

11-2-2017

Validation of the Electronic Kids Dietary Index (E-KINDEX) Screening Tool for Early Identification of Risk for Overweight/Obesity (OW/OB) in a Pediatric Population: Associations with Quality of Life Perceptions

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Validation of the Electronic Kids Dietary Index (E-KINDEX) Screening Tool for
Early Identification of Risk for Overweight/Obesity (OW/OB) in a Pediatric Population:
Associations with Quality of Life Perceptions

by

Patricia A. Hall

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
College of Nursing
University of South Florida

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Date of Approval
October 25, 2017

Keywords: adolescent, obesogenic environment, pediatric obesity

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DEDICATION

A doctoral dissertation is the product of an individual who has received support from any number of individuals. I am grateful to my family, in particular my Aunt Jan who schooled me in the importance of higher education from the tender age of three. Others of my family, Sandra and Michael, accepted my absences from family activities without fully understanding why, while my 6-year-old granddaughter, Nadia, was content to “work” with me in my library on her spaceship. I will always be grateful to Dr. Susan McMillan, often much more to me than committee chair, for the positive feedback she provided on some of the darkest days: I always left her presence feeling upbeat with priorities in perspective. Other advocates who encouraged me to keep moving forward were Karen Roth, Morton Plant Librarian Extraordinaire, Sandi Vannes, and Roberta Capewell. Fellow dissertation travelers who advised me on statistics, Lisa Huhn, Glenna Brewster, Shannon Morse, Allison Poff, and Pinky Budhrani—all had open-door policies for statistically challenged folks such as myself. I thank you, dear Jesus, for blessing me early with Mimi and Jan who planted and nurtured seeds of education that gave me the potential to complete this project, which I am sure I had to do in preparation for some other work that must be done. JMJ.

ACKNOWLEDGMENTS

I would like to extend my heartfelt thanks to my doctoral committee: Dr. Sahebzamani-Rankin, Dr. Ming Ji, and the chairperson of my committee, Dr. Susan McMillan. Dr. Denise Edwards at the USF Pediatric Clinic and her staff, particularly clinic manager, Jill Barerra, were all very supportive in facilitating data collection for this project. I am extremely grateful to Sigma Theta Tau International Honor Society for Nursing, Delta Beta Chapter, for the financial award that so generously contributed to this effort. Roberta Capewell served as personal trainer for the PhD presentation in the final critical weeks: thank you so much Dr. Capewell!

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ABSTRACT

Despite a worsening obesity epidemic and despite the American Medical Association (AMA) declaring Obesity a disease (2013), few assessment tools exist that assist practitioners who are charged with identifying risk for development of OW/OB in children. The Center for Health Statistics (2017) reported a 40% rate in obesity in the adult population and 18.5% in children in the U.S. Successful weight loss maintenance after 1 to 2 years of non-invasive treatment is less than 1%, indicating obesity is nearly incurable, making prevention imperative. Assessing risk for OW/OB in children has proven difficult given the lack of validated tools. The purposes of this study were to evaluate the predictive validity and estimate the reliability of the Electronic Kids Dietary Index (E-KINDEX) to measure risk for development of overweight and obesity OW/OB in children aged 10 to 18. In addition, the relationship between quality of life perceptions and OW/OB in children was assessed.

Methods. E-KINDEX, a 30-item questionnaire encompassing three dietary domains of food quality, dietary behaviors (attitudes), and dietary habits (Lazarou et al., 2011), was administered to 50 child participants who, with their parents' consent, agreed to participate. The children also completed the quality of life questionnaire. The range for E-KINDEX scores was 1 (worst) to 87 (best) for assessment of the *obesogenic environment* that encompasses the immediate environment of the individual, factors that influence food quality, choices, and behaviors. Predictive validity was evaluated using multiple regression, factor analysis, and receiver operating curve statistics in SPSS; reliability was analyzed using Cronbach's alpha.

Pearson product-moment correlations were used to measure strength of relationships among OW/OB, E-KINDEX scores, and quality of life perceptions in the sample.

Results. E-KINDEX overall score was significantly correlated with OW/OB ($r = -.340$, $n = 50$, $p = .008$), as was Dietary Behaviors ($r = -.593$, $n = 50$, $p = <.001$). These results were consistent with other statistical analyses, including regression and ROC curve analyses. Internal consistency for all subscales and the total ranged from .643 to .703. The correlation between OW/OB and IWQOL-Kids was strong ($r = -.340$, $n = 50$, $p = <.016$), as was E-KINDEX and IWQOL-Kids ($r = .925$, $n = 50$, $p = <.001$). Subscale structure was supported by factor analysis.

Discussion. Predictive validity of E-KINDEX subscales and overall were supported through achievement of aims of the study. Correlations between both E-KINDEX scores and child weights were significant and reliability supported by Cronbach's alpha. Limitations included small sample size of 50 and accuracy of children self-report data in the presence of parents. Parental weight did not correlate with E-KINDEX, but should be studied further relative to the Obesogenic Environment. Physical activity was high in both OW/OB and lean groups. Validated Physical Activity tools are needed.

Implications. Although refinement and further study are needed, E-KINDEX is a useful tool for clinicians to identify children at risk for the chronic disease of OW/OB before it develops, perhaps before risk factors become difficult to modify.

CHAPTER ONE:

INTRODUCTION

Overweight (OW) and Obesity (OB) are complex, chronic diseases that are precursors to a multitude of chronic ailments that decrease life expectancy and quality of life (QOL) globally (Centers for Disease Control and Prevention [CDC], 2013). Beyond the individual burden imposed by chronic diseases such as cardiovascular disease, hypertension, hyperlipidemia, diabetes, stroke, and cancers that contribute to premature death, OW and OB carry a financial burden for all citizens in the United States. Tsai, Williamson, and Glick (2011) reviewed 33 U.S. studies to calculate direct medical costs of OW and OB to the individual as \$266 and \$1,723 respectively, and, combined, to the nation as \$113.9 billion annually in 2008. CDC reported a figure of \$147 billion for direct and indirect costs as well, indicating that in 2006 this represented 9.1% of all annual medical costs paid by Medicare, Medicaid, and private insurers—up from 6.5% in 1998. This was a 42% increase in cost for care of obese patients in one decade. In the time period of 2009 to 2012, 35.7% of adults age 20 to 74 were classified as obese, a number that increased 31% from 1998. Medical care costs related to obesity increased by more than \$315.8 billion in 2010 as a result (Stilwell, 2015). Prevalence of obesity worldwide has caused the World Health Organization to declare it as an epidemic threatening public health worldwide (2013), currently causing more deaths worldwide than underweight, and state that it is preventable (2014). Modern lifestyle patterns have changed to reflect increasing choices of energy-dense foods combined with decreased expenditures of physical activities (Lang &

Froelicher, 2006). Early studies suggested OW/OB was associated with factors other than willpower and self-control: a combination of factors that include genetic, metabolic, biochemical, cultural, and psychosocial factors are all implicated. Obesity is generally recognized as a disorder related to the appetite mechanism, energy intake, and energy expenditure, presenting as a condition linked to many other chronic, serious, comorbid conditions (CDC, 2011).

Background of the Problem

Childhood obesity is also growing to a global epidemic and is a leading factor contributing to obesity in the adult population. Obesity rates for children and adolescents age 2 to 19 have climbed from 5% in 2003 to 17.6% in 2006 to nearly 19% in 2014. One-third to one-half of these children will maintain OW/OB status in adulthood (Lazarou & Newby, 2011). The World Health Organization (WHO) reports that 65% of the world's populations live in countries where the mortality for OW/OB is greater than for the underweight. Globally, more than 40 million children under the age of five were overweight in 2011 (WHO, 2013). The changing velocity of OW/OB as well as increasing recognition of obesity as an incurable disease—less than 1% are able to maintain weight loss for more than one year after conventional treatment—speak to the urgency of the arguments to identify the risk in early childhood when dietary behaviors are in the formative stages and susceptible to modification.

The *obesogenic environment* has been defined as the environment in which individuals reside with regard to accessible, quality food groups, dietary attitudes and beliefs within that environment, and resultant meal pattern behaviors. Research suggests that dietary attitudes, patterns, and behaviors learned early in life impact lifelong choices that, unchecked, can usher in the obesogenic environment for generations that follow. Early identification of elements of an

obesogenic environment that lend themselves to modification may allow for changes within that environment as well as promote long-term healthy eating and dietary behavior patterns for individuals through the life-span (Lazarou, Panagiotakos, Spanoudis, & Matalas, 2011).

A review of relevant literature suggests strong evidence of negative psychosocial consequences for obese youth that includes poor quality of life (QOL) scores (Nadeau, Kolotkin, Boex, Witten et al., 2011; Kolotkin, Zeller, Modi, & Samsa, 2006; Jensen & Steele, 2010). Health-related QOL is the individual's quality of life associated with physical, mental, and social well-being (WHO, 2001). Positive health-related QOL perceptions are essential for individuals to practice health-promoting behaviors with regard to OW and OB and their sequelae (Tsiros, Olds, Buckley, Grimshaw et al., 2009). Based on pooled results from 28 studies, Tsiros and colleagues identified an inverse relationship between Body Mass Index (BMI) scores and Pediatric Quality of Life Inventory scores in patients who did not have other medical conditions. The association of QOL with adult OW/OB is well-documented in the literature (Jensen & Steele, 2010; Katz, McHorney, & Atkinson, 2000). Examination of health-related quality of life in the pediatric population began around 2000. Preliminary findings indicate that poor health-related QOL is associated with increased symptoms of depression and decreased social support for obese youth pursuing a weight-loss program (Zeller & Modi, 2006). Symptoms of depression can be a barrier to pursuit of weight loss and/or weight loss maintenance for these individuals who are at a developmental stage when peer acceptance is critical (Kolotkin, Zeller, Modi, Samsa et al., 2006).

Ineffective Treatment

Extensive research has been devoted to the pathophysiology of OW and OB over the past three decades (NIH, 2010; Redinger, 2007). Weight loss and maintenance of weight loss across

populations remain difficult, however, despite targeted recommendations aimed at both nutrition and physical activity from the Surgeon General, National Institutes of Health, and medical and behavioral research communities (Lang & Froelicher, 2006; Montesi, Ghoch, Brodosi, Calugy et al., 2016; Ogden, Carroll, Kit & Flegal, 2014). High rates of participation in a variety of evidence-based weight loss regimens have been documented, and many of these same participants have repeated the regimen or an alternative with poor outcomes over time. Weight regain in both the pediatric and adult populations continues to contribute to the rise in obesity; in many cases, the weight regained is greater than the weight lost in a supervised weight-loss regimen (Elder, Ritenbough, Mist, Aickin et al., 2007). OW/OB are theoretically preventable conditions, yet prevention methods are not yet clear. Many studies have supported the inverse relationship of OW/OB to Health-Related Quality of Life (HRQOL) in adults, but studies in the pediatric population have only begun to appear in the literature since 2003 (Jensen & Steele, 2010; Tsiros et al., 2009). Studies that inform clinicians about risks to their patients at earlier developmental stages in the life cycle may point to preventive measures that are more effective than weight loss therapy might be at a later stage. The E-KINDEX behavioral domain scores have shown strong correlation with OW/OB status as a domain that may lend itself to successful behavioral interventions interrupting further development of OW/OB in individuals.

Prevention

Instruments have been developed that measure OW/OB retrospectively. Body Mass Index (BMI) can easily be calculated to diagnose the disease after it has developed. The Centers for Disease Control and Prevention (CDC) developed growth charts that measure growth in percentiles based on children's age, gender, stature, and weight that determine if the child—age 2 to 20—has a body mass index (BMI) that is healthy, overweight, or obese (2000). Clinicians

might be of greater service to patients if high-risk individuals could be identified before development of OW/OB. Screening measures are needed to identify youth at risk for OW/OB in order to effect changes in their obesogenic environment that, in turn, will decrease the incidence of OW/OB and sequelae. The Electronic Kids Dietary Index (E-KINDEX), originally developed by Lazarou et al. (2011), is one of the first tools designed to screen children for risk of development of OW/OB based on exposure to environmental factors. According to Lazarou et al. (2011), the index measures the *obesogenic dietary habits* of children within the family. Arguably, E-KINDEX measures elements of the obesogenic environment. The index contains three subscales: Foods E-KINDEX (dietary quality), Dietary Habits E-KINDEX (dietary attitudes), and Eating Behaviors E-KINDEX (dietary meal patterns). Age, gender, physical activity level, screen time, socioeconomic status (SES), breastfeeding, and parental OW/OB status data were examined for significant associations with OW/OB in the original study. Results supported prior evidence that suggests the importance of dietary habits in childhood obesity. The index discriminated well across socio-demographic and health behavior factors: children with low SES also had high screen-time scores while parents practicing healthy dietary habits tended to have children who did the same (Lazarou et al., 2011). Validated tools are needed, therefore, that identify risk for unhealthy weight status prospectively.

Purpose. The purpose of this study is to evaluate validity and estimate reliability of the E-KINDEX in identification of pediatric patients at risk for OW/OB who come to the Healthy Weight Clinic at University of South Florida Health South Tampa campus and to measure the association of excess weight with quality of life perceptions in this sample.

Study Aims

The proposed study has three aims. The first aim of this study is to evaluate the predictive validity of E-KINDEX: To what extent does E-KINDEX overall score and each E-KINDEX subscale predict diagnosis of OW/OB in children age 10 to 18 in Tampa, Florida?

Hypothesis 1. There is an inverse relationship ($> .0.60$) between overall E-KINDEX score and diagnosis of OW/OB.

Hypothesis 2. An inverse relationship exists between each subscale and the diagnosis of OW/OB.

The second aim of this study is to estimate the reliability of E-KINDEX subscales to measure the elements of the obesogenic environment and resultant prediction of OW/OB in a child and adolescent sample in Florida.

Hypothesis 3. Internal consistency for each of the three subscales and E-KINDEX overall will be acceptable. Coefficient Alpha in this study >0.70 is expected for each subscale. Cronbach's alpha is acceptable at 0.6 or greater if the instrument is new in the field.

The third aim of this study is to measure the disease burden for those who are OW/OB as evidenced by impact of weight on quality of life in children (IWQOL-Kids) scores.

Hypothesis 4. A positive correlation of overall E-KINDEX score and IWQOL-Kids is predicted.

