., & Binns, H. J. (2006). Parents' perceptions of their child's weight and health. Pediatrics, 117(3), 681-690. DOI: 10.1542/peds.2005-0910

Appendix E

Girls body habitus silhouette

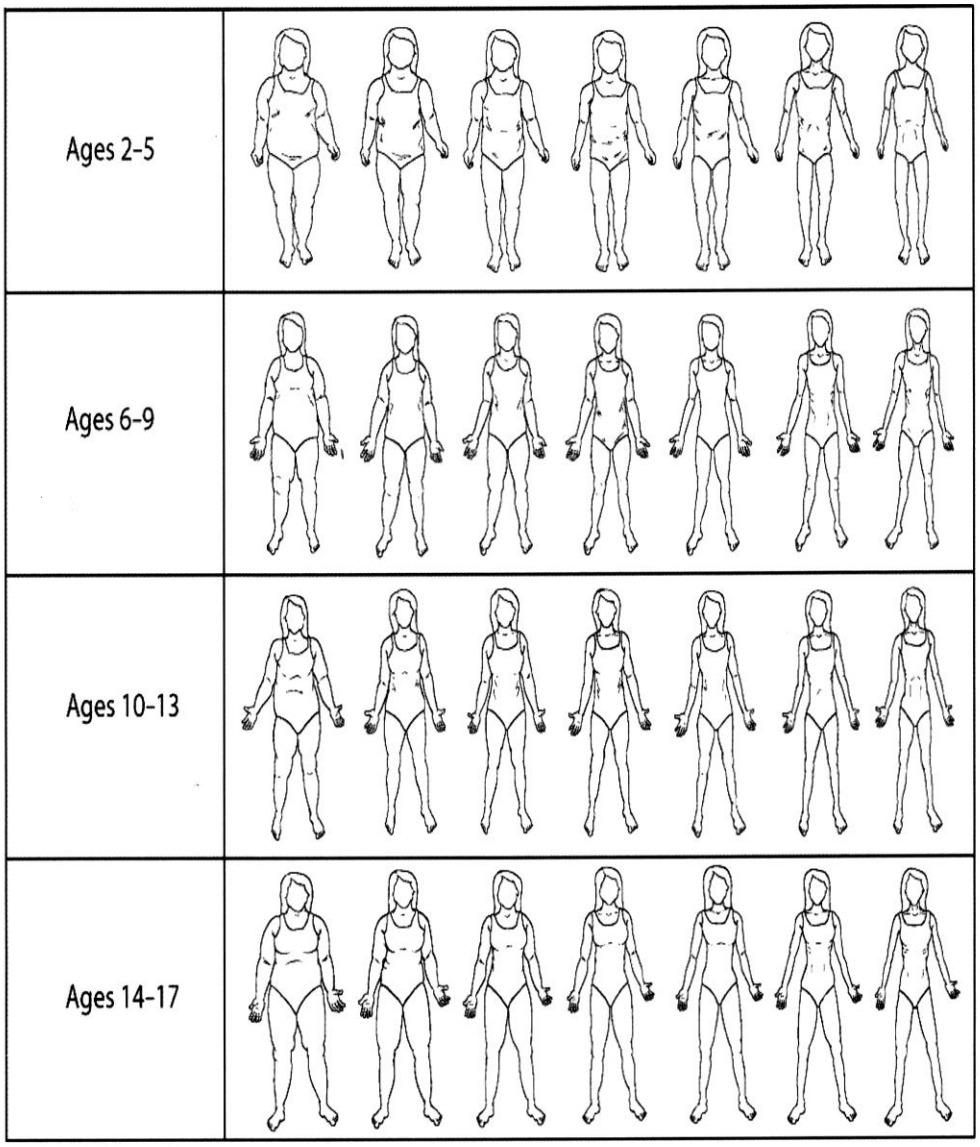
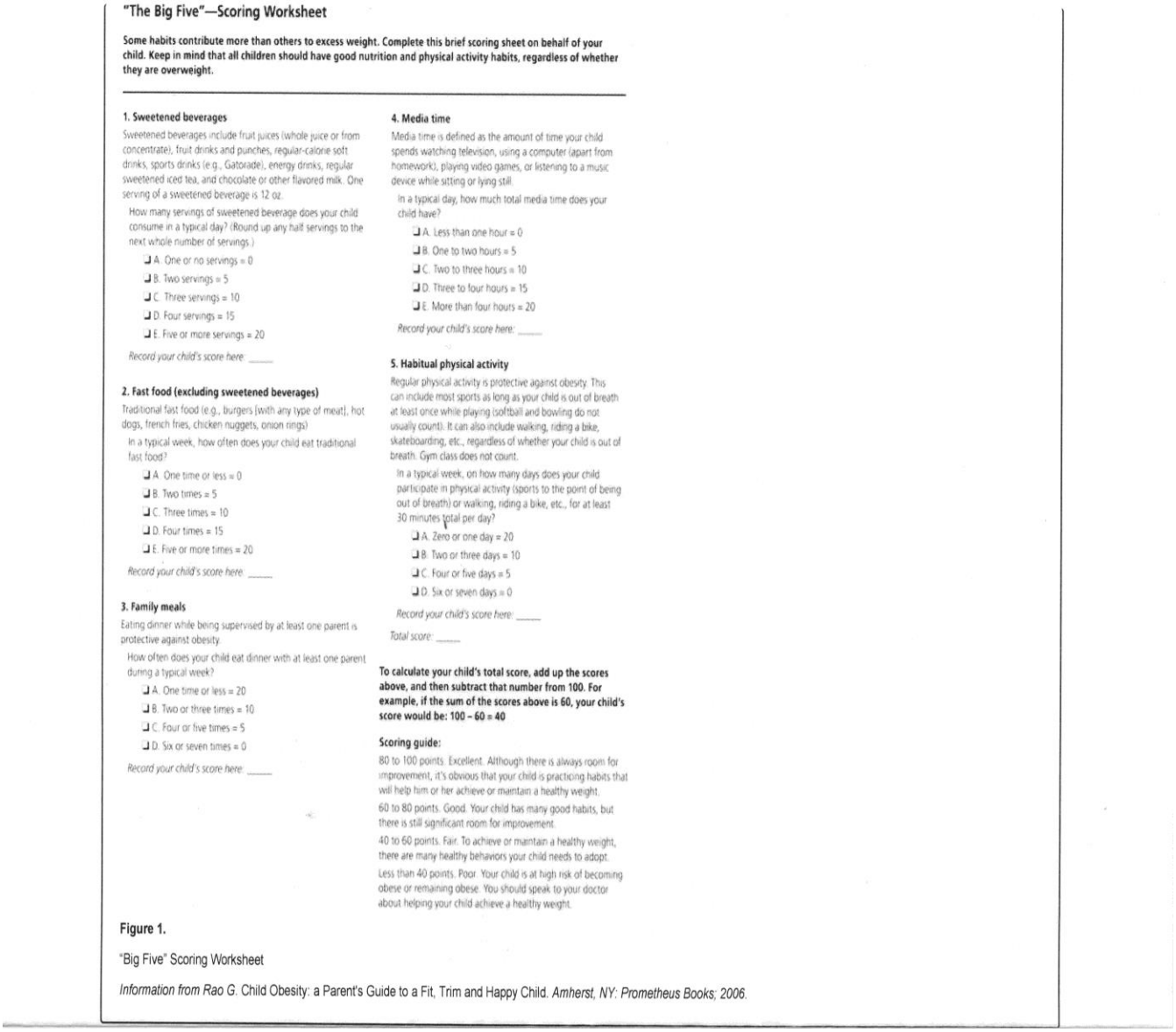


