

ASSESSMENT OF OBESE CHILDREN  
WITHIN A FAMILY-BASED INTERVENTION PILOT STUDY

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**Title**

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The Supervisory Committee certifies that this *disquisition* complies with North Dakota State University's regulations and meets the accepted standards for the degree of

**DOCTOR OF NURSING PRACTICE**

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## ABSTRACT

About one third of children in the United States are overweight or obese. Multiple comorbidities coincide with obesity affecting children physically and emotionally, which in turn impacts obese children's quality of life. Despite the increased prevalence and negative consequences of pediatric obesity, few evidence-based practice or generalizable assessment tools exist. The purpose of this project is to transition a generalizable, evidence-based pediatric obesity assessment tool from research into practice in a local pediatric obesity program which can later be utilized in primary care in order to implement early intervention with obese children.

The pediatric obesity specific quality of life measurements for children and their parents, "Sizing Me Up" and "Sizing Them Up," were presented to two providers with clinical expertise from a local family-based obesity intervention outpatient program. These specific measurements, along with height, weight, BMI, and readiness for change assessment, were utilized by the providers at the beginning and end of the 10-week program consisting of 10 families. Evaluation of the assessment tool was conducted through a Likert Scale survey of the providers to determine the utilization, ease, and difficulty of use of the pediatric obesity assessment tool.

The providers evaluated the tool as having quality utilization, good clinical battery, and ease of implementation. Therefore the tool is ready for implementation into primary care. By transitioning an evidence-based pediatric obesity assessment tool from research into practice, advanced practice nurses will be able to more accurately and fully assess obese children so that interventions can be implemented expeditiously.

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## CHAPTER ONE. INTRODUCTION

### Background and Significance

About one third of children in the United States are overweight or obese (Klish, 2011b). The National Health and Nutrition Examination Survey monitors the national prevalence of overweight and obese adults and children in the United States. In 2009-2010, 16.9% of 2-19 year olds were obese as defined by a body mass index (BMI) greater than or equal to the 95<sup>th</sup> percentile based on sex and age (Fryar, Carroll, & Ogden, 2012). Four percent of children and adolescents are considered severely obese measured based on a BMI greater than or equal to 120% of the 95<sup>th</sup> percentile values or a BMI greater than or equal to 35 in children (Klish, 2011b).

Since the 1970's, there has been a three to six fold increase in the prevalence of obesity (United States Preventative Services Task Force, 2010). A plateau was reached around the year 2000. The percentage of children and adolescents in each weight category remained relatively stable between the years 2000-2008 (Fryar et al., 2012; Klish, 2011b). The 2009-2010 National Health and Nutrition Examination Survey revealed 12.1% of 2-5 year olds are obese, 18% of children ages 6-11 and 18.4% of 12-19 year olds are obese (Fryar et al., 2012).

Obesity rates tend to be higher in older children and in males (USPSTF, 2010). Childhood obesity is more common among non-Hispanic blacks, and Mexican Americans compared to non-Hispanic whites (Fryar et al., 2012; Gance-Cleveland, Sidora-Arcoleo, Keesing, Gottesman, & Brady, 2009; Klish, 2011b; Tyler & Horner, 2008). Having an obese parent increases a child's risk of being obese by two to three times. Obesity tends to be more common in low-income families (Klish, 2011b).

## **The Problem of Childhood Obesity**

For the first time in modern history, children will have more chronic disease and decreased life expectancy in comparison to their parents due to the consequences of obesity (Tyler & Horner, 2008). The health outcomes that result from obesity involve numerous body systems including the cardiovascular, metabolic, respiratory, gastrointestinal, renal, musculoskeletal, reproductive, and psychological (Hopkins, DeCristofaro, & Elliott, 2011). Over half of overweight children ages five to ten have at least one cardiovascular risk factor such as hypertension or dyslipidemia (Tyler & Horner, 2008). In a population based sample of five to seventeen year olds, 70% of obese children had at least one cardiovascular risk factor while 39% had two or more risk factors (Vaczy, Seaman, Peterson-Sweeney, & Hondorf, 2011).

Preschool aged children greater than the 95<sup>th</sup> percentile for BMI are five times more likely to be obese by age 12 compared to 2-5 year olds with a BMI less than the 85<sup>th</sup> percentile (Boles, Scharf, & Stark, 2010). Overweight adolescents have a 50-70% chance of being overweight or obese as an adult (Hopkins et al., 2011). In addition to the high prevalence of obesity and the comorbidities that result, obesity also contributes to economic consequences. In 2006, an obese American cost an average of 42% more in health care expenditures than a normal-weight American (National Institutes of Health, 2010).

Despite the prevalence and negative consequences of pediatric obesity, few evidence based practice, generalizable assessment and intervention tools exist. A local clinic is creating a family based intervention pediatric obesity program to demonstrate

feasibility and compliance. The program does not have an assessment tool to measure children at the beginning of the program.

**Problem Statement**

A local clinic has no generalizable evidence based pediatric obesity screening assessment tool that can be utilized in primary care in order to implement early intervention with obese children.

## **CHAPTER TWO. LITERATURE REVIEW AND STUDY FRAMEWORK**

### **Review of Literature**

The seriousness and increased prevalence of pediatric obesity has led to a great deal of research on overweight and obese children and adolescents. In order to have an effective impact on reversing childhood obesity, an understanding of the seriousness of negative outcomes due to excessive weight must be established. Ascertaining measurement guidelines provides mechanisms to determine the successfulness of family, parent, nutrition, physical activity, sleep, and cognitive behavioral therapy interventions. Reviewing the literature provides an exploration of ways in which healthcare providers have assessed, measured, and intervened with the weight status of children and adolescents.

#### **Comorbidities.**

Pediatric obesity is one of the most important public health problems in the United States mainly due to the increase of comorbidities that excess weight creates (Klish, 2011b). Consequences resulting from obesity include cardiovascular, metabolic, respiratory, gastrointestinal, renal, musculoskeletal, reproductive, and psychological body systems (Hopkin et al., 2011). Cardiovascular complications include dyslipidemia, hypertension, left ventricular hypertrophy, endothelial abnormalities, and early atherosclerosis (Hopkins et al., 2011; Jones, Lettenberger, & Wickel, 2011; Tyler & Horner, 2008).

Metabolic consequences of obesity include insulin resistance, hyperinsulinemia, increased risk of type two diabetes mellitus, and metabolic syndrome. Obesity can affect the respiratory system by inducing sleep apnea and asthma by a mechanical and inflammatory process (Hopkins et al., 2011; Jones et al., 2011; Tyler & Horner, 2008).

Obesity produces effects on the gastrointestinal system through nonalcoholic fatty liver disease, gallbladder disease, gastroesophageal reflux disease, and altered responses to medications (Hopkins et al., 2011; Jones et al., 2011). Musculoskeletal complications can include slipped capital femoral epiphysis, tibia vara, and osteoarthritis. Obesity can increase the risk for polycystic ovary syndrome and pregnancy complications (Hopkins et al., 2011; Jones et al., 2011; Tyler & Horner, 2008). In addition, obesity increases anesthesia risks (USPSTF, 2010). More prevalent obesity can also induce a shorter life expectancy (Jones et al., 2011).

Obesity also has the ability to provoke depression, anxiety, low self-esteem, disturbed body image, negative self-perception, and low health related quality of life (Hopkins et al., 2011; Small et al., 2009). Psychological factors may be a result of relationships with peers, discrimination, or a physiologic response (Small et al., 2009). Decreased self-esteem is more prevalent in girls, children and adolescents whom are morbidly obese, and those who are socially isolated. Defiance and aggression can also be seen if obesity continues into adolescence from childhood (Jones et al., 2011). A study conducted in Sweden of eight to nineteen year olds with a mean BMI of 32.5 produced conflicting results. Age and gender were significant for low self-esteem but BMI was not. Self-esteem was below normal levels at increased ages for both genders. Overall, the girls had significantly lower self-esteem. The study concluded that the severity of obesity did not affect self-esteem (Nowicha et al., 2009).

### **Environmental versus genetic factors.**

In order to contemplate ideas for the treatment of obesity, one must have an understanding of dynamics that promote obesity. Many hypotheses exist as to which

environmental factors affect obesity and which factors have created the current pediatric obesity epidemic. According to the American Academy of Pediatrics policy statement on prevention of pediatric overweight and obesity, genetics, biological, psychological, sociocultural, and environmental factors all play a role. Environmental factors include prenatal, genetic, social, endocrine, feeding behaviors, nutritional components, activity level, and types of activity (Hopkins et al., 2011).

An increase in sedentary lifestyle and greater caloric intake likely contribute to the current trend of overweight children (Klish, 2011b). Additionally, the availability of cheaper foods with high sugar and fat content, socioeconomic transitions, urbanization, mechanization, and rural-to-urban migration are also hypothesized (Arslan, Erdur, & Aydin, 2010). Janicke et al. (2009) suggest that children in medically underserved rural areas have an increased risk of obesity compared to their non-rural peers. A decrease in structured physical activity, decrease in duration of sleep, and a change in elements of built structures such as the availability of sidewalks and playgrounds may contribute to obesity (Klish, 2011b).

Research shows that environmental cues override children's internal satiety signals by around the age of four (Small et al., 2009). Sugar containing beverages and low physical activity are associated with obesity or metabolic abnormalities. Dietary factors contributing to increase weight include an increase in the glycemic index of foods, increased sugar containing beverages, increased portion sizes, availability of fast food, and a decrease in the number of family meals (Klish, 2011b).

Klish (2011b) examines multiple environmental factors and reports a direct relationship between the amount of time spent watching television and the prevalence of

obesity. Shortened sleep duration is also associated with obesity or insulin resistance. Some medications can also contribute to an increase in weight such as the psychoactive drugs Olanzapine and Risperidone as well as some antiepileptic and glucocorticoid medications. Metabolic programming is increasingly being studied and has increased evidence that environmental and nutritional influences during development predispose an individual's weight. A mother's pre-pregnancy weight and amount of weight gain during pregnancy predicts a child's birth weight. Children born to mothers with a history of gastric bypass surgery have decreased obesity rates compared to those born before gastric bypass surgery. Evidence also exists supporting breastfeeding as protective against obesity of the child. Multiple studies also reveal an association among rates of weight gain in infancy and early childhood and the prevalence of obesity and or metabolic syndrome during childhood, adolescence or adulthood. The associations of BMI among a parent and child are equally strong in fathers as in mothers (Klish, 2011b).

Tyler and Horner (2008) propose that the genetic contribution to obesity is from 30-70% but genetics do not predetermine health outcomes. An individual's lifestyle has a huge impact on their health outcomes. Klish (2011b) suggests that heredity contributes to weight status by 30-35% however, genetic polymorphisms have not been found yet. Rare specific syndromes such as Prader-Willi Syndrome which consists of mutations in the melanocortin four receptor is an example of a single gene defect that only contributes to 4-6% of severe obesity (Klish, 2011b).

Less than one percent of obese children have endocrine disorders such as hypothyroidism, cortisol excess, growth hormone deficiency, or acquired hypothalamic lesions (Klish, 2011b). Arslan et al. (2010) studied the interplay of metabolic, hormonal,

genetic, and psychosocial factors that influence obesity. Adipose tissue acts as an endocrine organ by producing several proteins called adipokines. Adipocytes, cells of adipose tissue, store and release energy in the form of triglycerides during excess food consumption and starved periods. The liver contributes to the systemic inflammation of obesity but adipose tissue plays a bigger role. The components of the adipose tissue include fibroblasts, pre-adipocytes, adipocytes, macrophages, and vascular tissue. Once pre-adipocytes mature, they acquire similar functions of macrophages including responding to bacterial cell wall products, inducing cytokine cascades, and secreting cytokines or acute phase reactants. Cytokines produced by adipose tissue include interleukin-6 (IL-6), tumor necrosis factor alpha (TNF-alpha) and adiponectin. Cytokines induce a pro-inflammatory stage causing insulin resistance and endothelial dysfunction (Arslan et al., 2010).

Multiple hormones influence weight. The hormone Ghrelin is a peptide of 28 amino acids that enter the brain through the bloodstream after being secreted by the stomach. Ghrelin's roles include the regulation of energy balance, appetite, weight gain, increasing gastric motility, gastric and pancreatic secretions, regulating glucose and lipid metabolism, stimulating cellular differentiation in adipose tissue, inhibiting apoptosis in adipocytes, inhibiting lipolysis and stimulating lipogenesis. Ghrelin contributes to preprandial hunger signals which increases food intake, decreases the use of fat as metabolic fuel, and promotes fat deposition. Fasting and chronic food restrictions increase serum ghrelin which is negatively correlated with body mass index. Ghrelin is also a marker of insulin resistance (Arslan et al., 2010).

Obestatin is also a hormone produced in the stomach which suppresses food intake, inhibits gastrointestinal motility and decreases body weight. Obestatin levels are



significantly lower in obese individuals compared to lean individuals. Leptin is produced by adipose tissue and when it reaches the brain, inhibits energy intake. Leptin is a marker for cardiovascular risk factors and the presence of metabolic syndrome. In obese individuals, excessive food intake increases leptin levels. Leptin deficiency decreases appetite and induces weight loss (Arslan et al., 2010).

TNF-alpha is a proinflammatory cytokine produced by macrophages, lymphocytes, and a small amount from adipose tissue. One hypothesis proposes leptin and other adipokines may induce TNF-alpha secretion. TNF-alpha contributes to insulin resistance and endothelial inflammatory changes. Inflammatory changes of vascular tissue induce endothelial damage which causes hypertension. IL-6 is significantly enhanced by adipose tissue and also contributes to insulin resistance and increases the risk for cardiovascular complications, atherosclerotic plaques, and fatty liver. IL-10 is a cytokine secreted by activated macrophages and lymphocytes. IL-10 has insulin-sensitizing, anti-inflammatory and endothelial protective properties by antagonizing TNF-alpha and IL-6. Obese individuals as well as those with metabolic syndrome and type II diabetes have lower productions of IL-10 (Arslan et al., 2010).