Definition of Terms

For purposes of this study, the following terms are defined:

Obesogenic environment. The concept of *obesogenic environment* is currently described in the literature as “the sum of the influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations, or, any characteristic that

presents a barrier to maintaining a healthy weight” (Swinburn, Egger, & Razzar, 1999, p. 563). The environment includes the home, school, and social gatherings—anywhere children reside with regard to availability of dietary quality, attitudes, and meal pattern behaviors. This study focused on the individual, a pediatric client age 10-18, who is living in the Tampa area. This study was not concerned with the obesogenic environment of the community, rather that immediate environment, including home and school, in which the participant conducts his or her daily life. Lazarou and colleagues (2011) developed the E-KINDEX as a composite measure of obesogenic dietary habits of children within their environments. The obesogenic environment encompasses *dietary quality, dietary behaviors/attitudes, and dietary meal patterns*.

Dietary quality. Obesity researchers have long associated quality of diet as indicated by variety and balance as being associated with OW/OB or healthy weight individuals (Lazarou, kalavana, & Matalas; 2008; Ihmels, Eisenmann, Nusser, & Myers, 2009; Kirk, Penney, & McHugh, 2009). This study examined frequency of consumption of eleven foods/food groups and two methods of food preparation associated with individuals designated as OW/OB against those who are of healthy weight. Quality and frequency of dietary intake relative to variety, balanced choices, cooking methods, and home-made versus fast food intake were measured.

Dietary behaviors. The development of OW/OB has been associated with dietary behaviors that are related to nutritional attitudes. Specific attitudes that drive lifetime behaviors are associated with development of OW/OB (DeAndrade, Barros, Carndina, Goldbaum et al., 2010; Feskanich, Rockett, & Colditz, 2004; Haines, Siega-Riz, & Popkin, 1999), and, based on review of relevant literature, eight of them were identified by Lazarou (2011) and colleagues for inclusion in the E-KINDEX: individual feelings regarding attitudes about personal weight status, history of dieting, food choices, parental insistence on cleaning the plate, and feelings of guilt

when eating unhealthy foods. These items are indicators of the concept Lazarou calls “*cognitive schemas*” that influence lifetime dietary practices of individuals and are believed to be critical factors associated with development of OW/OB (Lazarou et al., 2011). These eight items were measured in this study.

Dietary meal patterns. Several studies have found associations between particular meal pattern behaviors and OW/OB (Woodward-Lopez, Ritchie, Gerstein, & Crawford, 2006; Feskanich, Wilbur, & Larson, 2005). This study measured these patterns that include frequencies of eating breakfast, when not hungry, alone, because of advertising, and foods made in the home.

Overweight and/or obesity (OW/OB). This study includes a sample of OW/OB patients in a pediatric population in Tampa, Florida, focusing on the obesogenic environment of the pediatric and adolescent patient age 10 to 18. Children present to the clinic at varying stages of growth, development, and maturity, and these variances differ for boys and girls. Body Mass Index (weight for height) is adequate for measuring adult weight status, but measurement in children is reported as a Body Mass Index (BMI) for gender and age percentiles comparing the individual BMI, which also incorporates stature, with other boys and girls of the same age (CDC, 2010). This study reports weight status as described in Table 1. Individual growth charts developed by CDC as percentiles for girls and boys age 2 to 20 can be viewed in Appendix A.

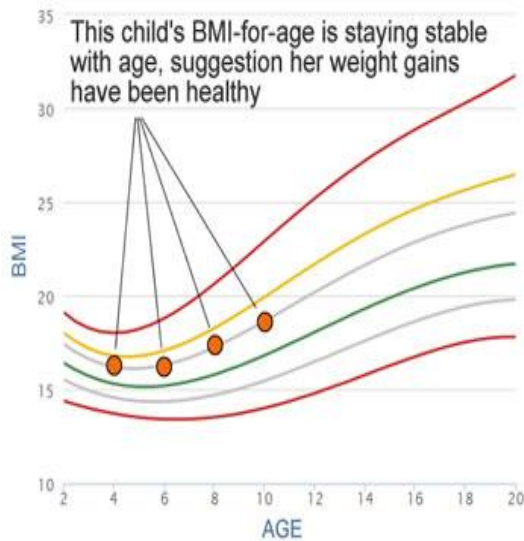
Table 1

CDC Growth Chart Interpretation United States

| Body mass index for age and gender percentiles: | Weight category |
|--|-----------------|
| Less than 5th percentile | Underweight |
| 5th percentile to less than the 85th percentile | Healthy weight |
| 85th percentile to less than the 95th percentile | Overweight |
| 95th percentile or greater | Obese |

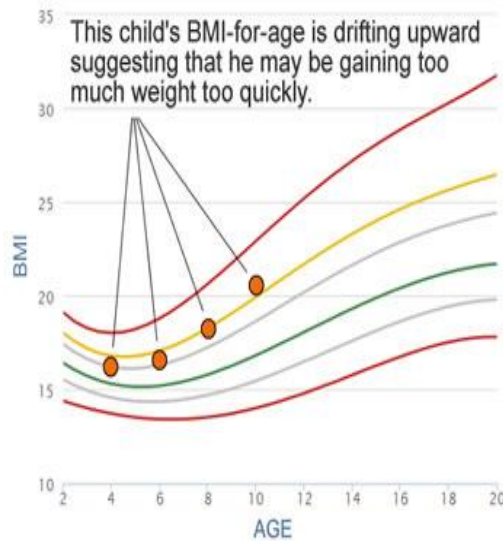
Further, the following graphs, Figures 1 and 2 respectively, illustrate how primary care providers can plot BMI for age on these charts to detect whether weight gains in the child are stable or rapid—all based on age, weight, stature, and gender. These figures are published by CDC.

Figure 1. Trended BMI Stable



Graphed BMI-for-age trend for female. Copyright 2004 by the Centers for Disease Control..

Figure 2. Trended BMI Rapid



Graphed BMI-for-age trend for male. Copyright 2004 by the Centers for Disease Control...

Quality of Life

Health-related quality of life has been defined by the World Health Organization as an “individual’s quality of life associated with their physical, mental, and social well-being” (WHO, 2001), derived from their original definition of that individual’s “Perceptions of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns” (World Health Organization, 2001). Researchers have measured pediatric quality of life with specific diseases in an effort to quantify the particular burden of a disease carried by individuals with a specific disease. Health-related quality of life focuses on health, illness and the impact of treatment in a variety of diseases. In

the past decade, the relationship of childhood OW/OB been explored in relationship to the disease burden experienced by children, and findings suggest a significant relationship between pediatric OW/OB and decreased quality of life. (Jensen & Steel, 2010; Tsiros, Olds, Buckley, Grimshaw et al., 2009). Further, young people afflicted with OW/OB suffer self-esteem deficiencies that can impact the efficacy of specific interventions including weight-loss interventions and are critical to identify in those with the diagnosis of OW/OB (Ferrans, Zerwick, Wilburand & Larsen, 2005). Nadeau and colleagues (2011) examined quality of life in adolescents who had comorbidities with OW/OB and designed an instrument called IWQOL-Kids, or the impact of weight on quality of life in kids. They demonstrated decreased physical comfort, diminished body esteem, dissatisfying social life, and strained family relations in adolescents suffering from OW/OB. Psychosocial correlates are as yet poorly understood in adolescents, although many who have studied the relationship of quality of life to OW/OB suggest that body dissatisfaction, pressure to be lean, and depressive symptoms contribute to difficulties in treating OW/OB in adolescents (Chaiton, Sabiston, O'Loughlin, McGrath et al. 2009; Tsiros et al., 2009; Nadeau et al., 2011). The IWQOL-Kids has subsequently been validated for use in adolescents and was administered as part of this study.

Although the literature suggests a significant burden of OW/OB for children and adolescents, consideration must be given to the notion that low self-esteem and depression may be precedents as opposed to consequences for weight status. This is reflected in the conceptual framework that depicts the bidirectional arrow for these two concepts.

Physical Activity Levels

Physical activity levels have been associated with decreased incidence of overweight and obesity (Lazarou & Soteriades, 2010; Loucaides, Jago, & Theophanous, 2011). This study

categorizes child participants into three levels based on their responses to items in the International Physical Activity Questionnaire Short Form (IPAQ-SF) developed by Hagströmer, Oja, & Sjöström, (2006). The levels are based on measures of metabolic equivalents (MET) intensity plus duration. One MET minute is the amount of oxygen consumed at rest known commonly as resting metabolic rate. Moderate intensity activity is in the range of 3.0 to 6.0 METs; intensity that results in greater than 6.0 METs is considered vigorous (United States Department of Health and Human Services, 1999). (Appendix B).

Inactive. This is the lowest category of physical activity in which individuals are considered inactive. This category was assigned to those individuals who self-reported some level of activity but not enough to meet criteria for the other two categories.

Minimally active. This category was assigned individuals who report any one of the following duration and intensity of activities:

1. Three or more days of vigorous activity of 20 or more minutes' duration OR
2. Five or more days of moderate-intensity activity and/or walking of at least 30 minutes per day OR
3. Five or more days of any combination of walking, moderate-intensity or vigorous-intensity activities achieving at least 600 MET minutes per week.

HEPA active. This category was assigned to individuals who exceed the minimum public health physical activity recommendations and reported either of the following duration and intensity of activities:

1. Three or more days of vigorous activity that total 1,500 or more MET-minutes per week OR
2. Seven or more days of any combination of walking, moderate or vigorous

intensity activities that total 3,000 or more MET-minutes per week. (Hagströmer et al., 2006).

Significance to Nursing

Childhood obesity is growing to a global epidemic and is a leading factor related to obesity in the adult population in the United States and globally. Obesity rates for children and adolescents have climbed from 5% in 2003 to 17.6% in 2006, and even though they have leveled to 17.6% in 2012, this represents an alarming 300% increase in rates in one decade. Nearly half of OW/OB children maintain that weight status in adulthood (Lazarou & Newby, 2011). The World Health Organization (WHO) reports that 65% of the world's populations live in countries where the mortality for OW/OB is greater than for the underweight. Globally, more than 40 million children under the age of five were overweight in 2011 (WHO, 2013).

Identification of at-risk OW/OB clients at earlier ages is essential if progress is to be made to reverse the epidemic trends that are the status quo. CDC is currently reporting slight declines in a few states in the U.S. in the recent past, but much more work is needed. Instilling healthy eating patterns and dietary behaviors in youth is much more likely to result in a decline in OW/OB rates than trying to change habits in these individuals when they are older (Elder et al., 2007). Efforts at prevention of the onset of OW/OB in younger populations would be enhanced if modifiable risks were identified and appropriate interventions implemented before elements of the obesogenic environment become established. Nursing process begins with assessment, and valid, reliable measurement tools are essential to accurate assessment.

E-KINDEX promises to be a valid and reliable measure of the obesogenic environment of children, resulting in the possibility of early and tailored intervention.

Nurses are well-positioned to implement the health promotion measures associated with childhood OW/OB. Primary care practitioners encounter their pediatric patients in clinical settings ideal to screen for risk factors or sequelae for OW/OB. The obesogenic environment that is consistently being outlined in the literature includes food group intake, eating beliefs and behaviors, and dietary practices (Combs, Pearson, & Smith, 2011; Lazarou & Kouta, 2010; Lazarou, Panagiotakos, Spanoudis, & Matalas, 2011; McAdams, 2010). Results of this study may be used to advance the body of nursing science in the provision of a tool for clinicians to use as they attempt early identification of individuals at risk for OW/OB as a consequence of an obesogenic environment. The National Association of Pediatric Nurse Practitioners (NAPNAP) has (2015) issued a position statement charging nurse practitioners to identify children at risk for OW/OB early in childhood. Nurse Practitioners will need measurement tools in order to perform assessment. An index such as the Electronic Kids Dietary Index (E-KINDEX) presents a method to assess the obesogenic environment in pediatric patients early—prior to development of OW/OB. Chapter Two includes a review of relevant literature as well as the conceptual framework that guides the study.

CHAPTER TWO: REVIEW OF LITERATURE

Chapter Two includes a discussion of relevant literature surrounding the increasing problems of overweight and obesity that are increasingly being seen in younger populations [Centers for Disease Control (CDC), 2013; Kirk, Penney, & McHugh, 2009]. The conceptual framework that drives the literature review of the study will be presented. Factors identified as contributing to development of OW/OB in children will be explored, as well as quality of life perceptions that often are diminished in children who are overweight.

Overweight and obesity (OW/OB) in adult populations have been diligently studied over the past three decades National Institutes of Health (NIH, 2012). The cost to individuals and society in the forms of disease burden and health care dollars are well known (CDC, 2013). Despite what is known about pathophysiology, prevention, and treatment, little has been achieved to stall or retard this epidemic Weight regain after supervised weight-loss programs in both the pediatric and adult populations is a major factor implicated in the persistent rise of OW/OB because weight regain is often greater than weight loss (Soeliman & Azadbakht, 2014; Elder, Ritenbough, Mist, Aickin et al., 2007). Focus on younger individuals has intensified in order to effect behavioral changes with regard to dietary preferences, attitudes, and behaviors that can prevent the development of OW/OB earlier (NAPNAP, 2015; Lazarou, Panagiotakos, Spanoudis, & Matalis, 2011).

During the past decade, researchers attempting to advance the science of OW/OB have begun to use the term “obesogenic environment” to describe the environment of the individual who is at risk for OW/OB. “Obesogens” in the environment include dietary attitudes, habits, and beliefs, food preferences, physical activity and screen time (Lazarou, Panagiotakos, Spanoudis, & Matalas, 2011; Kirk et al., 2009).

While OW/OB is a key public health concern and medical sequelae well-documented (CDC, 2013; Seals, 2007; WHO, 2016), excess weight exerts deleterious effects on physical, functional, and social well-being, the components of health-related quality of life (Nadeau, Kolotkin, Boex, Witten et al., 2011; CDC, 2013; NIH, 2013). Pediatric quality of life related specifically to OW/OB has been studied only within the past ten years, but the relationship of OW/OB to poor quality of life has been established. Researchers cite the difficulty of treating either OW/OB or depressive symptoms in the face of both (Tsiros, Olds, Buckley, Grimshaw et al., 2009; Chaiton, Sabiston, O’Loughlin, & McGrath, 2009).

Dietitians collected data on dietary and lifestyle characteristics of 1,140 Cypriot children in the 4th, 5th, and 6th grades in 24 primary schools in Greece for the CYKIDS study. Self-reported data of interest to Lazarou et al., (2011) were retrieved to calculate the Electronic Kids Dietary Index (E-KINDEX) Overall Score. This was followed by the collection of anthropometric data from a subset of 622 children who, with their parents, consented to participate in the study. Factors considered in the analysis included BMI, waist circumference, general obesity, physical activity levels, screen time, parental OW/OB status, demographics, gender, and vital signs. The Lazarou study results suggested E-KINDEX is a useful predictor of risk for OW/OB in a pediatric population (Lazarou et al., 2010). The study proposed here

documented many of these data points in addition to quality of life perceptions in children 10 to 18. A summary concludes Chapter Two.