FIGURE 2
Gender– and age-range–specific sketches for girls. In analysis, sketch 7 on left (heaviest) and sketch 1 on right (lightest). (© 2003 Scott Millard.)

Source: Eckstein, K. C., Mikhail, L. M., Ariza, A. J., Thomson, J. S., Millard, S. C., & Binns, H. J. (2006). Parents' perceptions of their child's weight and health. Pediatrics, 117(3), 681-690. DOI: 10.1542/peds.2005-0910

Appendix F

Healthy habits questionnaire



"The Big Five"—Scoring Worksheet

Some habits contribute more than others to excess weight. Complete this brief scoring sheet on behalf of your child. Keep in mind that all children should have good nutrition and physical activity habits, regardless of whether they are overweight.

1. Sweetened beverages

Sweetened beverages include fruit juices (whole juice or from concentrate), fruit drinks and punches, regular-calorie soft drinks, sports drinks (e.g., Gatorade), energy drinks, regular sweetened iced tea, and chocolate or other flavored milk. One serving of a sweetened beverage is 12 oz.

How many servings of sweetened beverage does your child consume in a typical day? (Round up any half servings to the next whole number of servings.)

- ❑ A. One or no servings = 0
- ❑ B. Two servings = 5
- ❑ C. Three servings = 10
- ❑ D. Four servings = 15
- ❑ E. Five or more servings = 20

Record your child's score here: _____

2. Fast food (excluding sweetened beverages)

Traditional fast food (e.g., burgers [with any type of meat], hot dogs, french fries, chicken nuggets, onion rings)

In a typical week, how often does your child eat traditional fast food?

- ❑ A. One time or less = 0
- ❑ B. Two times = 5
- ❑ C. Three times = 10
- ❑ D. Four times = 15
- ❑ E. Five or more times = 20

Record your child's score here: _____

3. Family meals

Eating dinner while being supervised by at least one parent is protective against obesity.

How often does your child eat dinner with at least one parent during a typical week?

- ❑ A. One time or less = 20
- ❑ B. Two or three times = 10
- ❑ C. Four or five times = 5
- ❑ D. Six or seven times = 0

Record your child's score here: _____

4. Media time

Media time is defined as the amount of time your child spends watching television, using a computer (apart from homework), playing video games, or listening to a music device while sitting or lying still.

In a typical day, how much total media time does your child have?

- ❑ A. Less than one hour = 0
- ❑ B. One to two hours = 5
- ❑ C. Two to three hours = 10
- ❑ D. Three to four hours = 15
- ❑ E. More than four hours = 20

Record your child's score here: _____

5. Habitual physical activity

Regular physical activity is protective against obesity. This can include most sports as long as your child is out of breath at least once while playing (softball and bowling do not usually count). It can also include walking, riding a bike, skateboarding, etc., regardless of whether your child is out of breath. Gym class does not count.

In a typical week, on how many days does your child participate in physical activity (sports to the point of being out of breath) or walking, riding a bike, etc., for at least 30 minutes total per day?

- ❑ A. Zero or one day = 20
- ❑ B. Two or three days = 10
- ❑ C. Four or five days = 5
- ❑ D. Six or seven days = 0

Record your child's score here: _____

Total score: _____

To calculate your child's total score, add up the scores above, and then subtract that number from 100. For example, if the sum of the scores above is 60, your child's score would be: 100 – 60 = 40

Scoring guide:

80 to 100 points. Excellent. Although there is always room for improvement, it's obvious that your child is practicing habits that will help him or her achieve or maintain a healthy weight.

60 to 80 points. Good. Your child has many good habits, but there is still significant room for improvement.

40 to 60 points. Fair. To achieve or maintain a healthy weight, there are many healthy behaviors your child needs to adopt.

Less than 40 points. Poor. Your child is at high risk of becoming obese or remaining obese. You should speak to your doctor about helping your child achieve a healthy weight.

Figure 1.