#### **Assessing weight status.**

There is limited literature on comparing instruments to determine the accuracy of measurements of weight status however, conflicting results exist. Evans and Colls (2009) argue that body mass index (BMI) is a poor indicator of weight status but do not provide an alternative. Skinfold measurements have been indicated as the best non-invasive technique in predicting subcutaneous and intra-abdominal fat in six and seven year olds. Supra-iliac and abdominal skinfolds together provide the best indicator for subcutaneous abdominal

adipose tissue (Liem et al., 2009). In contrast, Paineau et al. (2008) report skinfold, bioelectrical impedance analysis, and anthropometrics were not accurate in individual monitoring or small populations. They recommend using BMI in addition to field measurements that still need to be determined (Paineau et al., 2008). In regards to measuring blood pressure, BMI was found to be a better predictor of elevated blood pressure than skinfold measurements in children (Ribeiro, Lamounier, Oliveira, Bensenor, & Lotufo, 2009).

Many acknowledge BMI as the accepted standard measure to determine whether or not a child is overweight or obese (Hopkins et al., 2011; Klish, 2011a; Klish, 2011b; Small et al., 2009; USPSTF, 2010). BMI is measured by weight in kilograms divided by height in meters squared. Normal BMI ranges change and varies with age and sex due to height differences (Klish, 2011b). The 2000 Centers for Disease Control growth charts to calculate BMI were developed from five national health examination surveys that occurred from 1963 to 1994 with supplemental data from surveys from 1960 to 1995 (USPSTF, 2010). Health care providers typically underestimate weight of patients based on looks alone (Klish, 2011a). BMI percentiles are assigned on growth charts based on height and weight for various ages and sex. Normal weight is considered the 5<sup>th</sup> to the 85<sup>th</sup> percentile. A child or adolescent under the 5<sup>th</sup> percentile for BMI is underweight. An individual is overweight in the 85<sup>th</sup> through 94<sup>th</sup> percentile and obese at the 95<sup>th</sup> percentile. Those who are greater than or equal to 120% of the 95<sup>th</sup> percentile or have a BMI equal to or greater than 35 are considered severely obese (Hopkins et al., 2011; Klish, 2011a; Klish, 2011b; USPSTF, 2010). Children and adolescents who fall above the 85<sup>th</sup> percentile correlate with

the adult definition of overweight while those greater than the 95<sup>th</sup> percentile correlate with adult obesity (Hopkins et al., 2011).

Most agree including the American Academy of Pediatrics and the National Committee for Quality Assurance that BMI measurements and screening for overweight and obesity should begin at the age of two (Hassink, 2010; Klish, 2011a; Klish, 2011b). The US Preventive Services Task Force (2010) however, does not recommend screening until the age of six. Children less than two years of age should have their height and weight plotted on a growth chart with percentiles instead of a BMI chart (Klish, 2011b). The USPSTF (2010) report there is no evidence for the ideal time for screening intervals of BMIs. Klish (2010a) and The American Academy of Pediatrics recommend screening BMIs at least annually (Hagan, Shaw, & Duncan, 2008).

Others have used waist circumference and waist to hip ratios as an additional measurement for regional fat distribution (Klish, 2011b; Tan-Ting & Llido, 2011; Tsiros et al., 2008; Vignolo et al., 2008). Additional documentation of demographics, age, sex, and ethnicity can be added when BMI is measured (Hunter, Steele, & Steele, 2008). Tsiros et al. (2008) recorded the Tanner stage of the adolescent subjects in their research. Pollak et al. (2009) included the measurement of daily average amount of sleeping time including naps as an assessment piece of the subjects in their study.

### **Clinical assessments.**

If a child's BMI is within the normal range on the BMI chart of less than the 85<sup>th</sup> percentile but increases from their last BMI by greater than three to four units or two percentile lines in one year, they have a greater chance of becoming overweight especially if they are older than four years old. Interventions should begin with these individuals

before they reach the overweight benchmark. When a child is over the 85<sup>th</sup> percentile in BMI, they are overweight and should be evaluated for comorbidities. Those who are obese or greater than the 95<sup>th</sup> percentile should also be evaluated for comorbidities as these individuals have a greater likelihood of being obese into adulthood. When a child is overweight or obese, one should attempt to identify treatable causes and comorbidities by completing a complete history and physical as well as obtaining labs such as fasting glucose, lipid panel, and serum ALT (Klish, 2011a).

A medical history should be obtained including any mental health diagnosis (Hunter et al., 2008), and the age of onset of superfluous weight (Klish, 2011a). A family history should include obese first degree relatives meaning parents and siblings as well as comorbidities. There is a strong association among risk of comorbidities regardless of weight. Comorbidities to include are cardiovascular disease, hypertension, diabetes mellitus, liver or gallbladder disease, and respiratory insufficiencies. Comorbidities of first and second degree relatives such as grandparents, uncles, aunts, half-siblings, nephews, and nieces should be included. Obesity of one or both parents strongly correlates with the child being obese as an adult (Klish, 2011a).

The social history should include aspects of eating habits such as who feeds the child, foods eaten especially high calorie low nutritional value foods, juice and soda, and eating patterns such as time, content, and location. Exercise habits should be discussed such as barriers to walking or biking to school, time spent playing, the frequency, duration, and intensity of school recess and physical education classes, after school and weekend activities, and screen time. Screen time includes watching television and playing video

games on gaming systems or computers. Questions can also be addressed relating to sleep, appetite changes, and school and social issues such as friends and bullying (Klish, 2011a).

The review of systems should include in depth questions regarding mental health such as self-esteem, eating disorders, depression, history of abuse, readiness to make changes to manage weight, parent or patient concerns about the child's weight, whether or not they are teased, and family dynamics (Small et al., 2009). The review of systems should also include questions to assess for comorbidities such as sleep apnea, gall bladder disease, nonalcoholic fatty liver disease, Blount's disease, polycystic ovarian syndrome, type II diabetes, eating disorder, or depression. Questions should ask if the patient is having symptoms in regards to headaches; snoring; daytime sleepiness; abdominal pain; hip, knee, or limp pain; oligomenorrhea or amenorrhea; urinary frequency, nocturia, polydipsia, or polyuria; binge eating or purging; insomnia; or a lack of enjoying activities (Klish, 2011a).

The physical assessment can begin with general appearance including affect and any dysmorphic features that would signify a genetic syndrome. Fat distribution in the trunk and periphery suggests overeating. "Buffalo type" fat distribution in the face, neck, trunk, and interscapular area suggests an endocrine disorder such as Cushing syndrome or hypothyroidism. Abdominal obesity can be associated with metabolic syndrome, polycystic ovarian syndrome, or insulin resistance. Obesity secondary to genetic or endocrine abnormalities is often associated with short stature. Exogenous obesity tends to increase height making obese children tall for their age (Klish, 2011a).

Assessment of blood pressure is important because hypertension increases long-term cardiovascular risk factors in overweight and obese kids (Tan-Ting & Llido, 2011). Hypertension can also be a sign of Cushing syndrome. Hypertension in children is defined

as a blood pressure greater than the 95<sup>th</sup> percentile for gender, age, and height on three separate occasions. For example, a ten year old boy in the 50<sup>th</sup> percentile of height and a blood pressure of 119/80 would be categorized at the 95<sup>th</sup> percentile for blood pressure (Klish, 2011a).

The head, eyes, ears, nose, and throat part of the exam should assess for microcephaly which may indicate Cohen syndrome; blurred disc margins for pseudotumor cerebri; clumps of pigment in the peripheral retina occurs in Bardet-Biedl Syndrome; enlarged tonsils can cause obstructive sleep apnea; and erosion of tooth enamel can signify self-induced vomiting. Skin and hair should be assessed for signs of endocrine etiologies. Examples include dry, coarse, brittle hair in hypothyroidism; striae and ecchymoses in Cushing Syndrome; acanthosis nigricans indicative of insulin resistance or type II diabetes; or hirsutism which can be present in polycystic ovarian syndrome or Cushing Syndrome (Klish, 2011a).

Tenderness of the abdomen can indicate gallbladder disease and hepatomegaly can be associated with nonalcoholic fatty liver disease. The musculoskeletal system can show nonpitting edema in hypothyroidism; postaxial polydactyly or extra digit in Bardet-Biedl syndrome; small hands and feet in Prader-Willi syndrome; slipped capital femoral epiphysis presents with decreased range of motion of hips and gait abnormalities; and Blount disease results in bowing of the lower legs. In the genitourinary system, undescended testicles, small penis, and scrotal hypoplasia can be signs of Prader-Willi syndrome; microorchidism and delayed puberty can be present in Prader-Willi or Bardet-Biedl syndrome; and delayed puberty can result from Cushing syndrome (Klish, 2011a).

## **Labs.**

Which specific labs should be assessed in overweight and obese children and adolescents is not standardized. Some suggest fasting glucose, lipid panel including total cholesterol, triglycerides, HDL, and serum ALT for those with a BMI greater than the 85<sup>th</sup> percentile. Other sources suggest only drawing labs if the values will change the treatment path. Informing children and parents of abnormal lab values may increase motivation to lose weight (Klish, 2011a). Irby, Kaplan, Garner-Edwards, Kolbash, and Skelton (2010) suggest obtaining a fasting glucose, triglycerides, LDL, and HDL. Vitamin D deficiency is common among obese children but there is not enough evidence to suggest routine screening (Klish, 2011a).

Klish (2011b) suggests screening for diabetes in overweight and obese children greater than 10 years old and having two or more risk factors such as family history in a first or second degree relative, high-risk ethnicity, acanthosis nigricans, or polycystic ovarian syndrome. Testing can be done with fasting plasma glucose, oral glucose tolerance test, or a hemoglobin A1C (Klish, 2011a).

Hyperlipidemia should be monitored as it increases the risk of atherosclerosis. Fasting serum triglycerides of greater than 150 mg/dL is an early sign of metabolic syndrome. Liver function can be assessed using ALT. An elevated ALT greater than two times the normal value for greater than three months can indicate fatty liver disease, viral hepatitis, autoimmune hepatitis, Wilson disease, or alpha-1 antitrypsin deficiency (Klish, 2011a).

### **Assessment tools available.**

In addition to the assessment of the child's history, review of systems, and physical exam, behavioral and psychosocial assessments need to be obtained. Assessment tools available include evaluations of dietary habits, physical activity, screen time, family functioning, parental involvement, attitudes, and readiness for change. Overall, there is a general consensus of components to include in a child's history, review of systems, and physical exam to indicate risk factors, signs, and symptoms of obesity and excess weight associated comorbidities. In contrast, psychosocial assessment tools have a wide range of variability. Some tools assess single elements such as nutrition, while others incorporate multiple components into one assessment tool such as diet, physical activity, and screen time (Eisenmann, 2011; Krebs et al., 2007).

Nutritional habits are the most singled out assessment component. Various dietary tools exist however, few are obesity specific. Many assessments of eating behaviors are focused for individuals with anorexia nervosa or bulimia. In addition, many diet questionnaires are lengthy which further adds to their difficulty of utilization (Birch et al., 2001; Goldschmidt et al., 2011; Goldschmidt, Celio Doyle, & Wilfley, 2007; Kalarchian, Wilson, Brolin, & Bradley, 2000; Lauzon et al., 2004; Wardle, Guthrie, Sanderson, & Rapoport, 2001).

Examples of assessment tools containing multiple elements include the HABITS questionnaire, REAP, WAVE, and questionnaires used in the Shape Up Somerville study. The 19-item HABITS questionnaire contains inquiry about diet, physical activity, and television screen time. HABITS has moderate internal consistency:  $\alpha = 0.61$  for the dietary subscale and  $\alpha = 0.59$  for the physical activity /sedentary behavior subscale and high



reliability:  $r = 0.94$  for the dietary subscale and  $0.87$  for the physical activity /sedentary behavior subscale (Wright et al., 2011). REAP is the Rapid Eating and Activity Assessment for Patients is a validated questionnaire consisting of eight questions. WAVE or Weight, Activity, Variety, and Excess is a tool designed to facilitate discussion about BMI, exercise, screen time, food pyramid, and foods which should be limited. WAVE is not specifically an assessment tool with a corresponding scale or score (Gans et al., 2003). The Shape Up Somerville study used three brief school-based questionnaires which demonstrated reliability and validity. The three questionnaires included a dietary intake, physical activity/screen time, and parental support (Economos et al., 2008).

Many pediatric obesity assessment tools can be found on various websites; however, most have not been studied to ensure reliability and validity. Studies that have confirmed validity of obesity tools lack repeated studies to support reliability. Numerous studies that have implemented pediatric obesity interventions do not provide reproducible assessment tools. The majority of studies give general terms for assessment such as a 24 hour recall, diet diary, or food frequency questionnaires but do not provide specific questions utilized (Maqbool, Olsen, & Stallings, 2008).

The Expert Committee organized by the American Medical Association, Health Resources and Services Administration, and Centers for Disease Control and Prevention provide recommendations on the assessment, prevention, and treatment of pediatric overweight and obesity (Childhood Obesity Action Network, 2007). The National Initiative for Children's Healthcare Quality (NICHQ) also provides general resources for the prevention and treatment of obesity. NICHQ recommends assessing mental health, family functioning/dynamics, readiness for change, food/nutritional habits, and screen

time/physical activity in children with a BMI greater than the 95<sup>th</sup> percentile (National Initiative for Children's Healthcare Quality, 2006). Similarly, the Expert Committee also advises assessing diet behaviors, physical activity behaviors/screen time, and attitudes including readiness for change. While the Expert Committee and NICHQ both provide more details on specifics of the assessments of history, review of systems, and physical exam; neither provide detailed assessment tools for behaviors and attitudes (Childhood Obesity Action Network, 2007; National Initiative for Children's Healthcare Quality, 2006).

Most pediatric obesity assessment tools do not provide family functioning or psychosocial assessments as the Expert Committee and NICHQ suggest. Numerous reliable and valid family and psychosocial assessment tools are available, however many are comprehensive and range from 36-90 items in length. Nearly all of the tools originate from general psychology and are not curtailed to focus on the psychosocial and family aspects of obese children (Beavers, Hampson, & Hulgus, 2003; Epstein, Baldwin, & Bishop, 1983; Jellinek & Murphy, 2007; Minnesota Department of Health; Moos & Moos, 1994; National Center for Chronic Disease Prevention and Health Promotion, 2012; Olson, 2011).

One type of assessment tool that incorporates multiple dynamics including psychosocial in relation to health status is quality of life measurements. The PedsQL, Pediatric Quality of Life Inventory is a valid, reliable, generalizable tool that assesses the impact of chronic health conditions on children's physical, mental, and social functioning. The PedsQL has been widely studied among pediatric cancer patients. The PedsQL is designed for children ages 8-12 with a child report in addition to a parent report (Varni, Seid, & Rode, 1999; Varni J. W., 2012).