Conceptual Framework

The conceptual framework for this study guided the review of relevant literature and the key study concepts including obesogenic environment, physical activity level, screen time, parental OW/OB status, as well as impact of weight on pediatric quality of life (IWQOL-Kids). The obesogenic environment encompasses three concepts: dietary quality, dietary attitudes and beliefs (cognitive schema) and dietary patterns and practices (Lazarou et al., 2011). Moderating variables included physical activity and screen-time levels determined by self-report as well as parental OW/OB status, also self-reported. Covariates included age, gender, and socioeconomic status by proxy of having private health insurance. Outcome variables included weight status and impact of weight on quality of life perceptions. Databases used to retrieve the literature included PubMed, CINAHL, and PsychINFO. An explanation of validity and reliability is presented because this is a psychometric study.

The conceptual framework is derived from the preponderance of the literature over the past three decades that describes the epidemic of overweight and obesity (OW/OB) that has increased worldwide despite advances in short-term weight loss treatment as well as advancement in the body of science of the pathology of OW/OB (CDC, 2010; Cole, Bellizi, Flegal, & Dietz, 2011; Deurenberg, Weststrate, & Seidell, 1991; WHO, 2013). The rise in the rates of increase in OW/OB has increased dramatically in younger children as well and continues to march on; the state of the science with regard to children age 10 to 18 is less robust than that of the adult population (Lazarou & Newby, 2011). The conceptual framework, Figure 3, illustrates the obesogenic environmental factors' influences on the variables of physical activity

levels and parental OW/OB that ultimately impact the measured outcomes of OW/OB and impact of weight on quality of life perceptions.

Figure 3. Conceptual Framework

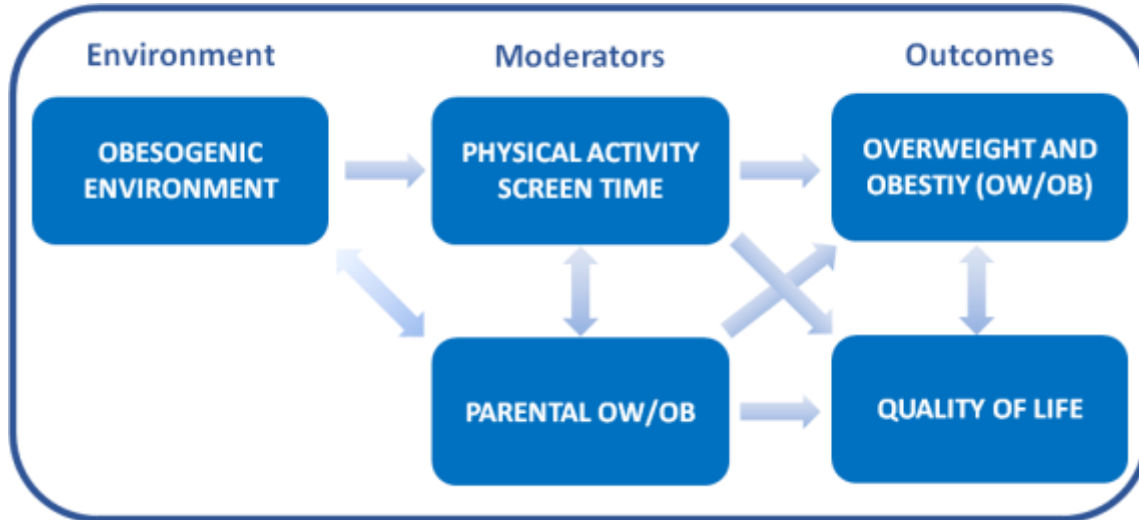


Figure 3. Visual description of the relationship between obesogenic environmental factors and their influence on variables that impact outcomes of weight and impact of weight on perceived quality of life. Copyright 2017 by Patricia A. Hall.

Obesogenic Environment

For purposes of this study, the obesogenic environment incorporates three categories of variables found in the immediate environment of the pediatric individual: food groups indicative of dietary quality, dietary attitudes, beliefs, and cognitive schema indicative of the formation of food practices that remain throughout the lifespan. Meal patterns and habits of young people that develop as they grow within their environment—such as eating alone or with family, whether they eat home-prepared foods, and whether food preferences are related to advertising—are formed at a young age. The Electronic Kids Dietary Index (E-KINDEX) concurrently assesses dietary quality, dietary attitudes and beliefs, and dietary meal patterns known to be associated with the development of childhood obesity (Combs et al., 2011; Lazarou et al., 2011; Zeller & Modi, 2006). Other dietary indices that are similar to E-KINDEX in that they assess very similar factors

within the obesogenic environment include the Family Nutrition and Physical Activity Screening Tool (Ihmels, Welk, Eisenmann, Nusser et al., 2009), Healthy Lifestyle Diet Index (Manios, Kourlaba, Grammatikaki, Koubitski et al, 2010), Dietary Quality Index (de Andrade et al., 2010), and Dietary Index Revised (Haines et al., 1999).

Dietary quality. For purposes of this study, food groups consumed plus two cooking methods are assessed relative to variety and frequency to be considered as proxy indicators of quality of the diet. Food frequency questionnaires (FFQs) score frequency of consumptions of bread, grains (excluding bread), fruits, vegetables, legumes, milk, seafood, meat, salted/smoked meat, sweets, junk food, soft drinks, fried foods, and grilled foods. These food groups and cooking methods are accepted across a number of studies as associated with development of overweight and/or obesity (Haines, Siega-Riz, & Popkin, 1999; Lazarou & Newby, 2011; Ihmels, Welk, Eisenmann et al., 2009).

Dietary attitudes and beliefs. Dietary attitudes that impact dietary behaviors serve as proxy indicators of cognitive schema that determine development of children's dietary preferences as they develop across the lifespan (Lazarou, Kalavana, & Matalas, 2008; Ihmels et al., 2009). Dietary attitudes are determined by assessing the degree to which individuals think their diet is healthy and weight is above normal, whether they have tried to be 'on a diet', feel guilty when eating something unhealthy, whether they choose to eat unhealthy items, whether parents insist they eat all their food or whether they eat even when not hungry. These attitudes are associated with OW/OB in adolescents (Ihmels et al.; Lazarou et al., 2008). These attitudes can influence preferences that can become patterns of usual and lifetime behaviors that are associated with the development and intractability of obesity. Other factors include parent modeling, child-feeding practices, restriction of certain foods, restraint with regard to dietary

preferences, and parenting styles in general (Lazarou, Kalavana, & Matalas, 2008). Evidence has shown that these factors are influential on the individually learned dietary patterns that are difficult to change after childhood (Ihmels et al.; Lazarou et al., 2010, 2011).

Dietary meal patterns. This factor includes assessment of frequencies for patterns of dietary practices over the past two days of eating in fast food and other restaurants, eating least favorite but ‘healthy’ food, eating with family, eating alone, eating afternoon school snacks, numbers of main meals plus snacks, eating foods because of advertising, and eating foods prepared in the home. Meal patterns and habits assess the psychological factors that influence dietary preferences. These patterns of behaviors have been identified in several studies as correlating with development of OW/OB in children (Gutin, 2011; Ihmels et al., 2009; Lazarou, Panagiotakos, Spanoudis, & Matalas, 2010). The behaviors become patterns in the lifespan arising from the cognitive schemas discussed and assessed in the dietary attitudes and beliefs subscale.

Moderator Variables

Moderator variables influence the strength of the relationship between the environment and the outcome variables in research. This study identified *parental OW/OB*, *physical activity levels*, and *screen time* as moderator variables.

Parental OW/OB. has been identified as a significant indicator for risk of OW/OB in children (CDC, 2010; Ihmels et al., 2009; Lazarou et al., 2010) and is included in the conceptual framework of this study. Leanness of parents is also associated with dietary attitudes, beliefs, patterns, and behaviors—the obesogenic environment (Combs, Pearson, & Smith, 2011; Ihmels et al., 2009; Lazarou, Kalavana, & Matalas, 2008). The majority of studies include the

assessment of parental OW/OB by self-report. This study collected height and weight for each parent in order to calculate Body Mass Index for each parent in the pediatric sample.

Physical activity level. Activity (or inactivity) has long been cited in the literature as an important factor associated with development of OW/OB in the adult population, and currently the same is true for pediatric OW/OB (Ihmels et al., 2009; Lazarou et al., 2009; Gutin, 2011). This study included both *physical activity levels* and *screen time* as moderating variables. They are opposing in that they relate to energy expenditure and sedentary behavior and are associated with elevated BMI scores in both adult and pediatric populations. Physical activity level was determined by using a questionnaire that documents weekly frequencies and intensity of activities within an average week as well as number of hours per day of screen time (ST). Greater than two hours per day of screen time is associated with increased diagnosis of OW/OB (Lazarou et al., 2010). Very few physical activity indices have been validated for use in the pediatric population. Actually, few are valid and reliable for adults (NIH, 2013). Further, children's physical activities are more difficult to measure than those of adults because children tend to exhibit short bursts of high-intensity exercise followed by periods of rest (CDC, 2010). This study utilized the International Physical Activity Questionnaire Short Form (IPAQ-SF) to measure three self-reported levels of physical activity intensity: low, moderate, or high (Hagströmer, Oja, & Sjöström, 2006). The levels are calculated measuring the frequency and intensity of physical activities over the last seven days. Sedentary behavior that is sometimes cited in adult studies is referred to as screen time in pediatric populations to identify time spent watching television, gaming, and using social media and computers measured in hours per day (Gutin, 2011; Ihmels et al., 2009; Lazarou, Panagiotakos, Spanoudis, & Matalas, 2010). Screen

time greater than two to three hours per day is associated with higher risk for OW/OB in both adults and children (Loucaides, Jago, & Theophanous, 2011; Lazarou et al., 2011).

Covariates

Covariates are variables of interest to the researcher that may or may not influence the outcome variable. *Age, gender, and socio-economic* status are considered covariates in this study. Children age 10 to 18 were included for participation in the study. Children in various stages of development across the lifespan, particularly in adolescence, have metabolic and BMI indicators that differ within and across both gender and age. Boys and girls produce hormones at various levels during puberty that affect metabolic rate and demands (Edwards, Huebner, Connell, & Patrick, 2002; Lazarou, Kalavana, & Matalas, 2008; NIH, 2010). Age differences have been calculated to reflect normal and abnormal BMI based on percentiles of expected growth in early childhood (CDC, 2013). Because age and gender are incorporated in the instrument of measurement of the outcome variable OW/OB, age and gender were reported as descriptive statistics for the sample. Socioeconomic status was estimated by proxy of having private health insurance.

Outcome Variables

The outcome variables for this study include OW/OB and quality of life. The obesogenic environment that includes factors influential in the development of OW/OB in children is well established (Swinburn, Egger, & Raza, 1999; Manios, Kourlaba, Grammatikaki, & Koubitski, 2010). Disease burden of weight as an outcome of OW/OB is well-established in adult populations (Jensen & Steele, 2010) and becoming established for children (Zeller & Modi, 2006; Kolotkin et al., 2006).

OW/OB. Anthropometric data that include height and weight were utilized to calculate Body Mass Index (BMI) for each child and plotted on the gender-appropriate CDC growth chart body mass index-for-age percentiles. CDC has developed separate charts for boys and girls, age 2 to 20, based on height, weight, stature, and age, that are used to identify those who are at risk or are currently OW/OB. The National Institutes of Health (2010) define OW as BMI greater than or equal to 25 kg/m² and OB as BMI greater than or equal to 30 kg/m² (Cole, Bellizzi, Flegal, & Dietz, 2000; Lazarou et al., 2010). Once the BMI is appropriately plotted on the gender-appropriate growth chart, the percentile indicates healthy weight as 5% or greater up to 85%; overweight as greater than 85% but less than 95%; obese as greater than 95% (CDC, 2013).

Quality of life. Treating excessive weight gain, regardless of population, is difficult. Overweight individuals are stigmatized, often by themselves as well as others. In some cases, individuals may have become depressed about another issue in their lives and develop OW/OB as a result while others became depressed as a result of developing OW/OB. Regardless, diminished quality of life as an association of OW/OB is well-documented (Kolotkin, 2011). Many studies have combined a pediatric health-related quality of life concept with specific diseases in an effort to quantify the particular burden of a disease carried by the young person (Nadeau et al., 2011; Kolotkin et al., 2011). Health-related quality of life focuses on health, illness and the impact of treatment in various diseases (Nadeau, Kolotkin, Boex, Witten et al., 2011). Only in the past ten years has the relationship of childhood OW/OB been studied in the context of QOL experienced by children specifically, and findings are significant for the positive correlation of these variables (Jensen & Steel, 2010; Tsiros, Olds, Buckley, Grimshaw et al., 2009). Young people afflicted with OW/OB suffer self-esteem deficiencies that can impact the

efficacy of specific interventions, including weight-loss interventions, so are critical to identify (Ferrans, Zerwick, Wilburand & Larsen, 2005). Children and adolescents diagnosed as OW/OB were found to experience decreased physical comfort, diminished body esteem, dissatisfying social life, and strained family relations (Kolotkin et al., 2010). Nadeau and colleagues point out that psychosocial correlates are as yet poorly understood in adolescents, and more studies are needed. Many who have studied the relationship of health-related quality of life with OW/OB suggest that body dissatisfaction, pressure to be lean, and depressive symptoms contribute to difficulties in treating OW/OB in adolescents (Chaiton, Sabiston, O'Loughlin, McGrath et al., 2009; Tsiros et al., 2009; Nadeau et al., 2011). IWQOL-Kids was used to assess quality of life in the children who participated in this study.

The review of literature reveals that research in the area of pediatric OW/OB is relatively new. The review finds that over the past three decades, the scientific community focused on physiologic factors leading to the development and sequelae of OW/OB that have led to varieties of repetitive diets, medicines, and therapies that have shown only short-term successes in the adult population. Weight loss successes in adults are often accompanied by weight regain and, in many cases, regain of weight in excess of the onset of the therapy or diet (Elder et al., 2007). This factor in the obesity epidemic begs for interventions to be successful at earlier instances in the life span. In order to offer interventions earlier in the life span, it is critical that individuals at risk be identified earlier. The literature offers minimal tools available to clinicians for screening at-risk individuals. Anticipation that OW/OB would extend to youth and even pre-school children seemed to have been overlooked in early studies. Current research is examining OW/OB in younger individuals in an effort to identify those at higher risk for developing OW/OB.