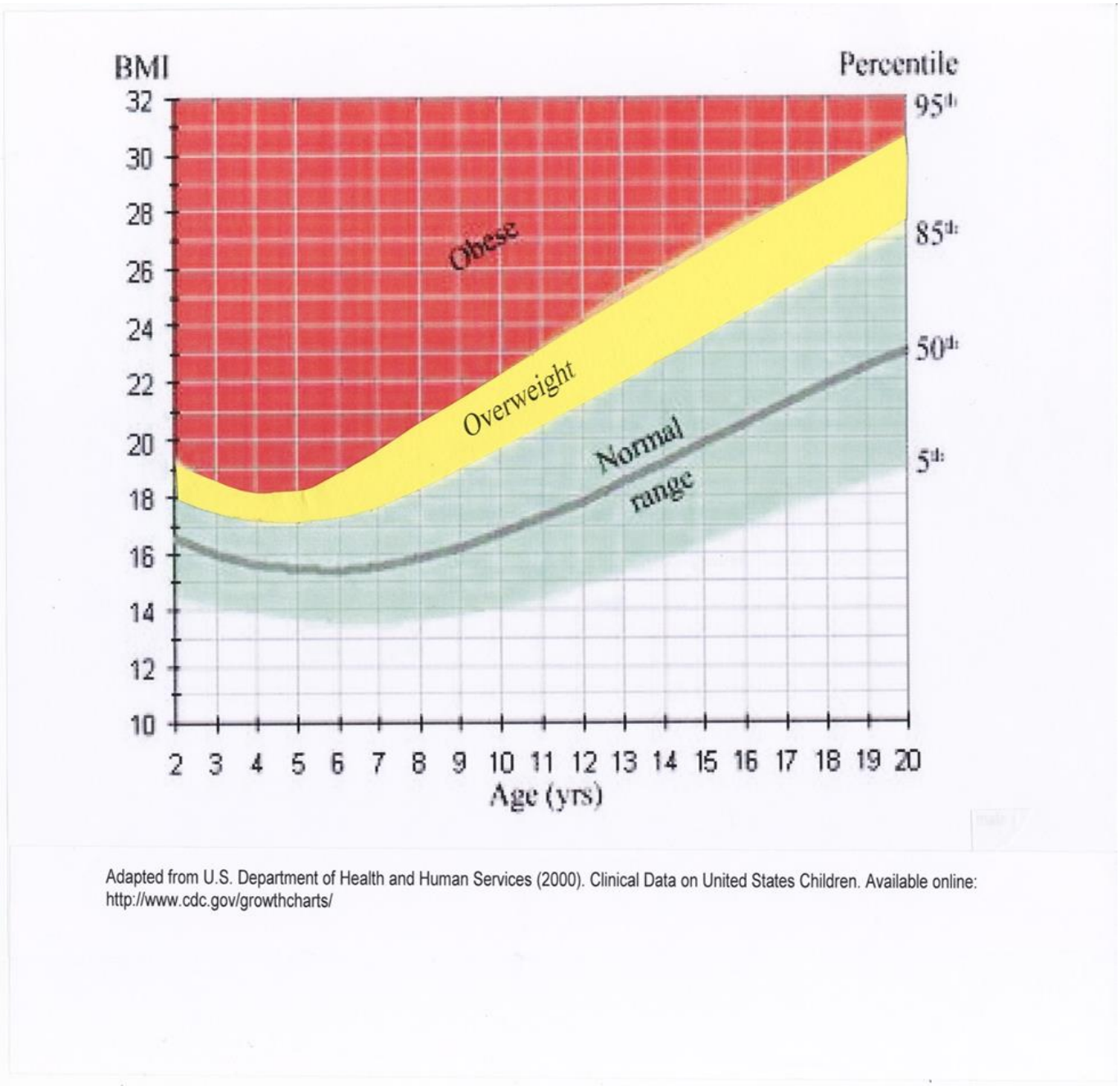
"Big Five" Scoring Worksheet

Information from Rao G. Child Obesity: a Parent's Guide to a Fit, Trim and Happy Child. *Amherst, NY: Prometheus Books; 2006.*

Source: Used with permission from Goutham Rao, MD

Appendix G

Color coded BMI chart



Adapted from U.S. Department of Health and Human Services (2000). Clinical Data on United States Children. Available online: http://www.cdc.gov/growthcharts/