Only two pediatric obesity specific quality of life measurements are available. The Youth Quality of Life – Weight Specific (YQOL-W) is designed for adolescents ages 11-18 (Patrick et al., 2011). Sizing Me Up is a pediatric obesity specific quality of life measurement for children ages 5-13 years. The scales within the 22 item Sizing Me Up include emotional functioning, physical functioning, social avoidance, positive social attributes, and teasing/marginalization. The parent-proxy form of this tool is called Sizing Them Up. Sizing Them Up also consists of 22 items with scales of emotional functioning, physical functioning, teasing/marginalization, positive attributes, mealtime challenges, and school functioning. Both tools have studies supporting the measures' initial reliability and validity. Sizing Me Up total quality of life score reliability is 0.78 and Sizing Them Up is 0.80. The five subscales reliability of Sizing Me Up range from  $r = 0.53 - 0.74$  and the six subscales reliability of Sizing Them Up range from  $r = 0.57 - 0.78$ . The internal consistency subscales of Sizing Me Up range from  $\alpha = 0.68 - 0.85$  with total quality of life scale of  $\alpha = 0.82$ . The internal consistency subscales of Sizing Them Up range from  $\alpha = 0.59 - 0.91$  with total quality of life scale of  $\alpha = 0.91$  (Modi & Zeller, 2008, 2009).

### **Interventions.**

Studies examining interventions for childhood obesity typically consist of multiple components including parental involvement, nutrition, physical activity, and cognitive behavioral therapy in an attempt to change life style behaviors to impact weight and health. Directly comparing various intervention methods to obesity outcomes is difficult due to the compiling of multiple interventions. In addition, the majority of studies do not separate the effects of individual intervention components utilized in relation to which has the largest impact on outcomes (Hassink 2010; USPSTF 2010).

### ***Parents and family involvement.***

According to Gentile et al. (2009), family involvement is the most important component of interventions. When programs target parents, more successful outcomes result mainly because the family provides the resources (Tyler & Horner, 2008). Incorporating parents in the intervention is especially important for younger children (USPSTF, 2010). Two studies singled out parental influence on child obesity outcomes. In comparison to nutrition and exercise education, behavioral therapy, and parental weight loss; the greatest predictor of child weight loss in the study by Hunter et al. (2008) was parent weight loss. Another study focused primarily on the effects of parental involvement and found similar results by comparing three groups divided into a behavioral family based intervention, a behavioral parent only intervention and a waitlist control condition. Both the family based and parent only interventions produced a significant decrease in weight status without a significant difference between the two groups. The waitlist group however, gained weight (Janicke et al., 2009).

Family therapy should include goals for each family member. All members must participate to be successful (Jones et al., 2011). Parents can contribute by offering praise such as when a child tries a new food (Boles et al., 2010), setting realistic goals, building on success, providing reinforcement, stimulus control, and providing a supportive family life style (Burrows et al., 2008; Hunter et al., 2008).

Role modeling is the most important parental contribution. The best means to provide example setting is through family meals in which every member eats the same foods (Boles et al., 2010, Tyler & Horner, 2008). This is accomplished best by eating

together without a television (Burrow et al., 2008). The subjects of Boles et al. (2010) study positively reported family meal time.

Parental intake of fruits and vegetables is significantly correlated with kids' intake of fruits and vegetables whether it is increased or decreased. Parents have a large influence on food choices and role modeling until at least age eight (Vanhala, Laitinen, Kaikkonen, Keinanen-Kiukaanniemi, & Korpelainen 2010). A program which taught children and their parents together suggests behavioral modeling is the likely reason for the parents' influence which decreased child BMI by an average of four percent. The study concluded that they do not know why or what exactly parents must do in order to decrease their children's BMI but found that parents make the difference (Hunter et al., 2008).

Parents should decide what food to serve, when to serve it and resist providing alternatives until the next meal or snack time. Kids should decide whether or not they are hungry and how much to eat (Burrows et al., 2008). Environmental cues override children's internal satiety signals by about the age of four (Small et al., 2009). A study proved reduction in parental restraint over a child's eating is related to improved child weight loss. Focusing on healthy eating instead is beneficial (Epstein et al., 2008). Tantrums for food at age three predict obesity at age five. Parents should ignore tantrums for food and food refusals (Boles et al., 2010). Children who were allowed to decide themselves how much to eat, ate slightly more fruits and vegetables than kids whose parents decided portion sizes (Vanhala et al., 2010).

### ***Nutrition.***

Emphasis should be taken off of weight loss and focus should rather be placed on changing food habits instead (Burrows et al., 2008). Instead of reducing calories, high

quality nutrient dense foods should be consumed. Foods such as fruits and vegetables induce satiety because of their water, fiber and fat free content (Tyler & Horner, 2008).

Diets should consist of three meals with two snacks totally 1200-1500 calories daily (Tan-Ting & Llido, 2011). Hopkins et al. (2011) emphasizes the importance of daily breakfast. Snacks should come from core food groups and should not contain high amounts of sugar or fat. Several studies have incorporated the traffic light diet which categorizes foods into three groups; red, yellow, and green based on nutritional value (Hopkins et al., 2011; Hunter et al., 2008; Janicke et al., 2009).

Fruits and vegetables are key elements to a nutritious diet and can be increased by one serving per day weekly until a total of five servings of fruits and vegetables combined are eaten daily (Epstein et al., 2008; Hopkins et al., 2011). Fruits and vegetables can gradually be introduced as snack foods (Boles et al., 2010). Studies provide evidence that fruits and vegetables promote healthy weights. One study compared children who at baseline had BMIs greater than the 85<sup>th</sup> percentile. The intervention group that consumed an increased amount of fruits and vegetables as well as low-fat dairy had a significantly greater decrease in BMI at 12 and 24 months than did the group focused on decreasing high energy dense foods. Dairy products should be reduced fat options. Dairy intake has been associated with lower body fat in children and a reduction in developing insulin resistance in young adults. After a two year follow-up, the children eating fruits, vegetables and low-fat dairy did not have a relapse in weight gain (Epstein et al., 2008). Another study showed similar results. Eighty percent of normal weight children from a survey of 119 eight year olds reported always having a serving of vegetables with meals while only 40% of

overweight children regularly ate vegetables. Normal weight kids ate more fruits and vegetables than overweight children (Vanhala et al., 2010).

With increased repetition and routine, children are able to acquire tastes for food they may not have originally been open to. In the same study, 90% percent of families that served vegetables at meals had children that preferably ate vegetables while 50% of families that did not serve vegetables consistently with meals had children that preferably ate vegetables (Vanhala et al., 2010). When children do not seem to like a particular food, parents typically offer a food three to five times before deciding the child does not like the food and gives up. Studies show however, that 10-15 exposures are necessary until kids finally try and eat the food (Boles et al., 2010).

One study specifically observed differences in carbohydrate diets. Diets of group one consisted of low carbohydrate, low fat, and protein rich foods, group two ate low carbohydrate and high fat diets while group three ate high carbohydrate and low fat diets. The intervention lasted 12 weeks with a follow-up at nine months. There was no significant difference among the two low-carbohydrate diets versus the high carbohydrate, low fat diet. Total cholesterol, LDL, HDL, and triglycerides decreased significantly in all groups. Fasting glucose also decreased significantly in all groups but there was significantly more reduction from the baseline insulin in the two low carbohydrate diet groups. The study concluded that there is no advantage to low carbohydrate diets versus high carbohydrate low fat diets (Demol et al., 2009).

One of the keys to decreasing obesity in children is advising no sweetened beverages including soda and juice (Burrows et al., 2008; Hopkins et al., 2011). Sugars have greatly increased in American diets over 30 years. In 1970, the average American

consumed 64 kg of sugar per year and by the year 2000 the average increased to 80 kg per year. Glucose, fructose, and sucrose are the main sugars consumed in diets. Studies also show an association between fruit juice and soda both of which contain fructose and the risk of developing obesity in adolescents (Maier et al., 2011). A pilot study of 15 overweight and obese children 5-8 years old by Maier et al. (2011) examined the effects of reducing fructose in diets. A 12 week intervention consisted of nutritional counseling every four weeks with a 24 week follow-up. The subjects were advised to decrease daily fructose intake by 50% which included sweets, lemonade, and fruit juice. After 12 weeks, there was no change in body weight but a significant improvement of BMI in all of the children. At 24 weeks, there was no further decrease in BMI but the BMIs remained steady. Another study had a similar impact by diminishing the consumption of sugared drinks which resulted in a decrease in weight and waist circumference (Tsiros et al., 2008).

Education on nutrition should be provided to children and their parents (Epstein et al., 2008; Janicke et al., 2009; Tan-Ting & Llido, 2011). Nutrition counseling can include healthy eating patterns, types of foods to eat and avoid, food preparation techniques, how to read food labels, triggers of overeating, and healthy shopping techniques (Epstein et al., 2008; Tan-Ting & Llido, 2011). None of the literature that addressed nutrition as a component of the intervention provided any specific information as to exact nutritional guidance provided to children and their families.

### ***Physical activity.***

Exercise components of interventions can begin with education about the positive effects of physical exercise (Epstein et al., 2008). Regular vigorous physical activity improves weight management, cardiovascular functioning, bone density, glucose uptake by



muscles, sleep quality, energy level, and decreases atherosclerosis (Tyler & Horner, 2008). In the study by Hunter et al. (2008) change in nutrition and exercise knowledge was a predictor of change in BMI although there was no indication of which had a bigger impact. Many studies suggest at least 60 minutes of moderate activity daily (Boles et al., 2010; Epstein et al., 2008; Hopkins et al., 2011). Epstein et al. (2008) suggests exercise six days per week and gradually increasing by 15 minute increments. Boles et al. (2010) advises 30 minutes of vigorous activity daily in addition to the 60 minutes of moderate exercise. Screen time which includes television, computer, and video games should total less than two hours per day (Boles et al., 2010; Hopkins et al., 2011). Hopkins et al. (2011) also recommends keeping televisions out of children's bedrooms.

Most studies did not separate outcomes based on intervention. Which component of interventions unitarily or in combination promotes the most advantage in decreasing BMI is unclear. Some studies promoted group exercise while others instructed increasing physical activity at home (Tan-Ting & Llido, 2011) by 10 minute increments until at least 30 minutes of daily exercise was established (Tsiros et al., 2008). An example of a group approach for inducting exercise included 90 minute group sessions weekly for the first eight weeks and biweekly for the next eight weeks. Each session comprised of 50 minutes of cycling, 50 minutes of walking or running and 20 minutes of stretching three days per week. Overall, results showed a decrease in body weight, BMI, waist circumference, fat mass, triglycerides, and an increase in height. Those with metabolic syndrome had an overall decrease in systolic blood pressure and an increase in insulin sensitivity. Risk factors for those with metabolic syndrome decreased by 72%. Nutritional guidance was

also provided but the study did not indicate which intervention actually contributed to the successful results (Leite et al., 2009).

One study separated outcomes attributed to various interventions and found physical activity appeared less beneficial in decreasing obesity than focusing on nutrition. The study produced by Tsiros et al. (2008) discussed increasing physical activity during 25% of the group sessions. Over 20 weeks, there was no change in physical activity levels.

### ***Sleep.***

Tyler and Horner (2008) found a negative correlation between length of sleep and BMI. Increased length of sleep is associated with decreased BMI and waist circumference. A study of males in grades 7-12 demonstrated for every one hour of additional sleep they received, there was a 10% reduction in the risk of being overweight (Tyler & Horner, 2008).

### ***Cognitive behavioral therapy.***

Behavioral counseling assists in behavior change, self-monitoring, stimulus control, and eating management (USPSTF, 2010). Primary care providers initiate health promotion counseling but implementation must be continued by the family (Tyler & Horner, 2008).

Motivational interviewing is a common form of cognitive therapy. Motivational interviewing involves the family, patient, and provider collaborating on a mutually agreeable agenda (Small et al., 2009; Tyler & Horner, 2008). Irby et al. (2010) described motivational interviewing as a “client-centered directive method for enhancing intrinsic motivation to change by exploring and resolving ambivalence” (p. 237). Motivational interviewing consists of goal setting, identifying personal barriers, and identifying potential ways to overcome barriers (Small et al., 2009). The motivational interviewing approach is

strength based and also assesses motivation and confidence regarding planning. Research shows that client-centered, non-confrontational approaches are effective when there is decreased resistance to advice and relationships between providers and clients (Tyler & Horner, 2008). Motivational interviewing generates positive, long lasting behavior change (Irby et al., 2010; Small et al., 2009). Motivational techniques include expressing empathy, understanding that ambivalence about change is normal, being nonjudgmental, using reflective listening techniques, and asking open-ended questions (Pollak et al., 2009; Small et al., 2009).

The literature supports the effectiveness of motivational interviewing. The more adherent providers were to motivational interviewing techniques, the more patients increased moderate physical activity, decreased weight, and reduced screen time (Pollak et al., 2009). An additional study showed that motivational interviewing helped to reduce the number of sweetened beverages consumed which correlated with a decrease in weight and waist circumference (Tsiros et al., 2008).

### **Conclusion.**

Obesity causes many adverse health problems affecting every system of the body. The causes of obesity are multifactorial including genetics and environment. No concrete evidence exists as to the best way to measure weight status in pediatrics. Assessments including histories and physicals are important in determining adequate treatments. Successful studies incorporate family, parents, nutrition, physical activity, and cognitive behavioral therapy as means of intervention.

## **Theoretical Framework: Calgary Family Assessment Model**

The Calgary Family Assessment Model (CFAM) developed by Wright and Leahey emphasizes the importance of assessing the whole family as the members affect individuals' health. The health of an individual can impact the family as well as the family influences a member's health. The assessment of the family includes relationships, patterns, and interactions. The manner in which a provider interacts with a family can influence the child's and family's functioning. Working with children stresses the importance of family involvement due to the nature of children's reliance on their family (Levac, Wright, & Leahey, 2002; Wright & Leahey, 1994).

The model has three main components of family assessment: structural, developmental, and functional. Each component is further divided into more specific elements of the family configuration. The structural category organizes who is in the family as well as connections among the family's members and community. The internal structural component assesses family composition, gender, rank order, subsystems, and boundaries. The external structural assessment consists of extended family and larger systems. Lastly, context structural assessment involves ethnicity, race, social class, religion, and environment.