Methodology for the proposed study can be found in Chapter Three.

CHAPTER THREE:

METHODS

Chapter Three describes the methods used in the study. The setting and sample are described, followed by a description of measures, procedures, and data analysis. The purpose of this study is to evaluate the validity and estimate the reliability of the E-KINDEX in identification of pediatric patients at risk for OW/OB who come to the Healthy Weight Clinic at University of South Florida Health South Tampa campus and to measure the association of excess weight with quality of life perceptions in this sample.

Setting and Sample

A group of primary care practitioners, both doctors and nurses, devote every Wednesday to patients at the Healthy Weight Clinic as a part of the Medical Pediatric Clinic. Healthy Weight specialists see patients exclusively on Wednesdays for excess weight as well as eating disorders of anorexia and bulimia.

Fifty child-parent dyad participants for the study were recruited from the University of South Florida Medical Pediatric Clinic in Tampa, Florida. Required sample sizes for validating a scale are unclear among researchers. A review of 114 PubMed articles published between early 2009 and late 2011 on scale validation for patient outcome measures revealed that sample size was pre-determined in only 9.6% of the studies, and only 4% (5/114) compared a sample size to item ratio *a posteriori* (Anthoine, Moret, Regnault, and Sebille, 2014, p. 1). Of these, 92% had a

subject-to-item ratio of greater than or equal to 2; 25% had a ratio greater than or equal to 20. These authors conclude that sample size required to power psychometric validation studies is rarely done *a priori* and that methods to justify sample size in these studies are not readily available. Power analysis using SPSS reveals this sample size is small ($n = 50$). Post-hoc analysis of independent samples T-test analysis for E-KINDEX scores and OW/OB status was performed in SPSS to reveal a large effect size: Cohen's $d = (57.09 - 51.37) / 6.34516 = 0.901475$. Hedges' $g = (57.09 - 51.37) / 6.34516 = 0.901475$, taking into account the different sample sizes of the lean and OW/OB groups (Table 2).

Table 2

Group Means, Standard Deviations, and Standard Error of Means (OW/OB, Lean)

| | Group | n | Mean | Standard Deviation | Standard Error of Mean |
|------------------|-------|-----|-------|--------------------|------------------------|
| E-KINDEX OVERALL | OW/OB | 29 | 51.37 | 6.39 | 1.18 |
| | Lean | 21 | 57.09 | 6.30 | 1.37 |

Participants were recruited from the general pediatric and adolescent population of the clinic plus those from the Healthy Weight Clinic (HWC) that is partnered with the Pediatric Clinic. The researcher prescreened the electronic health records of the patients age 10 to 18 who had upcoming scheduled appointments to further determine eligibility based on inclusion and exclusion criteria. Participants were invited into the study without regard to gender or ethnicity, who were 10 to 18 years of age, had the ability to speak, read, and write English at the third-grade level, but who were generally healthy other than being overweight. Participants without ability to perform activities of daily living or who suffered severe comorbidities, or neurological, psychological, or developmental delays were excluded. The researcher collaborated with the medical assistant who was admitting the patient for the provider visit prior to approaching the

patient and family. As prospective patients entered the exam room, the researcher provided them with a brochure (Appendix C) that described the study in language appropriate to third-grade reading level. The researcher answered any questions, and parents who, with their children, decided on participation in the study, signed the informed consent (Appendix D), either then or after their appointment, depending on flow of providers and patients. Children who agreed with their parents assented for themselves by printing their name on the assent form (Appendix E). A total of 50 child-parent dyads were targeted for inclusion. The researcher was assigned a room in the clinic in order to provide a private space for completion of the questionnaires and to facilitate patient flow in the clinic. In this study, the researcher collected data on dietary and lifestyle characteristics of 50 children and their parents in Tampa, Florida. The children were school age, 10 to 18, who were patients of pediatric nurse practitioners and physician providers at the USF Health Pediatric Clinic. These data were incorporated to calculate the E-KINDEX overall score as well as total scores for each of the subscales.

Measures

Descriptive data were documented on the Demographic Questionnaire Form identified by dyad number. The 30-item Electronic Kids Dietary Index, a 7-item IPAQ including Screen Time, and the 32-item weight-related quality of life questionnaire (IWQOL-Kids) were completed by the child in the presence of his or her parent(s) and the researcher. (Appendix F).

Demographic Questionnaire

Data were collected from parents within the dyads and documented on this form in order to provide descriptive characteristics of the sample. They were asked if they lived in the city or country, what type of insurance they had to determine socioeconomic status (SES) by proxy private insurance for high SES; Medicaid or none for low SES, and whether parents felt their

family dietary habits were good, very good, average, or needed improvement. They self-reported height and weight so the researcher could calculate BMI (Appendix G).

E-KINDEX

The questionnaire content of the overall E-KINDEX derives from food frequency questionnaires validated by data from the CYKIDS in Cyprus, Greece (Lazarou, Panagiotakos, & Matalas, 2008). The E-KINDEX was chosen for this study because it measures elements of the obesogenic environment as supported by the literature and that are reflected in the conceptual framework (Kirk, Penney, & McHugh, 2009). E-KINDEX measures the obesogenic environment of the pediatric client with three subscales:

1. Food Groups E-KINDEX measures frequencies of food group components as indicators of dietary quality (Appendix H).
2. Dietary Behaviors E-KINDEX measures components as indicators of the psychology of dietary attitudes and eating behaviors (Appendix I).
3. Dietary Habits E-KINDEX measures components as indicators of dietary practices and/or meal patterns (Appendix J).

Data on dietary and lifestyle characteristics of 1,140 Cypriot children in 2010 in the 4th, 5th, and 6th grades in 24 primary schools (age 9 to 18) were collected in the CYKIDS study. A subset of data from 622 children was incorporated to calculate the E-KINDEX overall score. Lazarou and colleagues further incorporated data that included the anthropometric measurements from those who assented and, with their parents, consented to participate in the original E-KINDEX study in 2010. E-KINDEX overall score comprises 3 subscales: Foods E-KINDEX, Dietary Behavior E-KINDEX, and Dietary Habits E-KINDEX, containing 13, 8, and 9 items respectively. All subscales scored food choices, attitudes, and behavior frequencies on a scale of

0 to 3 based on evidence-based dietary recommendations. Items were weighted to account for increased influence of some factors in the literature as being more influential than others (Lazarou et al., 2011). Questions and scoring are tabled (Tables 3, 4 and 5).

Validity. Lazarou et al. (2011) employed a validation dataset from the Cyprus Kids Study (CYKIDS) that was conducted in 2005 by the Cyprus Ministry of Education to track lifestyle behaviors of the children to assess the accuracy of E-KINDEX scores to discriminate OW, OB, and lean weight. E-KINDEX higher scores indicate lowered risk for development of OW/OB. For the CYKIDS subset, scores ranged from 32 to 77 without regard to gender, with a highest possible score of 87.

Cutoff-point analysis was used to determine the optimal value of the E-KINDEX total score and for each of the three subscales, which were able to discriminate for risk of OW/OB in children. In the Cypriot children study, four approaches were used to examine the association of the E-KINDEX score and OW/OB status:

1. Model for Excess Fat
2. Model for excess Waist Circumference
3. Model for Generalized Obesity
4. Model for BMI difference

The Lazarou et al., (2011) analysis determined the best score to discriminate OW/OB from normal weight to be a 61 of 87 total (sensitivity of 74%); OB from normal weight was 53 of 87 (sensitivity of 61%). E-KINDEX items as well as subscales were correlated.; The three subscale correlation coefficients were less than 0.118 ($p < 0.05$) (Lazarou et al., 2011). Multiple linear regression analysis was used to examine the association between overall E-KINDEX score and anthropometric measures of body composition at baseline and repeated a year later with

similar results. Logistic regressions were used to determine the strength of the associations between E-KINDEX score and these same four variables adjusted for age, gender, physical activity levels, screen times, SES, breastfeeding, and parental obesity status. Findings were that children in the top three E-KINDEX categories, >49 points, had 73%, 76%, and 85% decreased likelihoods respectively, of being OW/OB (Lazarou, 2011). Higher E-KINDEX scores indicate healthier dietary quality, attitudes, and behaviors in the obesogenic environment. No significant differences were observed in OW/OB status between genders in the Lazarou study; ($\chi^2 = 2.37$; $df = 2$; $p = 0.144$). The E-KINDEX overall score proved more reliable in screening for prediction of obesity than overweight. Significant inverse associations of E-KINDEX scores with each of the approaches were reported. Similarly, children in the 2nd, 3rd, and 4th categories were 62%, 78%, and 86% less likely to have Waist Circumference > 75th percentile. One-year follow-up showed similar results (Lazarou, 2011, p. 105). Scoring in the highest category was associated with an 84% decreased likelihood of increasing BMI >3 kg in one year. These analyses supported construct validity of the overall E-KINDEX scores (Lazarou, Panagiotakos, Spanoudis, & Matalus, 2011).

Reliability. A Cronbach's alpha statistic ≥ 0.6 suggests that items in an index are one-dimensional and may be combined in a scale (Indrayan & Sarmukaddam, 2001). The Cronbach's alpha statistic to assess internal consistency in research that is new, exploratory, related to a new instrument and/or within the behavioral field is acceptable at the >0.7 level (Nunnally, 1978). Others have argued against the arbitrary minimum adequacy of alpha, particularly for new measures and instead point out that some lower levels of alpha, 0.49, might have an upper limit of validity of .70 (Schmitt, 1996, p. 351). Internal consistency of E-KINDEX for the Lazarou study was 0.601 using Cronbach's alpha, suggesting the tool is reliable to use to determine risk

for obesogenic dietary behaviors in a field of research of the obesogenic environment that is relatively new.

Cronbach's alpha was calculated for each subscale in E-KINDEX to determine internal consistency. The subscales and scoring are tabled (Table 3-5).

Dietary Quality E-KINDEX. This subscale measures dietary quality or the frequency of consumption of eleven types of foods and two cooking methods. These items are queried on a four-point scale where responses vary from zero to three, zero to two and are sometimes reverse-scored three to zero based on recommended nutritional items and frequencies. Items for the subscale were chosen by Lazarou et al., (2010), based on findings from the DONALD study (Feskanich, Rockett, & Colditz, 2004). Response choices are never, one to two times/week, and three to five times per week. Responses are weighted within the scale to reflect healthy or unhealthy frequencies; for example, never eating smoked or salted meats is scored as three, one to two times per week is scored as one, three to five times per week is one and more than six times per week is zero. The scale includes frequencies for eleven foods and two cooking methods. The range of score possibilities is 0 to 37 for which, as with overall E-KINDEX, higher scores are associated with decreased likelihood of having or developing the diagnosis of OW/OB. Lower scores on this measure of dietary quality indicates healthier food and cooking method choices. The items and scores for Dietary Quality E-KINDEX are listed (Table 3).

Dietary Quality, subscale 1, the Lazarou study was the weakest in discriminative ability of the three subscales [Area Under the Curve (AUC) = 54.0], contributing the least to the overall predictive validity of overall E-KINDEX for OW/OB versus normal weight. Lazarou and colleagues found scores between 27 of 37 possible with Sensitivity of 82.03 and Specificity of 24.92 (p. 107).

Table 3*Dietary Quality E-KINDEX (Subscale 1)*

| Consumption frequency | Never | 1 to 2 times per week | 3 to 5 times per week | More than 6 times per week | Range |
|-------------------------------------|-------|-----------------------|-----------------------|----------------------------|--------|
| Bread | 0 | 1 | 1 | 3 | 0 to 3 |
| Cereals and grains other than bread | 0 | 1 | 2 | 2 | 0 to 2 |
| Fruits (whole, juice) | 0 | 1 | 2 | 3 | 0 to 3 |
| Vegetables | 0 | 1 | 2 | 3 | 0 to 3 |
| Legumes (beans, peas, nuts) | 0 | 1 | 3 | 3 | 0 to 3 |
| Milk | 0 | 1 | 2 | 3 | 0 to 3 |
| Fish, seafood | 0 | 3 | 3 | 2 | 0 to 3 |
| Meat | 1 | 3 | 2 | 1 | 0 to 3 |
| Salted, smoked meats | 3 | 1 | 1 | 0 | 0 to 3 |
| Sweets, junk food | 3 | 2 | 1 | 0 | 0 to 2 |
| Soft drinks | 3 | 3 | 1 | 0 | 0 to 3 |
| Fried food | 2 | 3 | 1 | 0 | 0 to 3 |
| Grilled food | 0 | 3 | 3 | 2 | 0 to 3 |

Dietary Behavior E-KINDEX. This Dietary Behavior subscale measures eight attitudes and beliefs individuals have toward his or her individual diet. The literature has suggested associations of these attitudes with the *cognitive schema* that leads individuals to develop dietary preferences and practices over the life span that are difficult to change. Behavior E-KINDEX items serve as proxy indicators for cognitive schema and measure the degree to which the participant thinks he or she has a healthy diet, attempts healthy dieting, eats when not hungry, feels guilty when eating unhealthy items, and whether parents insist on finishing servings at meals. These behaviors have been identified be strongly associated with childhood OW/OB (Davis, Gance-Cleveland, Hassink, Johnson et al., 2007) and OW/OB that persists from childhood into adulthood (Lazarou et al., 2011). The four-point scale frequency responses are weighted from 0 to 2 and 0 to 3 depending on the items. The range of score possibilities is 1 to 27 for which, just as with overall E-KINDEX, higher scores are associated with decreased likelihood of having the diagnosis of OW/OB. Lower scores on this measure of dietary behaviors indicates healthier eating patterns. Behavior E-KINDEX demonstrated the best ability to discriminate for OW/OB and contributed significantly to overall E-KINDEX's discriminative ability. This study hypothesizes that psychological factors, i.e., cognitive schema, play a bigger role in factors associated with OW/OB—and that these are learned in childhood. Items and scoring are listed (Table 4).

Dietary Behavior E-KINDEX discriminated OW/OB versus Normal Weight at 64.70 (AUC) or best of the three subscales. Cutoff point is 13.5 of 23 possible with Sensitivity of 48.03 and Specificity of 76.0. The ability of this subscale to discriminate OW/OB from healthy weight is evidence of construct validity for this subscale.