Appendix H

Demographic Record

Date: _____

Name: _____

Gender: _____

Age: _____

Ethnicity: _____

Weight: _____

Height: _____

BMI: _____

Appendix I

Handout

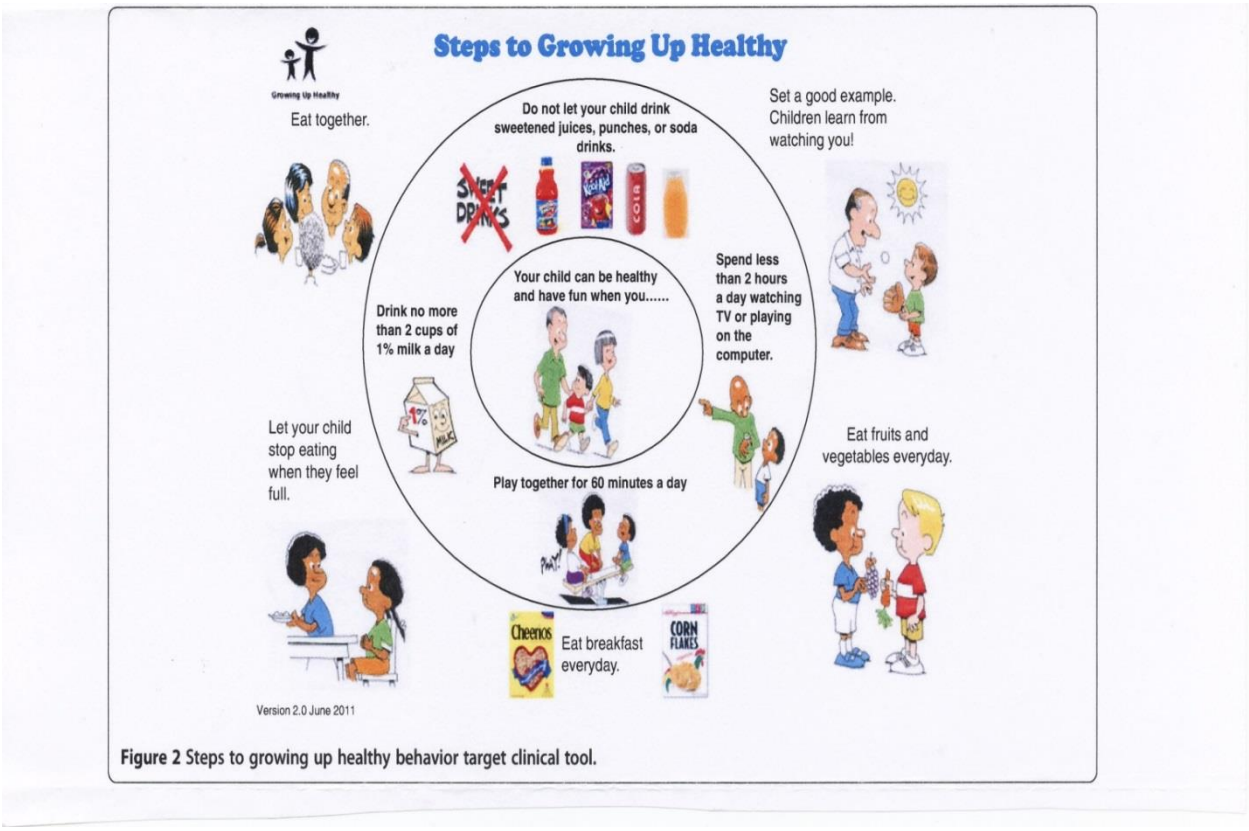


Figure 2 Steps to growing up healthy behavior target clinical tool.

Steps to Growing Up Healthy: a Pediatric Primary Care Based Obesity Prevention Program for Young Children - Scientific Figure on ResearchGate. Available from: https://www.researchgate.net/Steps-to-growing-up-healthy-behavior-target-clinical-tool_fig2_259881326 [accessed 25 Apr, 2018]

Appendix J

Script

I have reviewed the questionnaire that you filled out and I see that there are several behaviors that need to change to help (patient name) achieve a healthier weight. Are you interested in working on making some changes?

Eating fast food is convenient for busy families but most of the food is calorie dense and can lead to extra calories. Do you think you can limit eating out to once a week? When you do eat fast food try to make healthier choices by selecting salads instead of burgers, fruit instead of fries and water or low fat milk instead of soda.

The amount of soft drink and juice that (patient name) is consuming is part of the problem. Do you think (patient name) can cut down from 3 or 4 cups of soda and juice to 1 cup of soda or juice per day? This won't be easy but try to substitute water whenever you can.

It seems that (patient name) doesn't get much regular physical activity. Physical activity can be as simple as walking or riding bikes. 30 to 60 minutes most days of the week is recommended but it doesn't have to be done all at once. Do you think you could take a walk for 10 minutes? after school every day? Once you get in a routine I think you will find it easier to add in more physical activities.

Spending less time playing video games or watching television will allow more time to be physically active and help (patient name) meet their goal of achieving a healthier weight.

Appendix K

Improving Parental Perception of Child Weight Status in a Rural Medical Center

Informed Consent Agreement

Please read this consent agreement carefully before you decide to participate in the study.

Purpose of the research study: The purpose of the study is to evaluate parental perception of their child's weight status and to determine their health habits.