The developmental assessment exhibits the importance of taking into account the child's individual life cycle within the family life cycle. Family development is "the unique path that families construct" influenced by predictable and unpredictable events (Levac et al., 2002, p. 16). The family life cycle involves the typical, predictable events such as births and children entering school. The developmental assessment includes stages, tasks, and attachments.

Functional assessment addresses interactions between family members and family functioning. The functional component also “explores the reciprocal relationship between the family and illness” (Levac et al., 2002, p. 17). Instrumental functioning entails activities of daily family living which include eating, physical activity, sleeping, and health care regimens. Expressive functioning assesses the interaction between family members categorized as emotional communication, verbal communication, nonverbal communication, circular communication, problem-solving, roles, influence, beliefs, and alliances/coalitions. The expressive functioning assessment allows the provider to evaluate the family’s strengths and limitations (Levac et al., 2002).

The Calgary Family Assessment Model illustrates how influential the family system is on children. Therefore, when assessing a child, assessment of the whole family is essential. The structural framework of CFAM will guide the project of implementing an evidence based pediatric obesity assessment tool by the model’s emphasis of using a circular/systemic perspective to “understand the reciprocity between family relationships and health status” (Levac et al., 2002, p. 11). The model also demonstrates how change in one member affects the rest of the family. CFAM assists providers in the assessment of family’s abilities and strengths that can support families in ascertaining solutions and carrying out interventions (Levac et al., 2002; Wright & Leahey, 1994).

## **CHAPTER THREE. PROJECT DESIGN**

### **Project Implementation**

A local clinic requested the development of a pediatric obesity assessment tool to be used at the beginning and end of a ten week family based intervention program in order to determine whether or not the family-based intervention has an effect on the child or parents in terms of the child's obesity.

### **Program Goals**

The goal of this project was to develop a provider friendly pediatric weight assessment tool to guide assessment in order to provide an early intervention for pediatric obesity. The project was aimed to transition assessment tools from evidence-based practice and incorporate the research into use in the local pediatric obesity pilot program.

#### **Program goals.**

1. Generate a pediatric obesity assessment tool.
2. Transition an assessment tool from evidence-based research into practice.
3. Create the assessment tool with the capacity to transition into the electronic health record Epic with the possibility of being adopted into use as a screening tool in primary care.
4. Obtain providers' evaluations on the effectiveness of the obesity assessment tool.

### **Application to the DNP Role**

Childhood is a critical time for children to develop healthy behaviors and to establish a health-promoting lifestyle. Rapid developmental changes occur during childhood which emphasizes the criticalness of the need to enhance health through the prevention of obesity or the escalation of an individual's obesity. Advanced practice nurses

must enhance skills of healthy life style behaviors in children and adolescents in which they can begin using immediately as well as practice through adulthood (Pender, Murdaugh, & Parsons, 2011).

Through the development of a pediatric obesity assessment tool, advanced practice nurses will be able to more accurately and fully assess overweight and obese children and adolescents so that interventions can be implemented as soon as the problem is discovered. By using a generalizable, evidence-based tool in the assessment of childhood obesity, providers may save more time and be more inclined to check all patients so that fewer children are missed. By developing a useful and accurate assessment tool, interventions can be implemented, therefore hopefully halting or decreasing children's weight gain.

### **Project Plan**

The project plan was to present the clinic providers with evidence-based research on the use of various assessment tools. The clinic providers include one pediatrician and two psychologists. The psychologists were the coordinators of the pediatric obesity pilot study consisting of 10 children and their parents. The pilot study coordinators of the local pediatric obesity pilot program chose the pediatric obesity specific quality of life measures Sizing Me Up and Sizing Them Up as the major components of the assessment tool, the latter being the parents' version of the assessment (Modi & Zeller, 2008a, 2009). A completed assessment tool with the addition of height, weight, BMI, readiness for change, and the HABITS questionnaire was constructed with the ability of transitioning into Epic to be utilized as an assessment tool in primary care (Centers for Disease Control and Prevention, 2011; Schwartz, 2010; Wright et al., 2011). See Appendix A for the actual tool

used in the study. Data collection involved obtaining providers thoughts on utilization, ease, and difficulty of use of the assessment tool.

**Evaluation plan.**

Collect surveys from each provider whom performs the assessment tool.

***Survey.***

Please rate the following statements on a 5 point scale: 1-strongly disagree, 2-disagree, 3-undecided, 4-agree, 5-strongly agree.

1. The assessment tool enabled me as a provider to obtain all the necessary information from the child/family.
2. The child/family was willing to participate in the assessment.
3. The tool flowed and was easy to implement.
4. The tool presented some difficulties.
5. I would like to change some components of the tool.

**Protection of Human Subjects**

The study was approved by the Institutional Review Board of North Dakota State University and the Institutional Review Board of Sanford Health. The subjects of the project were providers of the local clinic involved in the pediatric obesity program. Potential consequences to the subjects included use of their time and obtaining their opinion on a possibly sensitive topic. Informed consent was obtained by the providers by their willingness to fill out the surveys. Potential benefits of the project included obtaining a uniform, time-saving assessment tool that may be generalized to primary care providers resulting in early intervention in pediatric obesity.



## CHAPTER FOUR. EVALUATION

### **Objective One: Generate a Pediatric Obesity Assessment Tool**

An extensive literature review was performed searching for evidence-based pediatric obesity assessment tools. The overall consensus of the research demonstrates key components of a comprehensive pediatric obesity assessment should include height, weight, BMI percentile, vital signs, ethnicity, medical and family history, review of systems, and physical exam, all of which can be assessed during a routine well child exam. Tests to obtain laboratory values which may aid in the well child exam of a potentially obese child include a fasting glucose, lipid panel, and liver function tests. In addition to a physical exam, the literature supports social-emotional assessments pertaining to readiness for change, family dynamics, nutritional habits, physical activity, and screen time (Childhood Obesity Action Network, 2007; National Initiative for Children's Healthcare Quality, 2006).

The Calgary Family Assessment Model emphasizes the importance of including family assessments when evaluating children due to the impact of the family on children's health statuses. The CFAM theoretical framework shows the complexity of family assessment and children's reliance on their parents (Levac et al., 2002; Wright & Leahey, 1994). Quality of life measurements are able to incorporate multiple dynamics into assessments tools.

Based on evidence in the literature, a comprehensive pediatric obesity assessment outline was presented at the first Sanford Pediatric Obesity Program meeting; see Appendix C. The literature provides an overall consensus on the assessment components of vital signs, history, review of systems, physical exam, and laboratory tests. The history and

physical exam assessment components of Appendix C supplies providers with a template based on obesity related comorbidities and causes organized into body systems. The literature concludes social-emotional components must also be assessed; however, no consensus has been made on how to best assess readiness for change, family dynamics, dietary, physical activity, and screen time habits. Appendix C provides lists of available tool options to assess readiness for change, family dynamics, and life style habits.

To guide the construction of the assessment tool, bimonthly meetings and conference calls were conducted in June, July, and August of 2012. Monthly meetings were attended by the pediatrician, the two pilot study coordinators, and the remainder of the personnel implementing the obesity program including dietitians, exercise therapists, and support staff. Monthly conference calls with the two pilot study coordinators focused solely on the development of the assessment tool. Feedback was presented by the pilot study coordinators based on their needs and the tool was adjusted accordingly. The coordinators suggested searching for a quality of life measurement tool to cover the social-emotional components of the assessment. After an extensive literature search, two quality of life measurement tools were found which specifically focus on pediatric obesity for the age group of the pediatric obesity pilot study.

The two pilot study coordinators evaluated the tools for utilization in practice. Based on the pilot study coordinators' clinical expertise, the quality of life measurements *Sizing Me Up* for children and *Sizing Them Up* for parents were adopted and implemented in order to assess social-emotional and family aspects of the obese children. The *HABITS* questionnaire was selected to assess nutritional habits, physical activity, and screen time. The outline which included specific history and review of systems questions as well as

physical exam components was presented to the Sanford pediatrician involved in assessing the children prior to starting the family based intervention pilot study. The two pilot study coordinators approved the use of the readiness for change, HABITS, Sizing Me Up, and Sizing Them Up questionnaires.

### **Objective Two: Transition an Assessment Tool from Evidence-Based Research into Practice**

The evidence-based recommendations gathered from the literature of assessing vital signs, history, a review of systems, and physical exam were performed during well child exams by a Sanford pediatrician. This pediatrician recommended children for the pediatric obesity pilot program based on the criteria of being at or above the 98<sup>th</sup> percentile for BMI as well as between the ages of 8-12 years old. The remaining components of the assessment (weight, height, BMI percentile, readiness for change, quality of life measures Sizing Me Up and Sizing Them Up, and HABITS questionnaire) were approved by the pilot study coordinators to be used in the Sanford Pediatric Obesity Pilot Study.

Based on the above criteria, families were invited to participate in the pilot pediatric obesity program. Families participated on a voluntary basis with the hopes of gaining guidance on how to implement healthy life style choices into their family's lives. A family packet including readiness for change, Sizing Them Up, and HABITS questionnaires were sent to each family (see Appendix A). The families brought their packets to the first week of the family based intervention obesity program and completed the family packets again at the tenth and final week of the study. The children were interviewed using the Sizing Me Up quality of life assessment tool during the first and final weeks of the intervention. The children's and parents' heights were calculated on week one of the program and the

children's heights were collected again on week ten. Weights and BMIs of the children and their parents were measured weekly. During the tenth and final week of the program, the Treatment Acceptability evaluation was given to each family (see Appendix B). Refer to Appendix D for the timeline of each measurement assessed based on the week of the program. Beginning October 9 through the end of the ten week program which ended December 18, 2012, conference calls or meetings were conducted every other week to ensure clear communication and implementation of the obesity program among the collaborating team members. The pilot study was not conducted on November 20 due to the Thanksgiving holiday week.

The scores of the assessment tool were as follows: the 85<sup>th</sup> – 94<sup>th</sup> percentile BMI are overweight; the 95<sup>th</sup> percentile or greater are obese; and children greater than or equal to 120% of the 95<sup>th</sup> percentile are considered severely obese. The three item readiness for change scores rank 3-15 with 15 being the most ready to change. Sizing Me Up is a 22 item tool with an 8-12 minute completion time when interviewer administered. An interviewer does not need to administer the questionnaire if the child is 11-13 years of age. Scores of both Sizing Me Up for children and Sizing Them Up for parents range from 0-100 with 100 representing the best health-related quality of life (Modi & Zeller, 2008; Zeller & Modi, 2009). The HABITS questionnaire is designed to look at individual health behaviors rather than creating a summary score. The tool is intended to promote dialogue about healthy behaviors and changes in behaviors (Wright et al., 2011). Last, the treatment acceptability or program evaluation scores range from 5-25 with 25 being the most favorable evaluation; see Appendix B. Question three is reversed coded on the program evaluation.

**Objective Three: Create the Assessment Tool with the Capacity to Transition into the Electronic Health Record Epic with the Possibility of Being Adopted into use as a Screening Tool in Primary Care**

The pediatric obesity assessment tool consisting of height, weight, BMI percentile, readiness for change, Sizing Me Up, Sizing Them Up, and HABITS questionnaires all have the ability of being transferred into the electronic health record Epic. Scores recorded in Epic would be easily trended over time. With the assessment tool's ability to be transitioned into Epic and the ease in which it is administered, the pediatric obesity assessment should be adopted into use in primary care. The questionnaires could be printed and given to families to fill out in the waiting room while the Sizing Me Up questionnaire could be asked by nurses or medical assistances that room the patient.

The assessment tool has not yet been used in primary care but has the potential for use. The tool has been evaluated by expert clinicians who indicate the tool's ease of utilization. The tool provided the pilot study coordinators with the needed information on the obese children and their parents. By using the assessment tool in primary care, the degree of obesity in children can be determined. If a child is diagnosed obese, interventions should be implemented promptly to decrease the risks of comorbidities.

**Objective Four: Obtain Providers' Evaluations on the Effectiveness of the Obesity Assessment Tool**

The two pediatric obesity pilot study coordinators completed the providers' survey at the last pediatric obesity meeting following the ten week completion of the intervention.

## CHAPTER FIVE. RESULTS

The assessment tool was created from evidence-based research through an extensive literature review (Childhood Obesity Action Network, 2007; National Initiative for Children's Healthcare Quality, 2006; Modi & Zeller, 2008a, 2009; Schwartz, 2010; Wright et al., 2011). See Appendix A for the completed pediatric obesity assessment tool. The tool was implemented in a ten week family-based pediatric obesity pilot study. The assessment tool has the ability of being translated into the electronic health care record Epic with the capability of being adopted into use in primary care.

Results of the providers' Pediatric Obesity Assessment Tool evaluation can be found in table one.

Table 1

*Providers' Evaluation of the Pediatric Obesity Assessment Tool*

<b>Survey Questions</b>		
Please rate the following statements 1-5		
<b>1</b> -strongly disagree, <b>2</b> -disagree, <b>3</b> -undecided, <b>4</b> -agree, <b>5</b> -strongly agree		
	<b>Provider 1's Answers</b>	<b>Provider 2's Answers</b>
1. The assessment tool enabled me as a provider to obtain all the necessary information from the child/family.	5	5
2. The child/family was willing to participate in the assessment.	5	4
3. The tool flowed and was easy to implement.	5	5
4. The tool presented some difficulties.	2	2
5. I would like to change some components of the tool.	1	3
Additional comments:	"Good clinical battery. Needed to be short and change sensitive. The QOL was essential in this regard."	

The key barrier to generating a pediatric obesity assessment tool was the limited number of pediatric obesity assessment tools that were available demonstrating validity and reliability. The main barrier of transitioning an assessment tool from evidence based research into practice is finding a tool that can be completed in a timely manner. Assessment time was a factor in implementing the tool into the pediatric obesity pilot study which facilitated the possibility of the tool being adopted into use in primary care. The Sizing Me Up interview requires approximately 8-12 minutes per child.

Periodic obesity program meetings were established by the pilot study coordinators which assisted the ease in which to obtain the providers' evaluation of the effectiveness of the obesity assessment tool. Both pilot study coordinators actively participated in the process of the creation of the pediatric obesity tool. The pilot study coordinators have expertise in psychology and pediatrics; however additional clinical expertise from multiple providers would benefit the assessment effectiveness evaluation.