Table 4*Dietary Behavior E-KINDEX (Subscale 2)*

| Degree to which: | Never | Sometimes | Much | Very much | Range |
|--|-------|-----------|------|-----------|--------|
| I think my diet is healthy | 0 | 1 | 2 | 2 | 0 to 2 |
| I think my weight is above normal | 3 | 2 | 1 | 0 | 0 to 3 |
| I have tried to be on a diet | 3 | 2 | 1 | 0 | 0 to 3 |
| I feel guilty when I eat something unhealthy | 3 | 2 | 1 | 0 | 0 to 3 |
| I feel guilty when I eat something I know is fattening | 3 | 1 | 1 | 0 | 0 to 3 |
| My parents insist I eat all my food | 0 | 1 | 2 | 3 | 0 to 3 |
| I eat things I know are fattening | 3 | 2 | 0 | 0 | 0 to 3 |
| I eat something I like when I am not hungry | 3 | 2 | 1 | 1 | 1 to 3 |

Dietary Habits E-KINDEX. The third subscale contains nine items that measure meal patterns and dietary practices of the individual. Items include frequencies of: eating breakfast, eating in fast food restaurants, eating home prepared foods, eating “unfavorite” foods considered healthy, eating alone, snacking, and eating foods because of advertising. Several studies have associated these nine dietary practices with OW/OB (Barlow, 2007; Gidding, Dennison, Birch, Daniels et al., 2006; Manios, Kourlaba, Grammatikaki, Koubitski, Siatista, Vandourou et al.,

2010). This subscale has six distinct sections, some of which include both monotonic and non-monotonic functions ranging from zero to three and one to three. Non-monotonic functions were needed to account for food items that dietary guidelines recommend as moderate rather than never, such as breads, fried foods, meats, and sweets (Table 5).

Table 5

Dietary Habits E-KINDEX (Subscale 3)

| Habits frequencies | Almost daily | 2 to 4 times per week | Once per week | 1 to 3 times per month | Range |
|------------------------------------|--------------|-----------------------|---------------------|------------------------|--------|
| Having breakfast | 3 | 2 | 1 | 0 | 0 to 3 |
| Eating least favorite healthy food | 3 | 2 | 2 | 0 | 0 to 3 |
| Eating with family | 3 | 2 | 1 | 0 | 0 to 3 |
| Eating alone | 0 | 2 | 2 | 3 | 0 to 3 |
| Eating cafeteria snacks | 0 | 1 | * | 3 | 0 to 3 |
| Fast foods past 2 days | Never = 3 | 1 time = 2 | 2 or more times = 0 | * | 0 to 3 |
| Meals + snacks per day | 2 to 3 = 0 | 4 to 5 = 3 | More than 6 = 3 | * | 0 to 3 |
| Eating foods as advertised | Yes = 0 | No = 3 | * | * | 0 to 3 |
| Eating foods prepared at home | Yes = 3 | No = 0 | * | * | 0 to 3 |

Responses are weighted on the scale to reflect healthy or unhealthy frequencies in the same manner as the other subscales. Results for the subscale Dietary Habits discriminated OW/OB versus healthy weight at 61.10 (AUC) or second best of the 3 subscales, contributing to the discriminative ability of overall E-KINDEX for OW/OB versus healthy weight. The cutoff point is 19.5 of 27 possible with Sensitivity of 61.54 and Specificity of 57.55. The ability of Dietary Habits E-KINDEX to discriminate independently as well as contribute strongly to overall E-KINDEX's discriminative ability is further evidence for construct validity of this subscale.

Physical Activity Levels

The International Physical Activity Questionnaire (IPAQ) is a 7-item questionnaire that estimates frequency, intensity, and duration of physical activities over the last 7 days (Hagströmer, Oja, & Sjöström, 2006). Scores on IPAQ result in categorical levels of physical activity for the individual: 1 indicates low level or little regular physical activity; 2 indicates moderate level or 5 or more days per week of 30 minutes of moderate-intensity activity; 3 indicates a high-level physical activity with 7 or more days of combination of moderate or vigorous-intensity activities OR 3 days of vigorous-intensity activities accumulating at least 1,500 MET-minutes per week (Appendix K).

Validity and reliability. There are few validated Physical Activity Indices (PAIs), measures of physical activity in children, found in the literature for children in the United States or elsewhere. During 2000, 14 centers from 12 countries who use the IPAQ examined the validity and reliability of the short form and found repeated measures with Spearman's rho of 0.8 (Craig, Marshall, Sjöström, Bauman et al., 2003). These authors assessed criterion validity against accelerometer over 7 days and found $p = 0.30$, acceptable, similar self-report measures (p. 1381).

Screen Time

Participants were questioned on the number of hours per day they were sitting in front of a computer or television screen or *screen time*. Excess screen time of more than two hours per day is associated with higher diagnoses OW/OB, as sedentary behaviors preclude healthy activity levels (Loucaides, Jago, & Theophanous, 2011; Lazarou, 2011). The odds ratio was 2.84 for the association of more than two hours per day of TV viewing and BMI in girls; TV viewing was the most significant factor in all obesity models for girls and boys: Odds ratios were 1.33 and 3.63 for boys and girls for % Body Fat; 2.15 and 3.25 for boys and girls Waist Circumference, and 2.26 and 2.23 for boys and girls for Total and Abdominal Obesity. Results of the backward logistic regression procedures suggest that the most important factors associated with OW/OB measures across genders are TV and DVD watching. Screen time assessment is included as part of the International Physical Activity Questionnaire but scored separately where number of hours of screen time equals the score; screen time greater than two hours per day is considered excessive and associated with development of OW/OB (Ihmels, Welk, Eiseman, & Nusser et al., 2009; Lazarou & Soteriades, 2010). (Appendix L).

Impact of Weight on Quality of Life in Kids (IWQOL-Kids)

IWQOL-Kids is used as a measure of quality of life perceptions. Disease burden for children and adolescents with comorbidities of OW/OB has not been studied to a great extent, as OW/OB itself in the young has been examined only for the past decade or so. IWQOL-Kids is a 27-item questionnaire that measures quality of life specific to OW/OB in domains of Physical Comfort, Body Esteem, Social Life, and Family Relations (Nadeau, Kolotkin, Boex, Witten et al., 2010; Zeller & Modi, 2010). Quality of life for adults with diseases has been well-

documented in the literature as has quality of life for the severely obese youth (Schwimmer, Burwinkle, & Varni 2003; Nadeau et al., 2011; Kolotkin et al., 2006).

IWQOL-Kids, which provides a total score and individual scores on four domains of Physical Comfort, Body Esteem, Social Life, and Family Relations, was administered to 111 participants and their parents or caregivers. The design is targeted to children and adolescents age 9 to 18, and each item is queried “Because of my weight...” the following is true: ranged from 0 to 4, for a total of 5 possible responses. The higher the score, the higher is the participant’s perception of their quality of life (Appendix F).

Validity and reliability. IWQOL-Kids has four domains, and total scores were correlated with both BMI and BMI z-scores for all children (Kolotkin , Zeller, Avani, & Modi, 2006). Mean scores for both parents/caregivers and children ranged from 62.2 +/- 26.1 standard deviations to 91.4 +/-13.8 standard deviations. In four of five IWQOL-Kids domains in a sample of 642 children, BMIs were inversely and strongly related: Physical Comfort: ($r = -0.51$; $p < 0.001$); Social Life: ($r = -0.48$; $p < 0.01$), Body Esteem: ($r = -0.51$; $p < 0.01$), and weakly related in Family Relations: ($r = -0.25$; $p < 0.01$). Despite the weak correlation in the Family Relations domain, total score correlation of IWQOL-Kids with BMI was significant [$(r = -0.54$; $p < 0.001$), (p. 452)].

Body Mass Index

Body Mass Index was calculated for parents utilizing self-reported data, height and weight. The National Institutes of Health (2010) defined OW as BMI greater than or equal to 25 kg/m² and OB as BMI greater than or equal to 30 kg/m². Obesity is widely recognized as measurable by these numbers and further includes children, as outlined by the International Task Force on Obesity based on age and gender-specified BMI (Heymsfield, Lohman, Wang, &

Going, 2005; Cole, Bellizzi, Flegal, & Dietz, 2000; Lazarou et al., 2010). BMI is widely accepted as the gold standard for defining OW/OB internationally (NIH, 2010). The outcome variable, OW/OB, was quantified with the CDC Growth Charts BMI for age and gender for boys age 2 to 20, and for girls age 2 to 20 (BMI AG2). The Centers for Disease Control has developed a classification system for children that is based on BMI for age and gender, recognizing developmental variabilities across gender and age, and may be plotted on a chart resulting in recommended percentiles for boys and girls age two to twenty respectively (CDC, 2010) and was the basis for estimating OW/OB in children in this study. Children whose age and gender-adjusted BMI are greater than 5% but less than 85% on the chart are considered of normal healthy weight; those who are 85% or greater but less than 95% are considered overweight (OW); those who are 95% or greater are considered obese (Appendix A).

Procedures

Approvals

Approvals were required from both the manager of the clinic that was the setting, and the Institutional Review Board which is charged with ethical oversight for the patients who are seen in the clinic. Dr. Denise Edwards is the director of The University of South Florida Medical Pediatric Clinic, the setting for this study. She was contacted more than one year prior in anticipation of the research and provided a letter of support for this study (Appendix M).

Expedited Institutional Review Board (IRB) approval was sought and obtained to commence the study at the Pediatric and Healthy Weight Clinics at the University of South Florida. Fifty parent-child dyads agreed to participate in the study. Because the target population for the study was pediatric, the study was explained to both the patients to obtain assent and to

their parents to obtain consent. Since some data was obtained from the Electronic Health Record, HIPPA language was contained in the consent form (Appendix N).

Data Collection

Demographic data for the study were collected by an interview with the parent(s) and documented on a Demographic Questionnaire (Appendix G), identified by the dyad number. Data were collected on this form to provide a description of the characteristics of the sample. Parents and their children were queried whether they resided in the city or a rural area, BMI status for each parent, SES status by proxy of insurance status (private insurance proxy for high SES; Medicaid or no insurance proxy for low SES), and whether parents felt their dietary habits were average, good, very good, or needs improvement.

E-KINDEX, IPAQ, and IWQOL-Kids questionnaires were completed by the child in privacy in the presence of his or her parent(s) and the researcher. All questionnaires were completed within 15 to 30 minutes. All children and their parents who initially consented and assented to the study completed the study. Children who completed the questionnaires were given a \$10.00 Target gift card upon completion of participation.

Data Analysis

Analyses of the data were driven by the three aims of the study. Statistical Package for the Social Sciences (SPSS) software was used to analyze and present means and standard deviations of the sample characteristics. Characteristics included age, gender, and socioeconomic status by proxy of having private insurance. Med-Calc statistical software was used to illustrate the ROC curve analysis of sensitivity and specificity values of elements of E-KINDEX and its subscales, as well as 95% confidence intervals. ROC curve analysis was completed software to determine the ability of the index to discriminate between OW, OB, and lean weight. Preparation

of the data prior to analysis is critical to the rigor of any study. The PI collected raw data from 50 parent-child dyads on 94 variables, and they were entered into the Statistical Software Package for Social Sciences (SPSS) was also used for Cronbach's alpha, regression, and factor analyses. Data were screened for accuracy, missing values, and outliers prior to analyses.

Aim One

The first aim was to evaluate the predictive validity of E-KINDEX: To what extent does E-KINDEX overall score and each E-KINDEX subscale predict diagnosis of OW/OB in individuals from a child and adolescent sample in Tampa, Florida?

Hypothesis 1. There is an inverse relationship (> 0.60) between overall E-KINDEX score and diagnosis of OW/OB.

Hypothesis 2. There is an inverse relationship between each subscale and the overall E-KINDEX scores.

Construct validity was assessed by calculating the Pearson product-moment correlation between BMI scores and E-KINDEX total scores. Those with E-KINDEX total >60 were 85% less likely to fall into either the OW or OB category. Subscale scores were individually correlated for strength of each of those categorical relationships to Growth Percentile (BMI for stature and gender, girls and boys age 2 to 20, (per CDC) scores. The second hypothesis also required a Pearson correlation.

Aim Two

The second aim was to estimate the reliability of E-KINDEX scales to measure the elements of the obesogenic environment and resultant prediction of OW/OB in a pediatric sample in Tampa, Florida.

Hypothesis 3. Internal consistency of the three subscales is acceptable as evidenced by Cronbach's alpha between 0.60 and 0.80.

Aim Three

The third and final aim was to measure quality of life for those who are OW/OB as evidenced by impact of weight on quality of life in children's (IWQOL-Kids) scores.

Hypothesis 4. A strong correlation between E-KINDEX total score and IWQOL-Kids exists. A moderate to strong correlation of OW/OB with quality of life perceptions in youth has been shown in earlier studies (Hullman et al., 2011; Jensen & Steele, 2010; Kolotkin et al., 2006). The relationship was supported earlier in adult populations (Katz, McHorney, & Atkinson, 2000; Skevington and McRate, 2010). Much evidence has been disseminated relating the relationship of eating patterns, psychological behaviors, and perceptions of QOL in youth (Hullman et al., 2011). More evidence is needed in an effort to begin to tailor interventions based on psychological and dietary eating behaviors (Meule & Vögele, 2013; Nadeau, 2011).

Descriptive Statistics

SPSS was used to create a histogram to depict normality and absence of skewness and kurtosis of E-KINDEX overall score distribution. The same analyses were performed on the subscales individually. Means, standard deviations, coefficients of correlations, and ranges are reported.

Pearson Product Moment Correlation Coefficient (r)

Pearson r correlations were measured in SPSS to verify hypothesis a that E-KINDEX scores correlate inversely with excess weight and answer the research question: Do individuals with lower E-KINDEX scores have a higher risk for developing OW/OB? These data met the

assumptions of interval or ratio level, linearity, absence of significant outliers, and normality, and were eligible for analysis using Pearson's product moment correlation (r).

Cronbach's Alpha

Internal consistency of the index was assessed with Cronbach's alpha to estimate reliability of items with their scales and overall. Level of significance for reported p values was set at $p \leq 0.05$.

Analysis of Variance

Analysis of Variance (ANOVA) was used to measure associations between normally distributed continuous variables. Statistical Package for Social Sciences (SPSS) software was used to calculate the strength of the associations between individual E-KINDEX total score and each of the subscale scores, each of these with OW/OB status, and weight status (lean and OW/OB) with quality of life perceptions. The Bonferroni procedure was used to correct for Type I error that can occur from multiple comparisons, and the Kruskal-Wallis procedure was used for continuous variables that do not have normal distribution.