What you will do in the study: The clinician will meet the parent when they arrive for their child's scheduled appointment and explain the study and invite them to participate in the study. If they agree, a consent form will be provided for their signature. A clipboard with the body habitus silhouette chart and health habits questionnaire will be provided for them to fill out while they are in the exam room. During the health care appointment the provider will use a color coded BMI chart to help parents be able to better understand their child's health risk from childhood obesity. The health habits questionnaire will show the provider which health habits need to be addressed at future visits. Parents will be given a handout that lists recommendations to help their child adopt health habits. Parents will complete a second body habitus silhouette chart at their child's follow up visit 4 weeks later.

Time required: The study will require about 15 minutes of your time.

Risks: There are no anticipated risks in this study.

Benefits: There are no direct benefits to you for participating in this research study. The study may help us better understand parental perception about childhood obesity.

Confidentiality: Participant's data will be kept private and confidential. Data that is collected will be stored in a locked cabinet and destroyed at the conclusion of the study.

Data linked with identifying information:

Your information will be assigned a code number. The list connecting your name to this code

will be kept in a locked file. When the study is completed and the data have been analyzed, this list will be destroyed. Your name will not be used in any report.

Confidentiality cannot be guaranteed: Every effort will be made to maintain confidentiality.

Voluntary participation: Your participation in the study is completely voluntary and your child's healthcare will not be affected by their participation in the study.

Right to withdraw from the study: You have the right to withdraw from the study at any time without penalty.

How to withdraw from the study: If you want to withdraw from the study, "tell the interviewer to stop the interview"). There is no penalty for withdrawing.

Payment: You will receive no payment for participating in the study.

If you have questions about the study, contact:

Christy Robinson
PATHS 4 South Main Street Chatham, VA 24531
434-432-4443 E-mail: crobinson@ pathsinc.org

Amy D. Boitnott, DNP, FNP-BC, CPNP-PC
Assistant Professor and Coordinator, Primary Care Nurse Practitioner Program
UVA School of Nursing MCL 4006
Tele[hone: (434) 982-1094
E-mail: ald4p@hscmail.mcc.virginia.edu

If you have questions about your rights in the study, contact:
Tonya R. Moon, Ph.D.
Chair, Institutional Review Board for the Social and Behavioral Sciences
One Morton Dr Suite 500
University of Virginia, P.O. Box 800392
Charlottesville, VA 22908-0392
Telephone: (434) 924-5999
Email: irbsbshelp@virginia.edu
Website: www.virginia.edu/vpr/irb/sbs

Agreement:
I agree to participate in the research study described above.

Signature: _____ Date: _____

You will receive a copy of this form for your records.

Appendix L

Statistics

		Actual BMI	Perc BMI	Difference between baseline BMI and baseline perceived BMI	BMI 1 mo later	1 mo later	Difference between 1 mo BMI and 1 mo perceived BMI
N	Valid	51	51	51	15	15	15
	Missing	0	0	0	36	36	36
Mean		94.0278	59.22	34.8122	94.5353	80.33	14.2020
Median		96.7300	50.00	36.6200	97.0600	85.00	13.9100
Mode		85.02[a]	50	11.60[a]	88.15[a]	85	13.15
Std. Deviation		5.28448	14.573	11.93448	5.64885	5.164	3.36707
Skewness		-.460	.015	.111	-.536	-.149	2.466
Std. Error of Skewness		.333	.333	.333	.580	.580	.580

a. Multiple modes exist. The smallest value is shown

Statistics

Difference between baseline BMI and baseline perceived BMI	Difference between 1 mo BMI and 1 mo perceived BMI
51	15
0	36
23.6900	12.0600
36.6200	13.9100
43.3900	14.9900

Appendix M

advance healthcare NETWORK | FOR NPs&PAs | Nurse Practitioner Perspective

GUIDELINES
FOR CONTRIBUTORS

Thank you for your interest in submitting an article to *Nurse Practitioner Perspective* or *ADVANCE for NPs & PAs*. This guide explains the submission process for each media type and provides tips that will assist in successful publication.

Nurse Practitioner Perspective is a bimonthly magazine for nurse practitioners as well as advanced practice nurses who have earned a doctorate of nursing practice (DNP). *ADVANCE for NPs & PAs* is a vibrant website and web community that publishes peer-reviewed scientific articles written by NPs and PAs, plus blogs and columns on subjects of interest to NPs and PAs.