The CFAM theoretical framework proved to help guide this project by placing emphasis on the effects family members have on one another. The parents were vital in accomplishing the completion of the assessment tools. The CFAM entails a very comprehensive family assessment that goes beyond the assessment needed in this project. However, the reciprocal relationship between family members and individual's health status component of the model was very beneficial in directing this assessment project. The model proves to be valid for use in future assessment projects and would be very beneficial for use in guiding projects involved with family interventions.

## CHAPTER SIX. DISCUSSION AND RECOMMENDATIONS

### Interpretation of Results

Evidence-based pediatric obesity assessment tools were analyzed and organized from the literature and presented to the coordinators of Sanford's Pediatric Obesity Pilot Study. Using clinical expertise, the pilot study coordinators chose from the evidence-based tools presented which would best serve the pilot study. The pilot study coordinators implemented the evidence based pediatric obesity assessment tools into practice through application in the pediatric obesity pilot study.

An additional literature review was performed after the completion of the pediatric obesity pilot study to determine the prevalence of any new evidence-based assessment tools. The literature continues to support the importance and need of focus placed on pediatric obesity. If obesity continues to climb in prevalence, by 2030 every state could be within 44% to 60% or greater in obesity rates. With this prospective, potential new cases of type two diabetes mellitus, coronary heart disease and stroke, hypertension, and arthritis could increase tenfold from 2010-2020 and double again by 2030. Medical costs treating preventable obesity related disease also has the possibility of increasing to \$66 billion annually by 2030 with a loss of economic productivity as high as \$589 billion per year (Robert Wood Johnson Foundation, 2012b).

Studies show that overweight children tend to stay overweight into adulthood leading to comorbidities such as heart disease and diabetes mellitus. However, studies are also showing that pediatric obesity interventions are starting to work. Pediatric obesity interventions appear to have a bigger impact on younger children especially less than 10 years of age (Lies, 2012; Melville & Murata, 2011). Some states that have actively played a



role in obesity prevention and intervention have actually seen a decrease in obesity rates. Philadelphia, New York City, Mississippi, and California have all seen a decrease in the prevalence of obesity after implementing greater access to healthy foods in schools and communities, as well as increasing physical activity. Despite this positive outlook, other areas still have persistent obesity rates especially in areas with socioeconomic, geographic, racial and ethnic disparities (Robert Wood Johnson Foundation, 2012a).

Studies continue to support the importance of early intervention because childhood obesity negatively impacts short and long term functioning, health, and well-being (Melville & Murata, 2011). Childhood obesity can also have psychological complications including body dissatisfaction, symptoms of depression, obesity stigma, and unhealthy weight control measures. Obese children have an increased risk of being victims of bullying (Davis & Pollock, 2012).

Since the literature shows multiple aspects of a child's life that are affected by being overweight or obese, developing a pediatric obesity assessment tool has been proven to be difficult. Due to the complexity of pediatric obesity, quality of life assessment tools provide coverage over various components worthy of assessment. The majority of quality of life assessments utilized in the literature are used with adolescent populations (Keating, Moodie, Richardson, & Swinburn, 2011). Studies that have used quality of life assessments for school aged children mainly use generic quality of life measurements such as the PedsQL versus using a pediatric obesity specific quality of life tool. Obesity studies using generic quality of life measures have shown that overweight and obese children tend to have lower quality of life indicators in areas of physical well-being, self-perception,

emotional, social, and psychosocial health (Ottova, Erhart, Rajmi, Dettenborn-Betz, & Ravens-Sieberer, 2012; Poeta, Duarte, & Giuliano, 2010).

Studies maintain the emphasis of the importance of screening for obesity in primary care. Many tools that have been created for this purpose still need additional evaluation to ensure proper utilization, sensitivity, and specificity (Owen, Sharp, & Shield, 2011). Presenting education to providers on pediatric obesity has proven to increase assessment, identification, and counseling in primary care on healthy eating and physical activity. Providing education on assessment also increased documentation of BMI in progress notes and the diagnosis of overweight to children's problem lists (Vaczy et al., 2011). As this project demonstrates, the diagnosis needs to be added to the patient's problem list and progress note indicating the problem has been addressed once overweight or obesity is determined based on the child's BMI. Once the diagnosis is made, ongoing evaluations and interventions to decrease the excess weight and comorbidities are crucial.

The literature supports the effectiveness of pediatric assessments and the importance of childhood obesity interventions (Epstein et al., 2008; Hopkins et al., 2011; Klish, 2011a; Maier et al. 2011; Tyler & Horner, 2008; USPSTF, 2010). Studies also show that assessing the effects of excessive weight on children is complex due to obesity's various consequences. More evaluation to increase reliability is needed to sustain the best pediatric obesity assessment tool so that further progress can be made in decreasing our country's prevalence of childhood obesity.

### **Limitations**

This practice improvement project was conducted in a pilot study within a large agency with multiple constituents. The project therefore was created in a manner to satisfy

all involved members' requests. The assessment tool evolved through these requests including time limits in which to administer the tool.

Due to the pilot study nature of the implementation of the obesity assessment tool, ten children were assessed by two providers. The impact of the effectiveness of the tool would be enhanced by assessing a larger number of children and by gaining effectiveness evaluations by a larger pool of providers. Another limitation of the study is the assessment tool has not yet been tested in its entirety in the primary care setting. Therefore, primary care providers have not yet been evaluated on the effectiveness of the assessment tool.

### **Recommendations for the Agency**

The use of the pediatric obesity assessment tool should be continued by being implemented into well child visits with primary care providers. The tool can be translated into the electronic health record Epic in order to enhance the ease in which primary care providers can administer the tool. Translating the tool into Epic requires the creation of documentation flowsheets and a SmartSet within a progress note. The readiness for change, HABITS, Sizing Me Up, and Sizing Them Up questionnaires must be instilled as separate documentation flowsheets. Each questionnaire can therefore be administered and recorded in the documentation flowsheet where total scores can be calculated. This process is the same as other questionnaires available in Epic such as the PHQ-9 scale for depression. Any provider using Epic for documentation can ask their institution's Epic representatives to enter this pediatric obesity screening tool into the institution's flowsheets and SmartSets after signing the copyright agreement of Sizing Me Up and Sizing Them Up.

After entering vital signs, height, and weight into Epic, the intake nurse who roomed the patient should complete each of the four documentation flowsheets on every

child with a BMI of the 85<sup>th</sup> percentile or greater. BMI can be automatically calculated through Epic after the entry of height and weight. The Sizing Me Up questionnaire requires interviewing children ages 5-10 while children ages 11-13 do not need to have the questions read aloud to them and can fill the form out on their own (Modi & Zeller, 2009). If a child's BMI has already been established as the 85th percentile or greater, families could complete the readiness for change, HABITS, and Sizing Them Up questionnaires in the waiting room or at home via My Chart access. My Chart provides patients and families with 24/7 internet access to their medical records including lab results, the ability to schedule appointments, and message their provider.

Having the tool completed prior to the primary care provider seeing the patient, allows for the provider to have more time to focus on the review of systems and physical exam of the child. The provider can open a pediatric obesity SmartSet within progress notes to evaluate the scores of the questionnaires from the documentation flowsheet as well as continue the documentation of the obese child's assessment. See Appendix D for an example pediatric obesity SmartSet. The text of the SmartSet highlighted yellow indicates information that will automatically be placed in the progress note from the patient's chart. The blue highlighted text indicates a list of options the provider can choose from by clicking the corresponding text with the mouse. Three asterisks means the provider must insert free text.

The scores of the questionnaires recorded in the documentation flowsheets can automatically be viewed within the SmartSet once the SmartSet is opened in a progress note. The scores of the tools do not provide exact cut-off points but are rather a continuum. The readiness for change scores rank 3-15 with 15 being the most ready to change. Scores

of both Sizing Me Up for children and Sizing Them Up for parents range from 0-100 with 100 representing the best health-related quality of life (Modi & Zeller, 2008b; Zeller & Modi, 2009). The HABITS questionnaire is designed to look at individual health behaviors rather than creating a summary score. The tool is intended to promote dialogue about healthy behaviors and changes in behaviors (Wright et al., 2011).

On-going evaluations are needed in the next implementation phase of this project into primary care. Pending the decision of conducting a second, larger pediatric obesity study at Sanford, the two pilot study coordinators can ensure the use of the pediatric obesity assessment tool in the second study. If conducted, more providers need to evaluate the tool during the second study. The implementation of the tool into primary care also needs evaluation by the expert clinicians who use the tool.

### **Implications for Advanced Nursing Practice**

By transitioning an evidence-based pediatric obesity assessment tool from research into practice, advanced practice nurses will have a tool to more accurately assess and manage obesity in children allowing the implementation of interventions when appropriate, based on evidence-based guidelines. As a Family Nurse Practitioner, I will implement the use of this pediatric obesity assessment tool. The tool will also aid other advanced practice nurses in assessing the pediatric populations of their practices. The tool is particularly helpful in guiding well child exams. After a diagnosis of overweight or obese based on BMI is established, the assessment template in Appendix C directs the history, review of systems questions, and physical exam components that need to be addressed during the well child exam. The remainder of the assessment incorporating social-emotional aspects found in Appendix A provides information on the degree in which obesity affects the

child's life. This practice improvement project was first introduced to other providers at the annual North Dakota Nurse Practitioner Association pharmacology conference on October 25<sup>th</sup> and 26<sup>th</sup>, 2012. The poster (see Appendix G) was available for viewing three separate times during the conference in which I was available to answer questions.

The assessment tool is important for early diagnosis of obesity in children so that interventions can be utilized before the obesity worsens. Administering an assessment tool also brings pediatric obesity awareness to families with possibilities of obesity prevention strategies. The evidence based pediatric obesity assessment tool of this project will be disseminated to primary care providers by presenting the executive summary (see Appendix F) to Sanford's local pediatric clinic and other appropriate primary care entities.

The executive summary consists of a synopsis of this practice improvement project including the consequences of pediatric obesity on quality of life and resulting comorbidities; BMI percentiles correlating to normal, overweight, and obesity diagnoses; comprehensive assessment components needed; methodology; and a discussion on how and why to use the assessment tool in practice. In addition, the executive summary explains the assessment tool by describing the template which directs history, review of systems, and physical exam findings based on causes and comorbidities of obesity. Readiness for change, HABITS, Sizing Me Up and Sizing Them Up provides information on the child's life style and degree in which obesity affects the child. Repeated use of the assessment tool overtime provides a means in which to determine improvement or decline in the child's health behaviors and the extent in which obesity is affecting the child's life. The information supplied will allow providers to begin implementing the tool.

Additional Doctor of Nursing Practice roles to exhibit with this tool are advocacy and role modeling. Due to the high negative impact of increasing childhood obesity, the use of this assessment tool must be advocated to primary care providers. As an advanced practice nurse, I will be a role model in the use of evidence based practice and use this tool with my pediatric patients.

### **Implications for Future Research**

Future practice improvement project implications include both assessment and implementation evaluations. The creation of intervention tools to utilize after assessments are completed are needed. Evaluating numerous primary care providers on the effectiveness, utilization, ease or difficulty of the pediatric obesity assessment tool would provide valuable information. Any needed alterations to the assessment could be made or more widespread utilization of the assessment tool in primary care could be established depending on the results of the evaluations.

Future research could also focus specifically on Sanford's family based intervention for pediatric obesity to evaluate the intervention's effectiveness with a focus on the components of the intervention. An evaluation of the intervention could be done in the second study comprised of a larger population of children and their families.

An important element of future research should incorporate interventions primary care providers can utilize once a child is diagnosed with obesity or scores a low quality of life index based on this project's assessment tool. Anticipated interventions include parental involvement with role modeling, promoting nutrition and physical activity, and using cognitive behavioral therapy techniques such as motivation interviewing.

Interventions need to be started as soon as possible in obese children to decrease the effects of obesity related comorbidities.



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**APPENDIX A. PEDIATRIC OBESITY ASSESSMENT TOOL**

**Pediatric Weight Assessment**

**Family Packet**

**Child's name:**

**Date of Birth:** \_\_\_\_\_

**Sex: M or F**

**Guardians' names:**

**Today's date:** \_\_\_\_\_

**Readiness for Change**

Please have your child answer the following 3 questions. Circle the number next to the corresponding answer.

1. How important is it to you to make a change in your eating or activity habits?

1 – Unimportant    2 – Of Little Importance    3 – Moderately Important  
4 – Important    5 – Very Important

2. How confident do you feel in the ability to make a change in your eating or activity habits?

1 – Not Confident    2 – A Little Confident    3 – Moderately Confident  
4 – Confident    5 – Very Confident

3. How ready are you to make a change in your eating or activity habits?

1 – Not Ready    2 – A Little Ready    3 – Moderately Ready  
4 – Ready    5 – Very Ready

## **Readiness for Change**

Guardian, please answer the following questions. Circle the number next to the corresponding answer.

What is your relation to the child? (mother, father, grandmother, etc.)

---

1. How important is it to you to make a change in your eating or activity habits?

1 – Unimportant   2 – Of Little Importance   3 – Moderately Important  
4 – Important   5 – Very Important

2. How confident do you feel in the ability to make a change in your eating or activity habits?

1 – Not Confident   2 – A Little Confident   3 – Moderately Confident  
4 – Confident   5 – Very Confident

3. How ready are you to make a change in your eating or activity habits?

1 – Not Ready   2 – A Little Ready   3 – Moderately Ready  
4 – Ready   5 – Very Ready

## HABITS questionnaire

In this section, we are interested in knowing about your personal habits. Please tell me what answer best describes your situation.