Multiple Linear Regression

Linear regression analyses were conducted to examine the strength of the relationships between E-KINDEX overall and subscale scores, as well as BMI, physical activity levels, parental weight status, and impact of weight on quality of life.

Receiver Operating Characteristics (ROC) Curve

A ROC curve analysis is often used to calculate sensitivity and specificity levels in combination to estimate the diagnostic accuracy of measurement instruments, indices, and tools. (Pepe, Janes, Longton, Leisenring, et al., 2004). ROC analysis was used to pursue Aim 1, determination of the predictive validity of E-KINDEX. Cutoff-point analysis was determined by

examination of the area under the curve (AUC) for the score that exhibited the greatest sensitivity (accurate identification of a case) and specificity (accurate identification of a non-case). The optimum cutoff point was at or near the ‘shoulder’ of the ROC curve. This study also performed cutoff-point analysis to determine the optimal value for E-KINDEX. Multiple regression analysis was used to determine the strength of the associations of the scores with OW/OB status, parental OW/OB status, physical activity levels, SES, screen time, and quality of life perceptions in the sample.

Missing Data

A univariate Missing Values Analysis (MVA) was conducted in SPSS on all quantitative and nominal variables. SPSS reported that no variables had less than 5% missing values so t-test was not performed. Output data are not shown.

Outliers

Distribution of normality of scores was verified in SPSS by inspection of normal and detrended normal P-P plots for each of the subscales and total IWQOL-Kids. A histogram can be found in Chapter Four, Figure 4. Outliers detection results found two outside scores for cases 37 and 38; inspection of overall data in these cases revealed these are low overall E-KINDEX scores that do not contain missing data, do not affect assumptions, and do not affect the results as indicated by regression graphs. All data were entered, verified, and subsequently analyzed using SPSS or Med-Calc, computerized statistical software packages. The results of these analyses are presented in Chapter Four.

CHAPTER FOUR:

RESULTS

Chapter Four presents results from the analyses conducted. These include comparison of means and standard deviations sample characteristics, satisfaction of assumptions for regression and factor analyses, calculation of Cronbach's alpha statistic, and Receiver Operating Characteristics curve analysis. Statistical Software for the Social Sciences (SPSS) and Med-Calc software were used for the analyses.

Data Screening

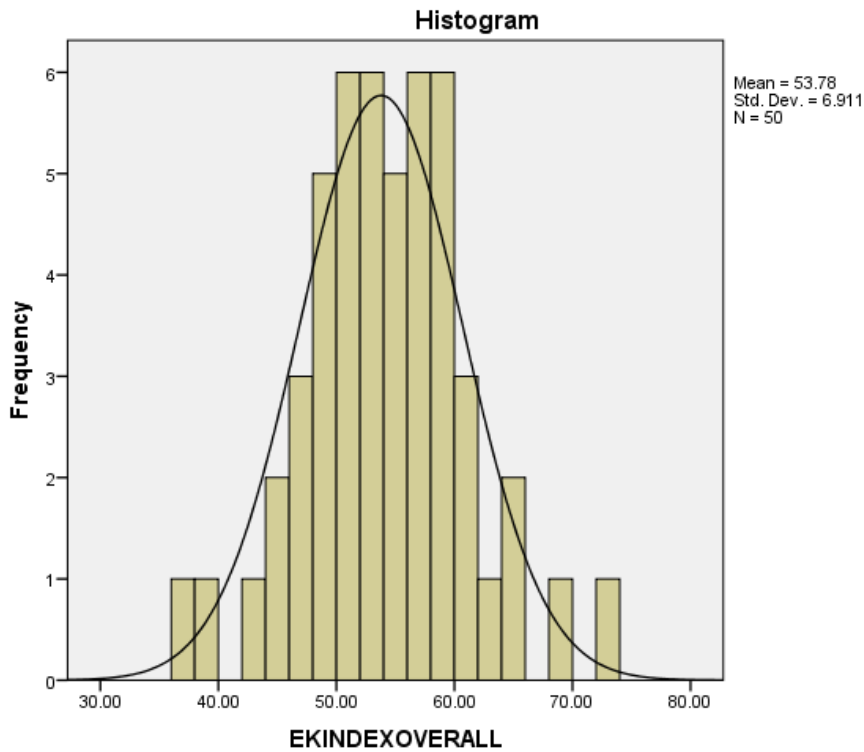
As participants completed their questionnaires, the primary investigator scanned them quickly to avoid missing data. These data were checked for accuracy of entry a second time as each data point was entered into SPSS and Med-Calc statistical software. When data entry for all 50 cases were complete, the data analysis began.

Missing Data

A univariate Missing Values Analysis (MVA) was conducted in SPSS on all quantitative and nominal variables. SPSS reported that no variables had more than 5% missing values so t-test was not performed. Output data are not shown. Distribution of normality of scores was verified in SPSS by inspection of normal and detrended normal P-P plots for each of the subscales and total IWQOL-Kids. A histogram presents this distribution (Figure 4). Outliers detection results found two outside scores for cases 37 and 38. Inspection of overall data in these

cases revealed these are low overall E-KINDEX scores that do not contain missing data, do not affect assumptions, and do not affect the results as indicated by regression graphs. These cases were therefore retained for the analysis (Table 6).

Figure 4. Distribution of E-KINDEX Scores



Characteristics of the Sample

A total of 63 child-parent dyads who met inclusion criteria were invited to participate during scheduled appointments with providers at the Medical Pediatric Clinic in Tampa, Florida. A total of 50 parent-child dyads consented and assented to participate in the validation of the E-KINDEX and associations with quality of life perceptions for the study. Mean age of the children was 13.7; the sample was split nearly evenly across gender. Ethnicity data were not collected, but the primary investigator notes that the majority of participants were African-American or Hispanic. Socioeconomic status was also split nearly evenly between high and low,

estimated by proxy of having private insurance. More than half of the sample identified as living in the city while slightly fewer than half identified as living in rural areas. Nearly half, (44%) of parents ($n = 100$), described their family eating habits as “needs improvement” ($n = 22$), while only 6% of the parent group of ($n = 100$ parents) self-reported anthropometric data indicating healthy weight. Many more parents in the sample described themselves as OW/OB as verified by their self-reported height and weight, and of these 100 parents, only 3 pairs reported themselves as lean. The sample of children was nearly half lean and half OW/OB, but more than 90% of parents of these children were OW/OB. (Table 6).

Table 6

E-KINDEX in Relation to Sample ($n = 50$ dyads)

| | Mean (SD) | Frequency | Percent |
|---------------------------------|--------------|-----------|---------|
| Gender | | | |
| Girls | | 26 | 52 |
| Boys | | 24 | 48 |
| Age | 13.70 (2.4) | 50 | |
| Obesity Status | | | |
| Normal Weight | 57.09 (7.49) | 21 | 42 |
| Overweight | 46.75 (5.96) | 4 | 8 |
| Obese | 52.12 (6.26) | 25 | 50 |
| Low SES | 53.60 (6.70) | 25 | 50 |
| High SES | 53.96 (7.24) | 25 | 50 |
| Physical Activity (IPAQ) | | | |
| Low | 52.8 (7.49) | 5 | 10 |
| Moderate | 50.11 (6.52) | 17 | 34 |
| High | 56.17 (6.20) | 28 | 56 |

(continued)

Table 6 *E-KINDEX in Relation to Sample (n = 50 dyads) (continued)*

| | Mean (SD) | Frequency | Percent |
|-----------------------|--------------|-----------|---------|
| Screen time | | | |
| Low | 57.44 (9.4) | 9 | 18 |
| High | 52.97 (6.08) | 41 | 82 |
| Parental Weights | | | |
| Both OW/OB | 52.86 (5.82) | 38 | 72 |
| One OW/OB | 55.11 (9.86) | 9 | 18 |
| Both lean | 61.33 (6.65) | 3 | 6 |
| Family Dietary Habits | | | |
| Needs improvement | 50.73 (6.02) | 22 | 44 |
| Average | 55.92 (6.26) | 14 | 28 |
| Good | 49.70 (7.91) | 10 | 20 |
| Very good | 58.50 (7.72) | 4 | 8 |

Aims

Analyses of the data were carried out to achieve the aims of the study and to accept or reject the alternate hypotheses. The aims of the study were to estimate the predictive ability of E-KINDEX to identify OW/OB diagnoses in the sample, estimate the reliability of E-KINDEX to measure the elements of the Obesogenic Environment that combine in the scale to be predictive, and to estimate the association of OW/OB and quality of life in the sample. It was hypothesized that an inverse statistically significant correlation would be found between E-KINDEX scores as a measure of the obesogenic environment and the diagnosis of OW/OB in the pediatric sample.

Relationship of OW/OB to E-KINDEX Scores

The first hypothesis predicted a moderate correlation would be found between E-KINDEX overall scores and each of the subscales in order to estimate the validity of these scales to predict risk for OW/OB and diagnosis of OW/OB in a pediatric sample in Tampa, Florida. Pearson product-moment correlation was used to address this hypothesis. Assumptions needed for Pearson calculations include using data that is interval or ratio level measurement, linear, normally distributed, and has no outliers Tabachnick & Fidell (2007). Normality for the variables E-KINDEX and OW/OB was analyzed in SPSS (Table 7). Outputs produced from the FREQUENCIES EXPLORE PLOTS P-P HISTOGRAM commands in SPSS were examined for normality of distribution, skewness and kurtosis of each variable; transformation was not indicated by the results from these analyses.

Table 7

Correlations: OW/OB with E-KINDEX and Subscales

| | OW/OB | Attitudes E-KINDEX | Habits E-KINDEX | Food Quality E-KINDEX | E-KINDEX Overall |
|--------------|----------|-----------------------|--------------------|--------------------------|---------------------|
| Pearson | | | | | |
| Correlations | | | | | |
| OW/OB | 1.000 | -.593*** | -.033 | -.041 | -.340** |
| Attitudes EK | -.593*** | 1.000 | -.027 | -.295 | .355** |
| Habits EK | -.033 | -.027 | 1.000 | .200 | .656** |
| Quality EK | -.041 | -.295 | .200 | 1.000 | .635*** |
| EK Overall | -.340** | .355** | .656** | .635*** | 1.000 |

Note. $n = 50$ for all correlations. * = $p < .05$; ** = $p < .01$; *** $p < .001$

The range of scores in the sample was 37 to 72 with a mean of 53.78. The distribution of E-KINDEX scores was symmetrical (Figure 4).

Validity

After satisfaction of assumptions, Pearson product moment correlation analyses were calculated to determine the relationships between E-KINDEX overall scores and diagnosis of OW/OB. These same calculations were made for each of the E-KINDEX subscale scores: Dietary Quality, Dietary Attitudes, and Dietary Habits. (Table 7). An inverse correlation between E-KINDEX overall and diagnosis of OW/OB (BMI AG2) was found, which was statistically significant ($r = -.340, n = 50, p = .008$). There was no correlation between Dietary Habits (Habits EK) and diagnosis of OW/OB (BMI AG2), ($r = .033, n = 50, p = .089$). Results -for correlation of Dietary Quality (Quality EK) and diagnosis of OW/OB (BMI AG2) were similar, no correlation was found ($r = .04, n = 50, p = .389$). There was an inverse correlation between Dietary Behavior and Attitudes (ATT EK) and diagnosis of OW/OB (BMI AG2), which was statistically significant ($r = -.593, n = 50, p = <.001$).

Reliability

The second aim of this study was to estimate the reliability of E-KINDEX scales to measure the elements of the obesogenic environment and resultant risk for development of OW/OB in the pediatric sample. Each of the subscales of E-KINDEX was expected to result in lower α because they are short: Dietary Quality E-KINDEX, Dietary Behaviors E-KINDEX, and Dietary Habits E-KINDEX contain 13, 8, and 9 items respectively. Scales were tested for internal consistency by performing Cronbach's alpha analysis (α) on the items in the total scale and for each subscale and its total independently. Cronbach's alpha for Dietary Quality E-KINDEX was found to be acceptable ($\alpha = .65$). Cronbach's alpha for Dietary Behaviors E-KINDEX, cognitive schema and attitudes that influence developmental dietary practices, was found to be acceptable, ($\alpha = .703$). Cronbach's alpha for Dietary Habits E-KINDEX, indicators

of dietary habits and practices, was found to be acceptable ($\alpha = .643$). Cronbach's alpha for Overall E-KINDEX, the composite score of the three subscales that comprise the indicators of the obesogenic environment was found to be acceptable ($\alpha = .683$). The results of the analyses are summarized (Table 8).

Table 8

Cronbach's α for Standardized Items for Overall E-KINDEX and Subscales

| | Cronbach's α | Cronbach's α on standardized items | Items |
|--|---------------------|---|-------|
| Dietary Quality E-KINDEX | .653 | .590 | 13 |
| Dietary Behaviors/Attitudes E-KINDEX | .703 | .735 | 9 |
| Dietary Habits E-KINDEX | .643 | .622 | 8 |
| E-KINDEX Overall Score | .683 | .597 | 30 |

Factor Analysis

Principle components factor analysis with Varimax rotation was performed on the 30-item E-KINDEX overall through SPSS, even though sample size (n is 50) provides insufficient power to determine effects. Initial extraction revealed that 10 items contributed to 73.25% of shared variance. Items contributing most to the variance include feeling 'guilty when eating something fattening', 'guilty when eating something unhealthy', reported having 'dieted', not having 'eaten something I don't like because it is healthy', frequency of 'eaten fattening' foods,

‘eating when not hungry’, frequency of eating ‘junk food’, frequency of eating ‘fast food’, frequency of ‘eating alone’, and frequency of ‘eating meals with family’ (Table 9).