NURSE PRACTITIONER PERSPECTIVE

Nurse Practitioner Perspective publishes articles on specific topic areas requested by NPs: education, career development, practice ownership, business management, legal issues, prescribing news and trends, the DNP degree, national health issues, nutrition, complementary care, and the intersection of person and provider (a category we call "The NP Life"). Each issue of *Nurse Practitioner Perspective* contains one peer-reviewed article that is eligible for CE credit.

Articles are selected for publication in *Nurse Practitioner Perspective* based on their quality and timeliness and whether the subject fits into the established topic categories described above. After review by the editor, some submissions are also reviewed by our editorial advisory board or our manuscript review panel. The only article submissions that undergo blinded peer review are those on prescribing topics and those considered for CE credit.

Articles accepted for publication in *Nurse Practitioner Perspective* appear in the print and digital editions of the magazine and are then archived on the *ADVANCE for NPs & PAs* website (www.advanceweb.com/NPPA). Archived articles are stored permanently and are searchable and retrievable using author names and key words.

Manuscript requirements for *Nurse Practitioner Perspective*:

- Submit the article as a Microsoft Word document, emailed to mperron@advanceweb.com. Maximum word length is 1,500 words. CE articles should be 2,500 words.
- Use your choice of font. Do not insert footnote, endnote or other formatting features in the document. It should be a clean and simple presentation of the article text.
- Submit tables and figures in a separate Word document. Do not apply color or other special features. Design tables using the Table feature of Microsoft Word.
- If reference citations are necessary for the information presented in your article, follow AMA style for numbering and citations. Find a tipsheet for AMA reference style here: http://library.nymc.edu/informatics/amastyle.cfm. Place the reference list in the same Word document as the article.
- Visual images can enhance the presentation of your article. Obtain permission to reproduce any material owned or created elsewhere. Write captions explaining what is shown in the image, and provide these captions in a single Word document. Electronic images should be sent as JPEG files at a resolution of at least 300 dpi. If this resolution is not available, the image should be saved at a minimum width of 8 inches.

ADVANCE FOR NPs & PAs

ADVANCE for NPs & PAs (www.advanceweb.com/NPPA) is a website and community that attracts more than 1 million visits per year. The site presents a blend of peer-reviewed clinical content, professional news, blogs and columns, and live and archived learning events. The site is also home to the National Salary Survey of NPs & PAs, conducted annually.

This website publishes clinical articles written by NPs, PAs and members of other health professions. Manuscripts written by students in NP and PA programs are also eligible for consideration. Clinical articles are evaluated in a blinded peer review process by our manuscript review panel.

Topics published on the *ADVANCE for NPs & PAs* website are wide ranging, but we especially encourage submissions on pediatrics, women's health, men's health, geriatrics, allergy and asthma, oncology and emergency medicine. These topics have been identified in reader surveys. We also encourage the submission of case studies and have a dedicated area for these articles ("Case Files").

Manuscript requirements for the *ADVANCE for NPs & PAs* website:

- Submit your article as a Microsoft Word document that is designed simply, without endnotes, footnotes or other extraneous formatting. Maximum length is 2,000 words. Send the submission to mperron@advanceweb.com.
- Include the reference list in the same Word document as the article. For reference citations and formatting, follow AMA style. A tipsheet is available at http://library.nymc.edu/informatics/amastyle.cfm.
- Save tables and figures in documents separate from the article. Do not use color or other design elements in tables. Design them simply using the Table feature in Word.
- Photographs, diagnostic studies and similar images add visual interest and are encouraged. Obtain permission to reproduce from their original creator or owner prior to submission. If you are submitting a patient photo, send the release form with your submission. Electronic images should be sent as JPEG files at a resolution of at least 300 dpi. If this resolution is not available, the image should be saved at a minimum width of 8 inches.
- Manuscripts submitted to are sent to the review panel once every 6 weeks. Your submission will be included in the next scheduled review cycle. In most cases, we are able to notify you about acceptance 8 to 10 weeks after submission.
- If accepted, your article will be published on our site and appear on the homepage during the first week that it is live. After about a week, it will move to our archives, where it is permanently searchable and retrievable using your name or key words from the article.

Should you have any questions about the manuscript submission process for our respected print and web media products for NPs and PAs, please contact the editor, Michelle Perron, at mperron@advanceweb.com. Phone: 610-278-1400, Ext. 1221.

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