### 1. In the past month, how often did you:

	Never	Sometimes	Every day
A. Eat three meals per day?	0	1	2
B. Eat fruit?	0	1	2
C. Eat vegetables?	0	1	2

### 2. Do you sometimes eat an extra meal, a snack, a bowl of cereal, or 'seconds':

- 1. Yes
- 0. No

### 3. In the past month, how often did you drink?

	Never/less than once a week	Several times a week	Once a day	Twice or more a day
A. Juice at home (like apple or orange)?	0	1	2	3
B. Other drinks at home? (ice tea, lemonade, fruit punch, Kool Aide, Capri Sun, Sunny Delight, Snapple, Gatorade, Vitamin Water)	0	1	2	3
C. Soda? What Kind:	0	1	2	3
D. Milk or other milk products? What Kind:	0	1	2	3
E. Water?	0	1	2	3

**4. In the past month, how many times did you:**

	<b>Never</b>	<b>Once</b>	<b>Twice a week or more</b>
<b>A. Eat a fast food meal? (pizza, chinese, hamburgers, fried chicken)</b>	0	1	2

	<b>Never/less than once a week</b>	<b>Several times a week</b>	<b>Once a day</b>	<b>Twice or more a day</b>
<b>B. Eat “junk food” (candy bars, potato chips, cookies)</b>	0	1	2	3
<b>C. Go outside to play? (ride a bike, do karate, jump rope, play basketball)</b>	0	1	2	3

**5. In the past month, how much time did you?**

	<b>&lt;1h</b>	<b>1h</b>	<b>2h</b>	<b>3h or more a day</b>
<b>A. Watch television on a weekday?</b>	0	1	2	3
<b>B. Watch television on a weekend</b>	0	1	2	3
	<b>Every Day</b>	<b>Sometimes</b>	<b>Never</b>	
<b>C. Eat with the television on?</b>	2	1	0	

**Family Weight Management Program  
Jacobi Medical Center  
Albert Einstein College of Medicine**





**SIZING THEM UP**  
PARENT VERSION (children 5-18 years)

*Understanding the impact of your child's health and treatment (e.g. exercise, diet) on their day- to-day activities can help healthcare professionals provide better treatment recommendations for you and your child. For this reason, we have developed a weight-specific quality of life measure for parents of children with obesity.*

**INSTRUCTIONS:** The following questions are regarding your child's quality of life and your perceptions of how their weight/shape/size impacts their day to day activities. *Please answer all the questions.* There are no right or wrong answers. If you are unsure how to answer a particular question, please choose the response that seems to best fit your child's situation.

SUBJECT ID: \_\_\_\_\_  
DATE: \_\_\_\_\_

Has your child been on vacation, out of school, or had any major changes (e.g. moving, starting a new school) during the past month?

NO  YES If yes, please explain: \_\_\_\_\_

**Please indicate how your child has been feeling within the past MONTH regarding their weight/shape/size by checking the box that best fits your child.**

*During the past month, indicate how often your child:*

	Never	Sometimes	Often	Always
1. Had difficulty participating in physical activities (e.g. sports) because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Was teased by peers because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Chose not to go to school because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Felt sad because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Had to make changes to surroundings (e.g. furniture, school desks) because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Argued about when, what and how much to eat.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*During the past month, indicate how often your child:*

	Never	Sometimes	Often	Always
7. Chose not to participate in gym/recess/physical education at school because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Felt frustrated because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Avoided dressing or undressing in front of others because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Kept their body clean and fresh.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Felt worried because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Felt left out because of their weight/shape/size (e.g. no one talks or sits with them).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Felt mad because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Was teased by others when physically active because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Seen as having a good sense of humor.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Felt concerned about their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Perceived as healthy by others.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Became upset at mealtimes (e.g. cried, fussed, argued).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Had difficulty keeping up with other children because their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Felt successful in daily activities.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Became out of breath and had to slow down because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Had low self-esteem because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



For parents of children **14 years and older**:

*During the past month, indicate how often your child:*

	Never	Sometimes	Often	Always
23. Talked about difficulties dating due to their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. Preferred to spend time alone because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Participated in hobbies/clubs (e.g. church group, school club, 4-H, scouts).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Found it difficult to find a job/volunteer activity because of their weight/shape/size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Worried about the future because of their weight/shape/size .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Attended extracurricular school activities (e.g. dances, sporting events, clubs, concerts).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Manual Scoring for Sizing Them Up

## Instructions

### Step 1: Item-by-Item Responses and Reverse Coding

Please check the data for missing responses. If the patient has completed all items, use Worksheet A. If the patient has missing responses, use Worksheet B.

*Copy the parent's responses on the in the spaces designated for each numbered question.* For items with a \*, the item needs to be reverse coded. Please reference the Reversed Keyed Responses box (1 = 4 etc.). Enter the reverse codes in the shaded boxes for items with an \*.

**Note:** If participants choose multiple response choices for the same question or they skip a question, do not assign the question a response value (i.e., leave it blank) and consider it missing.

### Step 2: Scaled Scoring (if no items are missing-Worksheet A)

Scaled scores are obtained for each domain by using the equations found for each scale. The formula below is used to calculate scaled scores:

$$\text{SCALED SCORES} = \frac{\text{Sum of responses} - \text{Minimal Possible sum (n} \times 1)}{\text{Maximum possible sum (n} \times 4) - \text{Minimum possible sum (n} \times 1)} \times 100$$

**Example:** For a scale comprising three items, such as the Teasing/Marginalization on Sizing Them Up, and on the basis of the four-point Likert scale used, the calculation method is:

- Minimum possible sum: 3 items  $\times$  1 point = 3
- Maximum possible sum: 3 items  $\times$  4 points = 12

If the parent who completed the questionnaire obtains 7 points (e.g., 2 points for #2 + 2 points for #12 + 3 points for #14), the result is:

$$\text{SCALED SCORE} = \frac{7 - 3}{12 - 3} \times 100 = \frac{4}{9} \times 100 = 44.4 \text{ points for the Teasing/Marginalization scale}$$

### Step 3: Missing Values (See Worksheet B)

For all scales, the number of items needed to score the scale is specified. Please follow the directions for Worksheet B to score this measure if items are missing.

## Scaled Scores Worksheet A

**\* Reverse Keyed Responses \***

1 (Never) = 4  
 2 (Sometimes) = 3  
 3 (Often) = 2  
 4 (Always) = 1

**Emotional**

4. \*  =

8. \*  =

9. \*  =

11. \*  =

13. \*  =

16. \*  =

22. \*  =

**Emotion Scaled Score** =  $(\underline{\quad} - 7) / 21 = \underline{\quad} \times 100 = \underline{\quad}$   
Raw Emotional Item Total

**Physical**

1. \*  =

5. \*  =

7. \*  =

19. \*  =

21. \*  =

**Physical Scaled Score** =  $(\underline{\quad} - 5) / 15 = \underline{\quad} \times 100 = \underline{\quad}$   
Raw Physical Item Total

**Teasing/Marginalization**

2. \*  =

12. \*  =

14. \*  =

**Teasing/Marginalization Scaled Score** =  $(\underline{\quad} - 3) / 9 = \underline{\quad} \times 100 = \underline{\quad}$   
Raw Teasing Item Total

## Scaled Scores Worksheet A (continued)

### Positive Attributes

10.
15.
17.
20.

$$\text{Positive Attributes Scaled Score} = \left( \frac{\text{_____} - 4}{12} \right) \times 100 = \text{_____}$$

Raw Positive Att. Item Total

### Mealtimes

6. \*  =
18. \*  =

$$\text{Mealtimes Scale Score} = \left( \frac{\text{_____} - 2}{6} \right) \times 100 = \text{_____}$$

Raw Mealtimes Item Total

### School

3. \*  =

$$\text{School Scaled Score} = \left( \frac{\text{_____} - 1}{3} \right) \times 100 = \text{_____}$$

Raw School Item Total

### Total QOL score

$$\text{Total QOL Scaled Score} = \left( \frac{\text{_____} - 22}{66} \right) \times 100 = \text{_____}$$

Total of Shaded Boxes (does not include Adolescent module)

### Adolescent Developmental Adaptation Module (not included in total score)

23. \*  =
24. \*  =
25.
26. \*  =
27. \*  =
28.

$$\text{Adolescent Devt. Adaptation Scaled Score} = \left( \frac{\text{_____} - 6}{18} \right) \times 100 = \text{_____}$$

Raw Devt. Adapt Item Total

## Scaled Scores Worksheet B –MISSING ITEMS

**\* Reverse Keyed Responses \***

- 1 (Never) = 4  
 2 (Sometimes) = 3  
 3 (Often) = 2  
 4 (Always) = 1

**Emotional (You must have at least 5 of 7 items)**

4. \* \_\_\_\_\_ =
8. \* \_\_\_\_\_ =
9. \* \_\_\_\_\_ =
11. \* \_\_\_\_\_ =
13. \* \_\_\_\_\_ =
16. \* \_\_\_\_\_ =
22. \* \_\_\_\_\_ =

Raw Emotion Total = (\_\_\_\_\_/# of emotion items completed)\*7 = \_\_\_\_\_

**Emotion Scaled Score** =  $(\frac{\text{Raw Emotion Total} - 7}{21}) \times 100 = \underline{\hspace{2cm}}$

**Physical (You must have at least 3 of 5 items)**

1. \* \_\_\_\_\_ =
5. \* \_\_\_\_\_ =
7. \* \_\_\_\_\_ =
19. \* \_\_\_\_\_ =
21. \* \_\_\_\_\_ =

Raw Physical Item Total: (\_\_\_\_\_/# of physical items completed)\*5 = \_\_\_\_\_

**Physical Scaled Score** =  $(\frac{\text{Raw Physical Item Total} - 5}{15}) \times 100 = \underline{\hspace{2cm}}$

**Teasing/Marginalization (You must have 2 of 3 items)**

2. \* \_\_\_\_\_ =
12. \* \_\_\_\_\_ =
14. \* \_\_\_\_\_ =

Raw Teasing/Marginalization Item Total: (\_\_\_\_\_/# of teasing items completed)\*3 = \_\_\_\_\_

**Teasing/Marginalization Scaled Score** =  $(\frac{\text{Raw Teasing Item Total} - 3}{9}) \times 100 = \underline{\hspace{2cm}}$

## Worksheet B -MISSING DATA (continued)

### Positive Attributes (You must have at least 3 of 4 items)

10.
15.
17.
20.

Raw Positive Attributes Item Score: (    /# of positive attributes items completed)\*4 =     

$$\text{Positive Attribute Scaled Score} = \left( \frac{\text{Raw Pos. Attributes Item Total} - 4}{12} \right) \times 100 = \text{    }$$

### Mealtime (You must have 2 of 2 items)

6. \*  =
18. \*  =

$$\text{Mealtime Scale Score} = \left( \frac{\text{Raw Mealtime Item Total} - 2}{6} \right) \times 100 = \text{    }$$

### School (You must have 1 of 1 item)

3. \*  =

$$\text{School Scaled Score} = \left( \frac{\text{Raw School Item Total} - 1}{3} \right) \times 100 = \text{    }$$

### Total QOL score (You must have 16 of 22 core items)

Raw Total QOL Item Score: (    /# of all items completed)\*22 =     

$$\text{Total QOL Scaled Score} = \left( \frac{\text{Total of Shaded Boxes (does not include Adolescent module)} - 22}{66} \right) \times 100 = \text{    }$$



**Adolescent Developmental Adaptation MODULE (You must have 4 of 6 items)**

- 23. \* \_\_\_\_\_ =
- 24. \* \_\_\_\_\_ =
- 25.
- 26. \* \_\_\_\_\_ =
- 27. \* \_\_\_\_\_ =
- 28.

Raw Adolescent Devt. Adapt Item Score: (\_\_\_\_/# of adol devt. adapt items completed)\*6 = \_\_\_\_

**Adolescent Devt. Adaptation Scaled Score = (\_\_\_\_\_ - 6)/18 = \_\_\_\_\_ × 100 = \_\_\_\_\_**

Raw Devt. Adapt Item Total

From “Validation of a Parent-proxy, Obesity-specific Quality-of-life Measure: Sizing Them Up,” by A. C. Modi and M. H. Zeller, 2008, *Obesity*, 16, pp. 2624-2633. Copyright 2008 by Modi and Zeller. Reprinted with permission.



**SIZING ME UP**  
SCHOOL-AGE CHILD VERSION (5-13 years)  
INTERVIEWER ADMINISTERED



SUBJECT ID: \_\_\_\_\_  
DATE: \_\_\_\_\_  
INTERVIEWER: \_\_\_\_\_

**INSTRUCTIONS:** This questionnaire is formatted to be used by an interviewer and should only be administered to a child in interview format. Directions that are to be read **ALoud** by the interviewer will be in italics. Children 11-13 years of age may complete the measure on their own after the practice items.

**Interviewer:** Now you are going to answer some questions, but first I want to go over the different answer choices with you. (Take out Answer Choice Card). If I asked you to pick **ALL** of the circle, which would you pick? If I asked you to pick **A lot** of the circle, which would you pick? If I asked you to pick **A little** of the circle, which would you pick? If I asked you to pick **None** of the circle, which would you pick? Make sure child understands these concepts.

**Interviewer:** We are going to be asking you some questions about some of the things that you think and feel. There are no right or wrong answers. For each question I ask you, you are going to look at this card (give child Answer Choice Card) and choose an answer. If you are not sure about your answer, just pick the one that you think is best for you.

Let's try a practice one:

**EXAMPLE:** **A library has books.**

Is that "none of the time," "a little," "a lot," or "all the time"?

Let's try another one.

**EXAMPLE:** **Dogs can fly.**

Is that "none of the time," "a little," "a lot," or "all the time"?

Please check the box that corresponds with the child's answers.

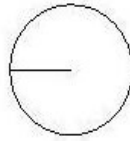
*During the past month, tell us how much you:*

	None of the time	A little	A lot	All the time
1. Were teased by other kids because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Felt sad because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Were told you are healthy or growing well .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. Felt mad because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Felt left out because of your size (e.g. no one talks or sits with you).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Found it hard to swing, climb, skip, bounce a ball, or jump rope because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. Like yourself because of your size .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Stood up for or helped other kids because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Felt frustrated because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Felt worried because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Chose not to go to school because of your size .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Had problems fitting into your desk at school because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Felt happy because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Were picked first for recess or gym because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Were teased by other kids when physically active (e.g. move your body) because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Felt you have a good sense of humor.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

*During the past month, tell us how much you:*

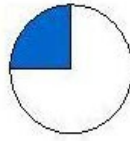
	None of the time	A little	A lot	All the time
17. Did not want to go to the swimming pool or park because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Felt uncomfortable sleeping at a friend's house because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19. Got upset at mealtimes (e.g. cried, fussed, argued).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Found it hard to keep up with other kids because your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Got out of breath and had to slow down because of your size.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Chose not to participate in gym or recess at school because of your size .....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

0



None of the time

1



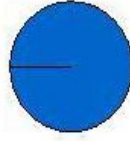
A little

2



A lot

3



All the time

# Manual Scoring for Sizing Me Up

## Instructions

### Step 1: Item-by-Item Responses and Reverse Coding

Please check the data for missing responses. If the patient has completed all items, use Worksheet A. If the patient has missing responses, use Worksheet B.