Table 9

Factor Analysis E-KINDEX Overall

| Component | Total | Initial Eigenvalues | | Extraction Sums of Squared Variance | | |
|--|-------|---------------------|--------------|-------------------------------------|---------------|--------------|
| | | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| Guilt eating fattening foods | 3.731 | 12.436 | 12.436 | 3.731 | 12.436 | 12.436 |
| Guilt if unhealthy foods | 3.145 | 10.482 | 22.918 | 3.145 | 10.482 | 22.910 |
| Dieted | 2.594 | 8.647 | 31.565 | 2.594 | 8.647 | 31.567 |
| Frequency least favorite healthy foods | 2.060 | 6.866 | 38.431 | 2.060 | 6.866 | 38.431 |
| Frequency fattening foods | 1.890 | 6.301 | 44.731 | 1.890 | 6.301 | 44.731 |
| Frequency eats not hungry | 1.838 | 6.125 | 50.856 | 1.838 | 6.125 | 50.856 |
| Frequency junk | 1.494 | 4.981 | 61.090 | 1.494 | 4.981 | 61.090 |
| Frequency fast food | 1.360 | 4.533 | 65.623 | 1.360 | 4.533 | 65.623 |
| Frequency eats alone | 1.203 | 4.011 | 69.364 | 1.203 | 4.011 | 69.364 |

(continued)

Table 9 Factor analysis E-KINDEX overall (continued)

| Component | Total | Initial Eigenvalues | | Extraction Sums of Squared Variance | | |
|------------------------------|-------|---------------------|--------------|-------------------------------------|---------------|--------------|
| | | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| Frequency eats w/family | 1.085 | 3.615 | 73.249 | 1.085 | 3.615 | 73.249 |
| Frequency meals + snacks/day | .973 | 3.244 | 76.493 | | | |
| Frequency grains | .932 | 3.106 | 75.599 | | | |
| Frequency fruit | .833 | 2.776 | 82.375 | | | |
| Frequency fish | .756 | 2.519 | 84.894 | | | |
| Frequency grilled | .654 | 2.182 | 87.076 | | | |
| Frequency legumes | .593 | 1.975 | 89.051 | | | |
| Frequency fried | .550 | 1.833 | 90.884 | | | |
| Think weight high | .448 | 1.494 | 92.378 | | | |
| Eat foods advertised | .434 | 1.448 | 93.826 | | | |
| Clean plate | .322 | 1.072 | 92.898 | | | |
| Feel diet healthy | .292 | .972 | 95.870 | | | |
| Frequency dairy | .253 | .844 | 96.714 | | | |

(continued)

Table 9 Factor analysis E-KINDEX overall (continued)

| Component | Total | Initial Eigenvalues | | Extraction Sums of Squared Variance | | |
|-------------------------|-------|---------------------|--------------|-------------------------------------|---------------|--------------|
| | | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| Feel diet healthy | .292 | .972 | 95.870 | | | |
| Frequency vegetables | .243 | .810 | 97.523 | | | |
| Frequency home prepared | .195 | .649 | 98.172 | | | |
| Frequency deli meats | .169 | .562 | 98.735 | | | |
| Frequency school snacks | .126 | .420 | 99.155 | | | |
| Frequency soda | .112 | .373 | 99.527 | | | |
| Frequency breakfast | .085 | .283 | 99.810 | | | |
| Frequency meat | .057 | .190 | 100.000 | | | |

A 3-factor analysis was conducted to estimate factor loadings of the three subscales of E-KINDEX. The results indicate that 8 of 13 items in the Dietary Quality, subscale 1, loaded on Factor 1. Five of 8 items from the Dietary Behaviors (Attitudes) scale stayed with Factor 2, while some of the Dietary Quality items also loaded to Factor 2—namely frequency of consuming fish, soda, deli meats and legumes. These loadings ranged from $-.37$ to 0.47 . The item ‘eats least favorite food because it is healthy’, an item that seems to fit in the Attitudes subscale, had a loading of $.47$. Seven of 9 of subscale 3 items, Dietary Habits (practices), loaded to Factor 3.

Dietary Quality frequency of eating ‘fried’ loaded on to Factor 3 at a low level, -.303. The data are summarized (Table 10).

Table 10

Rotated Factor Matrix Loadings

| Items | Factors | | |
|-----------------------------------|---------|--------|-------|
| | 1 | 2 | 3 |
| Frequency of bread | 0.732 | | |
| Frequency of meat | -0.597 | | |
| Frequency of dairy | 0.549 | | |
| Frequency of junk foods | -0.499 | | |
| Frequency of vegetables | 0.494 | | |
| Frequency of other grains | 0.480 | | |
| Frequency of fruits | 0.468 | | |
| Frequency of fats | -0.411 | | |
| Frequency of eats when not hungry | -0.405 | | |
| Frequency of grilled foods | 0.333 | | |
| Having dieted | | -0.784 | |
| Fuilt if eats unhealthy foods | | -0.683 | |
| Guilt if eats fattening foods | | -0.578 | |
| Must clean plate | | -0.545 | |
| Eats least favorite healthy foods | | 0.474 | |
| Frequency of soda | | 0.470 | |
| Frequency of smoked meats | | 0.451 | |
| Frequency of fish | | 0.380 | |
| Thinks weight is high | | -0.373 | |
| Frequency of legumes | | -0.371 | |
| Frequency of fast foods | | | 0.629 |
| Frequency of eating alone | | | 0.558 |
| Frequency of eating with family | | | 0.544 |
| Frequency of home prepared foods | | | 0.462 |
| Thinks diet is unhealthy | | | 0.423 |
| Number of meals + snacks per day | | | 0.418 |

(continued)

Table 10 *Rotated Factor Matrix Loadings* (continued)

| | |
|--------------------------------|--------|
| Frequency of fried foods | -0.303 |
| Frequency of school snacks | |
| Eats foods that are advertised | |
| Frequency of having breakfast | |

Note. Extraction Method: Principal Component Analysis, Varimax rotation. Values < .30 not shown.

The subscale structure is confirmed with the analysis, contributing to evidence of validity of the scale.

Moderators and Covariates

As a further assessment of E-KINDEX validity, moderating variables of physical activity, screen time, and parental weight status were measured. Physical activity levels as measured with IPAQ scores were correlated with E-KINDEX ($r = .315, n = 50, p = .026$). OW/OB also was significantly related to physical activity ($r = -.320, n = 50, p = .023$). Covariates including age, gender and SES did not affect the analyses as illustrated earlier in sample characteristics (Table 11).

Table 11

Moderator and Covariate Correlations with EKINDEX and BMIAG2 (OW/OB)

| | EKINDEX Overall | Parent Weights | BMIAG2 (OW/OB) | Gender | Age | SES |
|----------------------|--------------------|-------------------|-------------------|--------|-------|-------|
| Pearson Correlations | | | | | | |
| EKINDEX | | | | | | |
| Overall | 1 | .292* | -.340* | .074 | -.268 | .026 |
| Parent Weights | .292* | 1 | -.142 | .293* | -.152 | .035 |
| BMIAG2 (OW/OB) | -.340* | -.142 | 1 | .027 | .129 | -.111 |

(continued)

Table 11 Moderator and Covariate Correlations with EKINDEX and BMIAG2 (OW/OB) (continued)

| | EKINDEX Overall | Parent Weights | BMIAG2 (OW/OB) | Gender | Age | SES |
|--------|--------------------|-------------------|-------------------|--------|------|------|
| Gender | .074 | .293* | .027 | 1 | .080 | .160 |
| Age | -.268 | -.152 | .129 | .080 | 1 | .257 |
| SES | .026 | .035 | -.111 | .160 | .257 | 1 |

Note. $n = 50$. * $p = <.05$.

Age. Age was a normally distributed variable in the sample (Table 12).

Table 12

Age Distribution of the Sample

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------------|-----------|---------|---------------|--------------------|
| Valid 10.00 | 6 | 12.0 | 12.0 | 12.0 |
| 11.00 | 5 | 10.0 | 10.0 | 22.0 |
| 12.00 | 8 | 16.0 | 16.0 | 38.0 |
| 13.00 | 6 | 12.0 | 12.0 | 50.0 |
| 14.00 | 3 | 6.0 | 6.0 | 56.0 |
| 15.00 | 7 | 14.0 | 14.0 | 70.0 |
| 16.00 | 8 | 16.0 | 16.0 | 86.0 |
| 17.00 | 5 | 10.0 | 10.0 | 96.0 |
| 18.00 | 2 | 4.0 | 4.0 | 100.0 |
| Total | 50 | 100.0 | 100.0 | |

A point-biserial correlation between screen time (dichotomous variable) and E-KINDEX overall was run in SPSS and no relationship was found ($r = -.34$, $n = 50$, $p = .815$). The same analysis was run for screen time and OW/OB and again, no relationship was found ($r = -.251$,

$n = 50, p = .079$). Parental weight status correlated with EKINDEX overall score ($r = .292, n = 50, p = .040$). but not with OW/OB ($r = -.142, n = 50, p = .326$).

Parental Weight Status

Because parents, and families in general, contribute integral elements of the obesogenic environment in which they all live, parental weight status is important to any discussion of healthy or unhealthy weight status. In order to describe whether parental weight provided additional information to the prediction of OW/OB status in children, sequential regression analysis in SPSS was performed to quantify the information. SPSS EXPLORE demonstrated non-normality of the Parental Weight distribution of scores and substantial positive skewness. The variable required logarithmic transformation prior to analysis to achieve normality. The remainder of the variables were previously established as meeting assumptions of normality. OW/OB was the dependent variable and the predictor variables of Parental Weight status (log 10). Overall E-KINDEX, Dietary Behavior (Attitudes) E-KINDEX, Dietary Habits E-KINDEX, and Dietary Quality E-KINDEX were sequentially entered into the SPSS regression equation.

Table 13

Sequential Regression Model Summary (DV: BMI AG2)

| Model | R | R Square | Adjusted R Square | Standard Error of the estimate |
|-------|------|----------|-------------------|--------------------------------|
| 1 | .340 | .115 | .097 | 6.178 |
| 2 | .344 | .118 | .081 | 6.233 |
| 3 | .613 | .376 | .335 | 5.301 |
| 4 | .614 | .377 | .322 | 5.354 |
| 5 | .634 | .402 | .335 | 5.303 |

(continued)

Table 13 Sequential Regression Model Summary (DV: BMI AG2) (continued)

| Change Statistics | | | | | |
|-------------------|-----------------|----------|------|-----|---------------|
| Model | R Square Change | F Change | df 1 | df2 | Sig. F Change |
| 1 | .021 | 6.266 | 1 | 48 | .314 |
| 2 | .003 | .152 | 1 | 47 | .699 |
| 3 | .258 | 18.990 | 1 | 46 | .000 |
| 4 | .001 | .086 | 1 | 45 | .771 |
| 5 | .025 | 1.867 | 1 | 44 | .179 |

Note.

1. Predictors: (Constant), EKINDEXOVERALL

2. Predictors: (Constant), EKINDEXOVERALL LG_PRNTWTS,

3. Predictors: (Constant), EKINDEXOVERALL LG_PRNTWTS, , SS2_TOTAL

4. Predictors: (Constant), EKINDEXOVERALL LG_PRNTWTS, SS2_TOTAL, SS1_TOTAL

5. Predictors: (Constant), EKINDEXOVERALL, LG_PRNTWTS, SS2_TOTAL, SS1_TOTAL, SS3_TOTAL

The significant bivariate correlation of BMI AG2 (OW/OB) assessed at the end of step 1 finds correlation of .34 accounting for 11.5 % of the variance. Looking further at model 1, F change is 6.266, exceeding critical F for $df(1, 48)$. E-KINDEX overall is a predictor for BMI AG 2, $F(1, 48) = 6.266, p < .05$. In step 2, parental weights are entered into the equation: The results indicate that parental weight status does not improve R squared nor result in significant F change. The most significant result in the sequential multiple regression analysis is the addition to the equation of Dietary Behaviors (Attitudes) or subscale two. The addition of SS2 TOTAL to the equation in step three results in F change value for 18.99. Critical F for $df(1, 46) = 5.42$. F value of 18.99 exceeds critical F and the change is significant, $F(1, 46) = 18.99, p < .0001$. Dietary Habits (Attitudes) is a significant predictor of OW/OB diagnosis. The sequential regression analyses of addition of Dietary Quality and Dietary Habits (Practices) did not contribute significantly to the analysis. Analyses for this study included an n of 50; a larger sample size may have produced different results (Table 13).

Receiver Operating Characteristics Curve Analysis

Signal theory can assist in achieving aim two which was to estimate the ability of E-KINDEX scales to measure the elements of the obesogenic environment and resultant prediction of OW/OB in a pediatric sample in Tampa, Florida. Receiver Operating Characteristics (ROC) Curve analysis was used to evaluate the predictive score for diagnosis of OW/OB. ROC analysis was run on the three subscales and E-KINDEX overall. The area under the curve (AUC) for E-KINDEX overall was .722 or 72% (Figure 5). Dietary Quality, Subscale 1, had the least AUC was the Dietary Quality scale at 52%, supporting other analyses that Dietary Quality E-KINDEX, (food groups), is a less-powerful indicator of risk for OW/OB than psychological factors. Dietary Behaviors (Attitudes) E-KINDEX had an AUC of 88%. Dietary Habits E-KINDEX had an AUC of 60%, but asymptotic significance was .216 (Table 14).

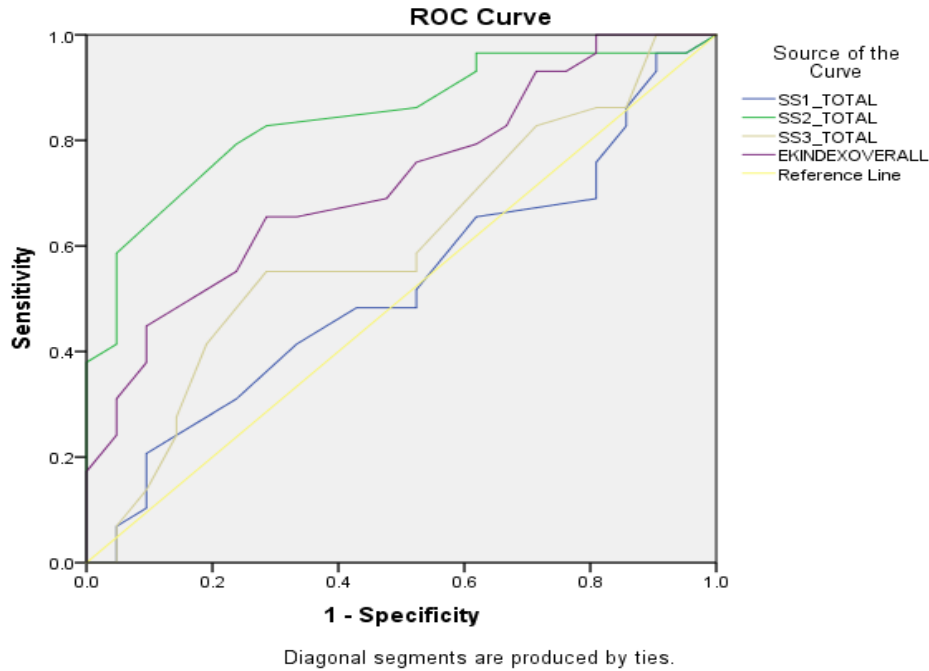
Table 14

E-KINDEX Area Under the Curve

| <i>EKINDEX Test Result Variable(s)</i> | <i>Area</i> | <i>Asymptotic Sig.</i> |
|--|-------------|------------------------|
| Dietary Quality (Foods) | .521 | .798 |
| Dietary Behaviors (Attitudes) | .844 | .000* |
| Dietary Habits (Practices) | .603 | .216 |
| EKINDEXOVERALL | .722 | .008* |

The graph of the ROC curve depicts the test results that Dietary Quality with an AUC of .521 is not useful in predicting OW/OB.