*Copy the participant's responses on the in the spaces designated for each numbered question. For items with a \*, the item needs to be reverse coded. Please reference the Reversed Keyed Responses box (1 = 4 etc.). Enter the reverse codes in the shaded boxes for items with an \*.*

**Note:** If participants choose multiple response choices for the same question or they skip a question, do not assign the question a response value (i.e., leave it blank) and consider it missing.

### Step 2: Scaled Scoring (if no items are missing-Worksheet A)

Scaled scores are obtained for each domain by using the equations found for each scale. The formula below is used to calculate scaled scores:

$$\text{SCALED SCORES} = \frac{\text{Sum of responses} - \text{Minimal Possible sum (n} \times 1)}{\text{Maximum possible sum (n} \times 4) - \text{Minimum possible sum (n} \times 1)} \times 100$$

**Example:** For a scale comprising four items, such as the Emotion scale on Sizing Me Up, and on the basis of the four-point Likert scale used, the calculation method is:

- Minimum possible sum: 4 items  $\times$  1 point = 4
- Maximum possible sum: 4 items  $\times$  4 points = 16

If the participant who completed the questionnaire obtains 4 points (e.g., 2 points for #2 + 2 points for #4 + 1 point for #9 + 4 points for #10), the result is:

$$\text{SCALED SCORE} = \frac{9 - 4}{16 - 4} \times 100 = \frac{5}{12} \times 100 = 41.6 \text{ points for the Emotion scale}$$

### Step 3: Missing Values (See Worksheet B)

For all scales, the number of items needed to score the scale is specified. Please follow the directions for Worksheet B to score this measure if items are missing.

## Scaled Scores Worksheet A

### \* Reverse Keyed Responses \*

1 (Never) = 4

2 (Sometimes) = 3

3 (Often) = 2

4 (Always) = 1

#### Emotional

2. \* =

4. \* =

9. \* =

10. \* =

$$\text{Emotion Scaled Score} = \frac{(\underline{\quad} - 4)}{12} = \underline{\quad} \times 100 = \underline{\quad}$$

Raw Emotional Item Total

#### Physical

6. \* =

12. \* =

15. \* =

20. \* =

21. \* =

$$\text{Physical Scaled Score} = \frac{(\underline{\quad} - 5)}{15} = \underline{\quad} \times 100 = \underline{\quad}$$

Raw Physical Item Total

#### Teasing/Marginalization

1. \* =

5. \* =

$$\text{Teasing/Marginalization Scaled Score} = \frac{(\underline{\quad} - 2)}{6} = \underline{\quad} \times 100 = \underline{\quad}$$

Raw Teasing Item  
Total

## Scaled Scores Worksheet A (continued)

### Positive Attributes

3.	<input type="checkbox"/>
7.	<input type="checkbox"/>
8.	<input type="checkbox"/>
13.	<input type="checkbox"/>
14.	<input type="checkbox"/>
16.	<input type="checkbox"/>

$$\text{Positive Attributes Scaled Score} = \left( \frac{\text{_____} - 6}{18} \right) \times 100 = \text{_____}$$

Raw Positive Attributes Item Total

### Social Avoidance

11.	*	=	<input type="checkbox"/>
17.	*	=	<input type="checkbox"/>
18.	*	=	<input type="checkbox"/>
19.	*	=	<input type="checkbox"/>
22.	*	=	<input type="checkbox"/>

$$\text{Social Avoidance Scale Score} = \left( \frac{\text{_____} - 5}{15} \right) \times 100 = \text{_____}$$

Raw Social Avoidance Item Total

### Total QOL score

$$\text{Total QOL Scaled Score} = \left( \frac{\text{_____} - 22}{66} \right) \times 100 = \text{_____}$$

Total of Shaded Boxes



## Scaled Scores Worksheet B –MISSING ITEMS

**\* Reverse Keyed Responses \***  
 1 (Never) = 4  
 2 (Sometimes) = 3  
 3 (Often) = 2  
 4 (Always) = 1

### Emotional (You must have at least 3 of 4 items)

2. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
4. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
9. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
10. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>

Raw Emotion \_\_\_\_\_/# of emotion items completed)\*4 =

Total = (

**Emotion Scaled Score** =  $(\underline{\hspace{1cm}} - 4)/12 = \underline{\hspace{1cm}} \times 100 = \underline{\hspace{1cm}}$   
Raw Emotion Item Total

### Physical (You must have at least 3 of 5 items)

6. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
12. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
15. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
20. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
21. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>

Raw Physical Item \_\_\_\_\_/# of physical items completed)\*5 =

Total: (

**Physical Scaled Score** =  $(\underline{\hspace{1cm}} - 5)/15 = \underline{\hspace{1cm}} \times 100 = \underline{\hspace{1cm}}$   
Raw Physical Item Total

### Teasing/Marginalization (You must have 2 of 2 items)

1. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>
5. *	=	<div style="background-color: #cccccc; height: 15px; width: 100%;"></div>

Raw Teasing/Marginalization Item \_\_\_\_\_/# of teasing items completed)\*2 =

Total: (

**Teasing/Marginalization Scaled Score** =  $(\underline{\hspace{1cm}} - 2)/6 = \underline{\hspace{1cm}} \times 100 = \underline{\hspace{1cm}}$   
Raw Teasing Item Total

## Worksheet B -MISSING DATA (continued)

### Positive Attributes (You must have at least 4 of 6 items)

- 3.
- 7.
- 8.
- 13.
- 14.
- 16.

Raw Positive Attributes (\_\_\_\_/# of positive attributes items completed)\*6 =  
Item Score: (

**Positive Attribute Scaled Score** =  $(\frac{\text{Raw Pos. Attributes}}{\text{Item Total}} - 6)/18 = \text{____} \times 100 = \text{____}$

### Social Avoidance (You must have at least 3 of 5 items)

- 11. \*
- 17. \*
- 18. \*
- 19. \*
- 22. \*

Raw Social Avoidance (\_\_\_\_/# of positive attributes items completed)\*5 =  
Item Score: (

**Social Avoidance Scale Score** =  $(\frac{\text{Raw Social Avoidance}}{\text{Item Total}} - 5)/15 = \text{____} \times 100 = \text{____}$

### Total QOL score (You must have 16 of 22 core items)

Raw Total QOL Item Score: (\_\_\_\_/# of all items completed)\*22 =

**Total QOL Scaled Score** =  $(\frac{\text{Raw Total QOL Item Score}}{\text{Total of Shaded Boxes}} - 22)/66 = \text{____} \times 100 = \text{____}$

From “Development and Initial Validation of an Obesity-specific Quality-of-life Measure for Children: Sizing Me Up,” by M. H. Zeller and A. C. Modi, 2009, *Obesity*, 17, pp. 1171-1177. Copyright 2009 by Zeller and Modi. Reprinted with permission.

## APPENDIX B. TREATMENT ACCEPTABILITY

### Program Evaluation

Please answer the following questions by circling the corresponding number at the end of each statement:

1 - Strongly Disagree   2 - Disagree   3 - Undecided   4 - Agree   5 - Strongly Agree

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Overall, this program was easy to complete.  | 1 | 2 | 3 | 4 | 5 |
| 2. Our family felt supported throughout the program.  | 1 | 2 | 3 | 4 | 5 |
| 3. The program interfered with our family's schedule.   | 1 | 2 | 3 | 4 | 5 |
| 4. As a parent, I feel I learned useful information that I will be able to incorporate into our family's daily lives. | 1 | 2 | 3 | 4 | 5 |
| 5. My child has expressed that he/she has enjoyed the program.  | 1 | 2 | 3 | 4 | 5 |

Additional comments:

**APPENDIX C. ASSESSMENT TEMPLATE PRESENTED TO KEY INFORMANTS  
OF PEDIATRIC OBESITY PILOT STUDY**

**Providers' Pediatric Weight Assessment**

**Patient's name:**

**DOB:**

**Sex:**

**Date of Visit:**

**Vital Signs:**

**HT** \_\_\_\_\_ in/cm \_\_\_\_\_ %

**WT** \_\_\_\_\_ lb/kg \_\_\_\_\_ %

**BMI** \_\_\_\_\_ kg/m<sup>2</sup> **BMI%** \_\_\_\_\_

Blood Pressure \_\_\_\_\_ / \_\_\_\_\_ mmHg \_\_\_\_\_ %

Pulse \_\_\_\_\_

**History:**      Ethnicity -

Medical - Any mental health dx

- Age of onset of excess weight

Family - Obesity (1<sup>st</sup> degree relatives)

- Cardiovascular disease & hyperlipidemia (1<sup>st</sup> and 2<sup>nd</sup> degree relatives)
- Early deaths from heart disease or stroke
- HTN
- Diabetes mellitus type II
- Liver or gallbladder disease
- Respiratory insufficiencies or sleep apnea

Social - Family Functioning / Dynamics:

- Nutritional Habits:

- Physical Activity:

- Screen Time:

**Review of Systems:**

General: Hours of sleep; energy level, day time sleepiness (depression, sleep apnea)

Mental Health:

- Depression – insomnia, lack of enjoying activities
- Anxiety, school avoidance, social isolation
- Parent/patient concerns about weight

Readiness for change:

HEENT: headaches (pseudotumor cerebri), snoring, night breathing difficulties (sleep apnea)

GI: abdominal pain (GERD, gallbladder disease, constipation, non-alcoholic fatty liver disease)

Musculoskeletal:

hip, knee pain (slipped capital femoral epiphysis, Blount's disease)

Endocrine: thyroid tenderness, heat or cold intolerance; polydipsia, polyuria (DMII), changes in facial or body hair, oligomenorrhea or amenorrhea (polycystic ovarian syndrome)

**Physical Exam:** (Look for causes and complications of obesity)

General Appearance: affect, dysmorphic features (genetic disorders: Prader-Willi Syndrome), fat distribution (trunk/periphery suggests overeating, exogenous obesity tends to increase height versus genetic of endocrine abnormality), poor linear growth (hypothyroidism; Cushings – hirsutism, moon facies, striae, HTN)

HEENT: Microcephaly  
Blurred disc margins  
Clumps of pigment in peripheral retina  
Tonsillar hypertrophy (sleep apnea)  
Papilledema, cranial nerve VI paralysis (Pseudotumor cerebri)

Abdomen: Tenderness (gallbladder disease, GERD, NAFLD)  
Hepatomegaly (non-alcoholic fatty liver disease)

Musculoskeletal:

Bowed legs (Blount's disease)  
Limited hip ROM (Slipped capital femoral epiphysis)

Genitourinary: Developmental delay / Abnormal genitalia (Prader-Willi, Turner, Bardet-Biedl Syndrome)  
Oligomenorrhea (+ hirsutism or excessive acne = polycystic ovarian syndrome)

# Pediatric Obesity Assessment Template

Kelly Agnello (kelly.shannon@my.ndsu.edu)

Family Nurse Practitioner – Doctor of Nursing Practice Student

North Dakota State University

June 14, 2012

**Resource Key:** NICH – National Initiative for Children’s Healthcare Quality: Approach for Prevention & Management of Overweight in Children 2-12 years

NICH – Expert Committee Recommendations on the Assessment, Prevention and Treatment of Child and Adolescent Overweight and Obesity – 2007

*Both*

**Sanford Population:** 8-12 year olds

99<sup>th</sup>ile BMI

**Vitals +:** *Height / weight*

*BMI / BMI%*

**Abdominal Girth?**

*BP / BP% (based on age, sex, & height %)*

*Pulse*

**History:** **Ethnicity** –

**Medical** - any mental health dx

- age of onset of excess weight

**Family** - Obesity (1<sup>st</sup> degree relatives)

- Cardiovascular disease & hyperlipidemia (1<sup>st</sup> and 2<sup>nd</sup> degree relatives)

- Early deaths from heart disease or stroke

- HTN
- *Diabetes mellitus type II*
- Liver or gallbladder disease
- Respiratory insufficiencies or sleep apnea

**Social - Family Functioning / Dynamics:**

- Family Adaptability and Cohesion Evaluation Scale (FACES III)
- McMaster Family Assessment Device
- Family Environment Scale
- Self-Report Family Inventory
- ACE Study – Adverse Childhood Experience (CDC)

**Food / Nutritional Habits:**

**Physical Activity:**

**Screen Time:**

- NICH A Menu for Action (Maine)
- Your Weekly Log (MA)
- HABITS Questionnaire
- Shape Up Somerville Questionnaires (3)

**Review of Systems:**

General: hours of sleep; energy level, day time sleepiness (depression, sleep apnea)

**Mental Health:** *depression – insomnia, lack of enjoying activities*

*Anxiety, school avoidance, social isolation*

Parent/patient concerns about weight

Pediatric Symptom Checklist (MDH & Bright Futures)

**Readiness for change:** NICH 0-10 readiness scale (Maine)

HEENT: headaches (*pseudotumor cerebri*), **snoring**, *night breathing difficulties*  
(sleep apnea)

GI: abdominal pain (GERD, gallbladder disease, constipation, non-alcoholic fatty liver disease)

Musculoskeletal: hip, knee pain (slipped Capital femoral epiphysis  
Blount's disease)

Endocrine: thyroid tenderness, heat or cold intolerance; polydipsia, polyuria (DMII), changes in facial or body hair. Oligomenorrhea or amenorrhea (polycystic ovarian syndrome)

**Physical Exam:** (Look for causes and complications of obesity)

General appearance: affect, dysmorphic features (genetic disorders: Prader-Willi Syndrome), fat distribution (trunk/periphery suggests overeating, exogenous obesity tends to increase height versus genetic of endocrine abnormality), poor linear growth (hypothyroidism; Cushings - hirsutism, moon facies, striae, HTN)

HEENT: Microcephaly

Blurred disc margins

Clumps of pigment in peripheral retina

Tonsillar hypertrophy (sleep apnea)

Papilledema, cranial nerve VI paralysis (Pseudotumor cerebri)

Abdomen: Tenderness (gallbladder disease, GERD, NAFLD)

Hepatomegaly (non-alcoholic fatty liver disease)

Musculoskeletal: Bowed legs (Blount's disease)

Limited hip ROM (Slipped capital femoral epiphysis)

Genitourinary: Developmental delay / Abnormal genitalia (Prader-Willi, Turner, Laurence-Moon-Badet-Biedle)



Oligomenorrhea (+ hirsutism or excessive acne = polycystic ovarian syndrome)

**Labs:** Fasting glucose –  $\geq 10$  yrs old +  $\geq 2$  risk factors (fam hx, ethnicity, signs of insulin resistance: acanthosis nigricans, HTN, dyslipidemia, ab girth > 90%ile, PCOS)

Lipid Panel –

ALT / AST -

## APPENDIX D. PROGRAM TIMELINE

	WEEK	1	2	3	4	5	6	7	8	9	10	11	12	6 month f/u
<b>ASSESSMENT</b>														
<b>Child:</b>														
Weight		x	x	x	x	x	x	x	x	x	x	x	x	x
Height		x											x	x
Sizing Me Up		x											x	x
Readiness for change		x					x						x	x
Treatment Acceptability													x	
<b>Parent:</b>														
Weight		x	x	x	x	x	x	x	x	x	x	x	x	x
Height		x												x
Sizing Them Up		x											x	x
Readiness for change		x					x						x	x
Treatment Acceptability													x	

APPENDIX E. PEDIATRIC WEIGHT ASSESSMENT PROGRESS NOTE

SMARTSET

**Patient's name:**

**DOB:**

**Sex:**

**Date of Visit:**

**Vital Signs:**

HT \_\_\_\_\_ in/cm \_\_\_\_\_ %  
WT \_\_\_\_\_ lb/kg \_\_\_\_\_ %  
BMI \_\_\_\_\_ kg/m<sup>2</sup> BMI% \_\_\_\_\_  
Blood Pressure \_\_\_\_\_ / \_\_\_\_\_ mmHg \_\_\_\_\_ %  
Pulse \_\_\_\_\_

**HPI:** Patient name is a age year old who is being seen today for \*\*\*. He/She presents accompanied by his/her (mother, father, grandparent, \*\*\*).

**History:** Ethnicity - (white or non-Hispanic, black or African American, Hispanic, Native American, Asian, Other \*\*\*)

Medical - Mental health diagnosis \*\*\*  
- Age of onset of excess weight \*\*\*

Current Medications – insert medication list

Family - Obesity (father, mother, sister, brother)

Cardiovascular disease & hyperlipidemia (PGF, PGM, MGF, MGM, father, mother, sister, brother, paternal aunt, paternal uncle, maternal aunt, maternal uncle)

Early deaths from heart disease or stroke (PGF, PGM, MGF, MGM, father, mother, sister, brother, paternal aunt, paternal uncle, maternal aunt, maternal uncle)

HTN (PGF, PGM, MGF, MGM, father, mother, sister, brother, paternal aunt, paternal uncle, maternal aunt, maternal uncle)

Diabetes mellitus type II (PGF, PGM, MGF, MGM, father, mother, sister, brother, paternal aunt, paternal uncle, maternal aunt, maternal uncle)

Liver or gallbladder disease (PGF, PGM, MGF, MGM, father, mother, sister, brother, paternal aunt, paternal uncle, maternal aunt, maternal uncle)

Respiratory insufficiencies or sleep apnea (PGF, PGM, MGF, MGM, father, mother, sister, brother, paternal aunt, paternal uncle, maternal aunt, maternal uncle)

Social – Readiness for Change score

Sizing Me Up score  
Sizing Them Up score  
HABITS insert questionnaire

Previous assessments: Date Readiness for Change score; Sizing Me Up score; Sizing Them Up score; HABITS insert questionnaire

**Review of Systems:**

General: Hours of sleep\*\*\*; energy level\*\*\*, day time sleepiness

HEENT: headaches, snoring, night breathing difficulties

GI: abdominal pain\*\*\*

Musculoskeletal: hip, knee pain

Endocrine: thyroid tenderness, heat or cold intolerance; polydipsia, polyuria, changes in facial or body hair, oligomenorrhea or amenorrhea

**Physical Exam:**

General appearance: affect\*\*\*; dysmorphic features \*\*\*; fat distribution (trunk/periphery; increased height); poor linear growth, no obvious abnormalities

HEENT: Microcephaly, Blurred disc margins, Clumps of pigment in peripheral retina, Tonsillar hypertrophy, Papilledema, cranial nerve VI paralysis, no obvious abnormalities

Abdomen: Tenderness, Hepatomegaly

Musculoskeletal: Bowed legs, Limited hip ROM

Genitourinary: Developmental delay, Abnormal genitalia, Oligomenorrhea

**Labs:** Fasting glucose – Most recent glucose result

Lipid Panel – Most recent lipid results

ALT / AST - Most recent ALT and AST results

**Impression:** (Overweight, obese). BMI percentile

This is the (1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup>, \*\*\*) time patient name has completed this assessment. His/her scores have (improved, worsened, stayed the same) since the last assessment.

**Plan:** \*\*\*

## APPENDIX F. DISSEMINATION OF PROJECT TO PRIMARY CARE

### PROVIDERS

#### Executive Summary:

#### *Implementing an Evidence Based Pediatric Obesity Assessment Tool*

#### BACKGROUND

- About 1/3 of U.S. children are overweight or obese
- 1<sup>st</sup> time in modern history children will have more chronic disease and decreased life expectancy compared to their parents due to obesity consequences
- Multiple comorbidities coincide with obesity affecting children physically and emotionally impacting obese children's quality of life

#### **Obesity Complications:**

Cardiovascular: dyslipidemia, hypertension, left ventricular hypertrophy, endothelial abnormalities, early atherosclerosis

Metabolic: insulin resistance, hyperinsulinemia, risk of diabetes mellitus, metabolic syndrome

Respiratory: sleep apnea, asthma

Gastrointestinal: nonalcoholic fatty liver disease, gallbladder disease, GERD, altered responses to medications

Musculoskeletal: slipped capital femoral epiphysis, tibia vara, osteoarthritis

Psychosocial: depression, anxiety, low self-esteem, disturbed body image, negative self-perception, low health-related quality of life

**Problem:** Despite increased prevalence and negative consequences, few evidence based practice, generalizable assessment tools exist

#### PURPOSE

Transition a generalizable, evidence based pediatric obesity assessment tool from research into practice in a local pediatric obesity program which can later be utilized in primary care in order to implement early intervention with obese children.

#### LITERATURE REVIEW

##### Assessment

**Assessing Weight Status:** (BMI most accepted and widely used)

- BMI – based on height, weight, age, and sex
- Normal Weight = 5<sup>th</sup> - 85<sup>th</sup> %
- Overweight = 85<sup>th</sup> - 94<sup>th</sup> %
- Obese = > 95<sup>th</sup> %

**History, Review of Systems and Physical Exam:** Assess for comorbidities and rare causes

**Behavioral / Psychosocial:** Diet/nutritional habits, physical activity, screen time, family functioning, parental involvement, attitudes, readiness for change

## **Interventions**

### **Parents and Family Involvement:**

- Most important component of interventions
- Target parents = more successful outcomes of treatment
- Successful studies = incorporate family, parents, nutrition, physical activity, and cognitive behavioral therapy such as motivational interviewing into interventions

## **METHODOLOGY**

### **Project implementation**

- Local clinic implementing family based 10 week pediatric obesity outpatient program
- Ages 8-12; N = 10 families
- Numerous assessment tools from the literature presented to key psychologists of program
- Quality of Life tools ‘Sizing Them Up’ for parents and ‘Sizing Me Up’ for children selected
- +Assessments: height, weight, BMI, readiness for change, HABITS, treatment acceptability

### **Project Goals**

1. Generate provider friendly pediatric obesity assessment tool
2. Transition assessment tool from evidence based research into practice
3. Create assessment tool with the capacity to transition into the electronic health record Epic with the ability of being adopted into use as a screening tool in primary care
4. Evaluate providers on effectiveness of obesity assessment tool

### **Evaluation**

Survey providers who implement assessment tool on utilization, ease, and difficulty of use

**RESULTS** The agency approved the use of the pediatric assessment tool.

## **DISCUSSION AND CONCLUSION**

Primary care providers are often very busy throughout their day and see many obese pediatric patients. While assessing obese children is a complex exercise, using this assessment tool can expedite the process of gaining broad yet essential information to guide the provider’s plan for the child. The tool consists of a template directing a history, review of systems, and physical exam indicating causes and comorbidities of obesity. The readiness for change, HABITS, “Sizing Me Up” and “Sizing Them Up” provides information on the degree in which the obesity affects the child’s life. The tool was created from evidence based practice and reinforced by the clinical expertise of the key informants of the agency.

After implementing the pediatric obesity assessment tool, the key informants concluded the tool provided the necessary information, flowed and was easy to implement, had good clinical battery, and families were willing to participate. Based on the expert clinicians’ evaluation, the assessment tool is ready to be implemented in primary care.

With the seriousness of the increased prevalence and multiple negative consequences of pediatric obesity, it is crucial to bring awareness of the problem to families. Providers have an obligation to screen their pediatric patients for obesity and start discussions with families right away. This tool provides a means of accurate childhood

obesity assessment and provides essential social and health behavior components that prompt providers to initiate a plan for the child and their family.

**Administer the Pediatric Obesity Screening Tool in Primary Care:**

- Height, weight, BMI percentile
- Readiness for Change
- HABITS
- Sizing Me Up and Sizing Them Up: Obtain copyright agreement at <http://www.cincinnatichildrens.org/research/divisions/c/adherence/labs/modi/hrqol/sizing/default/v> and send to [faye.doland@cchmc.org](mailto:faye.doland@cchmc.org)

## APPENDIX G. POSTER DISSEMINATION

# Assessment of Obese Children Within a Family Based Intervention in Primary Care

Co-Investigator: Kelly Agnello, DNP-FNP Student; PI: Dr. Dean Gross, PhD, FNP-C  
North Dakota State University



### BACKGROUND

- About 1/3 of U.S. children are overweight or obese
- 1<sup>st</sup> time children will have more chronic disease and decreased life expectancy compared to their parents due to obesity consequences
- Multiple comorbidities coincide with obesity affecting children physically and emotionally impacting obese children's quality of life

#### Obesity Complications:

Cardiovascular: dyslipidemia, hypertension, left ventricular hypertrophy, endothelial abnormalities, early atherosclerosis  
 Metabolic: insulin resistance, hyperinsulinemia, risk of diabetes mellitus, metabolic syndrome  
 Psychological: depression, anxiety, low self-esteem  
 Gastrointestinal: nonalcoholic fatty liver disease, gallbladder disease, GERD, altered responses to medications  
 Musculoskeletal: slipped capital femoral epiphysis, tibia vara, osteoarthritis  
 Psychosocial: depression, anxiety, low self-esteem, disturbed body image, negative self-perception, low health related quality of life

**Problem:** Despite increased prevalence and negative consequences, few evidence based practice, generalizable assessment tools exist

### PURPOSE

Transition a generalizable, evidence based pediatric obesity assessment tool from research into practice in a local pediatric obesity program which can later be utilized in primary care in order to implement early intervention with obese children.



### LITERATURE REVIEW

#### ASSESSMENT

- Assessing Weight Status:**
- BMI most accepted and widely used
  - BMI – based on height, weight, age, and sex
  - Normal Weight = 5<sup>th</sup>- 85<sup>th</sup> %
  - Overweight = 85<sup>th</sup>- 94<sup>th</sup> %
  - Obese = > 95<sup>th</sup> %

**History, Review of Systems and Physical Exam:** Asses for comorbidities and rare causes  
**Behavioral/ Psychosocial:** Diet/nutritional habits, physical activity, screen time, family functioning, parental involvement, attitudes, readiness for change

- Lots of variation in assessments used
- Many do not have studies supporting reliability and validity
- While some studies are promising, limited published studies to support reliability
- Limited obesity specific tools for young school aged kids
- Quality of life measure covers multiple components of psychosocial assessment
- Only 1 OOL pediatric obesity specific tool for young school aged children exists

#### INTERVENTIONS

- Parents and Family Involvement:**
- Most important component of interventions
  - Target parents = more successful outcomes of treatment
  - Successful studies = incorporate family, parents, nutrition, physical activity, and cognitive behavioral therapy into interventions

### METHODOLOGY

#### Project Implementation

- Local clinic implementing family based 10 week pediatric obesity outpatient program
- Ages 8-12, N = 10 families
- Numerous assessment tools from the literature presented to key psychologist providers of program
- Quality of Life tools "Sizing Them Up" for parents and "Sizing Me Up" for children selected
- Additional assessments: height, weight, BMI, readiness for change, treatment acceptability

#### Project Goals

1. Generate provider friendly pediatric obesity assessment tool
2. Transition assessment tool from evidence based research into practice
3. Evaluate providers on effectiveness of obesity assessment tool

#### Evaluation

Survey providers who implement assessment tool on utilization, ease, and difficulty of use

**Project Timeline – 10 weeks:  
October 9 – December 11, 2012**

ASSESSMENT	1	2	3	4	5	6	7	8	9	10	8 month follow
<b>Child:</b>											
Weight	x	x	x	x	x	x	x	x	x	x	x
Height	x	x	x	x	x	x	x	x	x	x	x
Sizing Me Up	x	x	x	x	x	x	x	x	x	x	x
Readiness for Change	x	x	x	x	x	x	x	x	x	x	x
Steps	x	x	x	x	x	x	x	x	x	x	x
Treatment Acceptability	x	x	x	x	x	x	x	x	x	x	x
<b>Parent:</b>											
Weight	x	x	x	x	x	x	x	x	x	x	x
Height	x	x	x	x	x	x	x	x	x	x	x
Sizing Them Up	x	x	x	x	x	x	x	x	x	x	x
Readiness for Change	x	x	x	x	x	x	x	x	x	x	x
Treatment Acceptability	x	x	x	x	x	x	x	x	x	x	x

### IMPLICATIONS FOR ADVANCED PRACTICE

By transitioning an evidence based pediatric obesity assessment tool from research into practice, advanced practice nurses will have a tool to more accurately diagnosis obesity in children allowing the implementation of interventions when appropriate, based on evidence based guidelines.

### BIBLIOGRAPHY & CONTACT

Bibliography available upon request  
 Kelly Agnello, DNP-FNP Student  
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