Figure 5. ROC E-KINDEX Overall



Quality of Life

Aim three was to measure the relationship between OW/OB and quality of life as evidenced by IWQOL-Kids scores. A positive correlation between E-KINDEX scores and IWQOOL-Kids scores was hypothesized. Standard multiple regression was performed between QOL as the dependent variable and OW/OB as the independent variable. Assumptions were evaluated and data did not require transformation. There were no missing values or outliers. The bivariate relationship, R , results in adjusted R^2 accounting for 92.4% of the variance.

E-KINDEX scores were significantly correlated with quality of life perceptions: ($r = -.340, n = 50, p = .016$). In all the analyses in this study, Quality of Life was significantly correlated with E-KINDEX and OW/OB (Table 15).

Table 15*Analysis of variance BMI AG 2 (OW/OB)*

| Model | Sum of Squares | Df | Mean Square | F | Sig |
|--------------|----------------|----|-------------|-------|-------------------|
| 1 Regression | 417.569 | 1 | 417.569 | 5.785 | .020 ^b |
| Residual | 3464.873 | 48 | 72.185 | | |
| Total | 3882.442 | 49 | | | |

| R | R Square | Adjusted R Square | F change | Sig. F change |
|------|----------|-------------------|----------|---------------|
| .962 | .925 | .924 | 605.685 | .000 |

Note. a. Dependent Variable: IWQOL KIDS

b. Predictors: (Constant), BMIAG2

E-KINDEX Short Form

Because ten items from the factor analysis contributed a high percent (73.25%) of the shared variance, analyses were warranted to assess whether there is value in combining them into a new shortened version of the E-KINDEX, creating a new subscale. To that end, these ten items were combined in an E-KINDEX Short Form 10 (EK SF10) to determine if these items can reduce the burden of the 30-item scale while retaining internal consistency.

Items extracted from E-KINDEX principle components analysis that were shown to account for nearly $\frac{3}{4}$ of shared variance for OW/OB (BMI AG2) scores in the 30-item scale were combined into a 10-item variable called E-KINDEX Short Form to determine if a shorter questionnaire could demonstrate similar results, retaining internal consistency. The extracted items were recoded into a scored variable (E-KINDEX SF10). A square root transformation was required for this variable for violation of Kolmogorov-Smirnov test for normality and minimal positive skewness. Normality of the distribution was achieved with the transformation and E-KINDEX SF10 was examined for internal consistency with Cronbach's alpha statistic. This scale was found to be acceptable as a new instrument in the social sciences ($\alpha = .641$).

E-KINDEX SF10 Correlations

Bivariate correlation analysis was conducted between OW/OB and the new variable E-KINDEX Short Form, logarithm parental weight status, quality of life, physical activity, and screen time. No correlation between the new E-KINDEX Short Form (SF) score and the diagnosis of OW/OB (BMIAG2) was found, ($r = -.261$ $n = 50$, $p = .067$). The inverse correlation between quality of life and E-KINDEX SF was moderate and significant ($r = -.311$, $n = 50$, $p = <.028$). This was as expected for quality of life relative to E-KINDEX overall score and OW/OB as quantified by BMIAG2 (Table 16.) Sequential regression analyses did not improve the results (Table 16).

Table 16

Pearson Correlations E-KINDEX SF 10

| | Physical Activity | OW/OB (BMI AG2) | E-INDEK Short Form | Quality of Life | Parental Weights |
|----------------------|-------------------|-----------------|--------------------|-----------------|------------------|
| Pearson Correlations | | | | | |
| Physical Activity | 1 | -.320* | .175 | .439** | -.068 |
| OW/OB (BMI AG2) | -.320* | 1 | -.261 | -.311* | -.145 |
| E-INDEK Short Form | .175 | -.261 | 1 | .179 | -.028 |
| Quality of Life | .439** | -.311* | .179 | 1 | .125 |
| Parental Weights | -.068 | -.145 | -.028 | .125 | 1 |

Note. $n = 50$ * $p = <.05$; ** $p = <.005$

CHAPTER FIVE:

DISCUSSION

This chapter presents a discussion of results, clinical significance for practitioners, and implications for future research in this field.

Results from the Validation of the Electronic Kids Dietary Index Dietary Screening Tool for Early Identification of Risk for Overweight/Obesity (OW/OB) and Associations with Quality of Life Perceptions in a Pediatric Population study provide valuable information to advance the state of the science in identification of risk for development of OW/OB in pediatric populations. Tools are needed in pediatric clinical practice in order to satisfy the charge made by the National Association of Nurse Practitioners to begin screening preschoolers for risk of development of OW/OB. Absent other medical conditions, babies do not begin their lives being overweight or obese. It is intuitive that feeding practices by parents are critical to whether their children will maintain healthy weight. Parents are critical in determination of the environment in which their young children live. Whether it is an obesogenic environment in which the individual resides or not is determined early in life. Cognitive schema is associated in dietary habits (attitudes) and habits (practices) that grow with the individual and can be very difficult to change later in life. This study aimed to advance the science of obesity prevention by validating a tool that assesses for presence of an obesogenic environment. E-KINDEX may be a useful tool in identification of obesogenic elements in a child's environment that may be modifiable.

Characteristics of the Sample

Targeted balance in the sample of approximately 50% lean and 50% OW/OB participants was achieved. Covariates in the sample included age, gender, and SES. As with the Lazarou study (2011), correlations were not found relative to E-KINDEX scores however, age and gender are embedded into the BMIAG2 variable for OW/OB. The sample adequately represented the age of the population as discussed in Chapter Four.

Aims

Aim one was to estimate predictive validity for the E-KINDEX instrument by finding an inverse relationship with OW/OB. CDC Growth Chart Percentiles were calculated for participants as part of their visit to the clinic. BMI for age and gender was used as the determinant of Growth Chart percentile.

Validity

One accepted approach to validation of a scale is via correlation with measures of the same or related concepts. Scores from the E-KINDEX overall and its subscales were correlated with BMI AG2. Moderate correlations were found between BMI AG2 and Dietary Behaviors (Attitudes) subscale score and E-KINDEX Overall score, as hypothesized, supporting construct validity of the instrument. Although Dietary Quality E-KINDEX and Dietary Habits E-KINDEX did not have significant correlation as stand-alone subscales, their items did contribute to the diagnostic ability of E-KINDEX total. Regression analyses supported evidence for the relationship between E-KINDEX overall and E-KINDEX behaviors with both OW/OB and quality of life. However, this is just one piece of evidence of construct validity.

Another approach to evidence of validity is factor analysis. Principle components factor analysis confirmed three factor structure of E-KINDEX, further supporting validation of E-KINDEX overall.

Signal theory in the form of the Receiver Operating Characteristics curve analysis was used to further estimate the ability of E-KINDEX to measure elements of an obesogenic environment. ROC curves revealed significance of diagnostic ability for E-KINDEX overall and Dietary Behaviors E-KINDEX, supporting the results of other analyses in this study. In the Lazarou (2010) study, ROC cutoff point analysis determined the best score for discriminating OW/OB from normal weight to be 61 of 87; in this study, the best score was 65 of 87. The difference in scores may be related to sample size—50 in this study versus 622 in the Lazarou study. Repeated validation of scales for different populations

As we gather more evidence in the field about the factors that contribute to the development of OW/OB at earlier ages, we will need to concentrate on the factors that contribute most heavily. An obvious problem in this area of research is the idea that we are seeking validity for a tool that measures ‘risk for’ by validating it using data from those who already have this chronic disease.

Proposed 10-item E-KINDEX. Because of these results, further refinement of the scale was considered. To that end, a factor analysis was conducted with oblimin rotation. Initial extraction calculated that ten items contributed to 73.2% of shared variance. Further analyses of these ten items included as a single subscale, E-KINDEX Short Form, were performed to determine whether a shortened form of E-KINDEX might be able to demonstrate similar results while retaining validity and reliability.

Reliability

The second aim of this study was to estimate the reliability of E-KINDEX overall and each of its subscales to measure the elements of the obesogenic environment and risk for development of OW/OB in a pediatric sample. Acceptable alpha for multi-item measures that are not yet established is ≥ 0.60 (Nunnally,1978). Cronbach's α coefficient of reliability in this study ranged from .643 to .703 (Table 8). Lazarou and colleagues (2011) reported Cronbach's alpha of .601 for overall E-KINDEX, less than what is reported here. Lazarou did not report Cronbach's alpha for the subscales individually. The highest reliability coefficients were Dietary Habits E-KINDEX and E-KINDEX overall, respectively. These are the same two scales that demonstrated the highest predictive validity.

Moderating Variables

Moderating variables proposed in this study included parental weight status, physical activity levels, and screen time. Correlations of parental weight status with OW/OB were significant, ($r = -.29, n = 50, p = < .05$). The sequential multiple regression that was conducted revealed that adding parental weight status did not improve information in that analysis. Electronic health records were examined to achieve a balanced sample of children relative to weight status, but it was found at interview that the majority of parents, 91 of 100, were found to be OW/OB despite the fact that only slightly more than half of the child participants were in that category.

Physical activity, despite the press it gets as being essential in healthy weight maintenance and weight loss, was found to be significantly correlated with E-KINDEX ($r = .315, n = 50, p = .026$) and nearly identically correlated with OW/OB ($r = .32, n = 50, p = .023$). Analysis of screen time, a factor relating to physical activity was similar in results. A point-

biserial correlation analysis was run between the dichotomous variable ‘screen time’ and E-KINDEX overall and OW/OB; no relationship was found. Lazarou and colleagues (2010) identified a significant relationship with regard to screen time in her study. Screen time has changed significantly in this technologically advancing world and the evaluation tool used has not changed with the technology. Many children participate in screen time as homework time and others who are older may be in the gym at the same time they are listening to music or watching television: each of these items are answered separately by participants.

While not strong, these relationships were significant. It is to be expected that when two measures of related but different variables are correlated, the relationship will not be very strong. Strong relationships would be expected only between measures of the same concept or variable. Thus, these results seem important and help to confirm the validity of the E-KINDEX. The multiple regression analysis using OW/OB as the dependent variable with the independent variables of E-KINDEX total, parental weight status, Dietary Behaviors, Dietary Quality, and Dietary Habits introduced into the equation sequentially, failed to identify parental weight status as a predictor for OW/OB. This analysis did confirm that E-KINDEX overall and Dietary Habits were significant predictors of OW/OB. The 30-item scale and its second subscale, as in the Lazarou et al., (2010) study, have merit in identification of risk for and status of OW/OB.

Covariates. Age, gender, and socioeconomic status had no bearing on the regression analyses. Lazarou and colleagues had similar findings (2010) and subsequently stopped collecting these demographic data. However, age and gender are included in the measurement of OW/OB, BMIAG2.

Quality of Life

Aim three was to assess the quality of life for those who are OW/OB using the validated Impact of Weight on Quality of Life in Kids (IWQOL-Kids) tool. Moderate inverse correlations between E-KINDEX scores and quality of life and OW/OB and quality of life were hypothesized and found. E-KINDEX scores were significantly related ($r = -.340, n = 50, p = < .05$) as were OW/OB scores ($r = -.311, n = 50, p = < .028$).

Some of the information gleaned from answers on the quality of life questionnaires were difficult for the investigator to read as answers to questions about family ‘not proud of me because of my weight’, ‘family talks about me behind my back’, and ‘family avoids being with me because of my weight’ were ‘always true’ to a higher degree than expected. The Family Relations subscale items in the IWQOL-Kids section were answered candidly by many of the participants in this study even in the presence of their parents. The format of the IWQOL-Kids lends itself to the researcher being able to easily note if the participant is circling 1 (always true) or 5 (never true). Children who are lean and active filled this survey out quickly—circling all 5’s while those who are not lean seemed to take longer and seemed to have painful answers. Of question is whether all children answer accurately in the presence of their parents. Perhaps in future studies, children and parents might be assessed in different rooms. Age differences may also have played a role in quality of life responses by the children.

The validity of E-KINDEX overall score and subscale two, Dietary Behavior (Attitudes) were shown to be both valid and reliable, and E-KINDEX overall was shown to be valid and reliable retaining all of the 30 items. Findings here support the initial Lazarou and colleagues (2010) study results in spite of the small sample size here. The analyses of the validity and

reliability of E-KINDEX are worthy of utilization in the clinical setting to determine the risk for overweight and obesity in children before they are diagnosed.

E-KINDEX Short Form

Development of the E-KINDEX Short Form by combining the top 10 factors extracted from the factor analysis into a subscale did not yield beneficial results for this study. However, further analysis of the factors contained in E-KINDEX is warranted. It is clear there are factors in the Dietary Quality and Dietary Practices scales that do not contribute to predictive validity. E-KINDEX Short Form was found to be acceptable for use as a scale ($\alpha = .64$). However, Short Form scores were not correlated with either OW/OB or E-KINDEX ($r = .179, n = 50, p = .21$). E-KINDEX Short Form correlations are available to view (Table 16).

Strengths

Strengths of this study include the ability to look at analyses that preceded this one with the benefit of the advancement of science since the prior analysis. Factors previously thought to be highly associated with OW/OB, such as the actual diet, are now known not to be so influential in development of OW/OB. Unfortunately, the epidemic of OW/OB has grown larger. Thus, the need to intervene early for at-risk individuals is paramount. E-KINDEX contributes added information regarding the trajectory of OW/OB.

Interviewing the parents was a strength of this study. Many parents questioned the items' importance to overall healthy weight; many asked how they could see the results of this study. They were advised that these results would be published as a dissertation available to the public at the University of South Florida website. An abstract will be posted in the clinic that can inform those who are interested in the results of the study.

Anecdotally, it should be noted that nurse practitioners in the clinic were using the Growth Chart percentiles to trend the percentiles of their patients, including those who fall between the 5% and 85%, normal weight, such that they were able to intervene when a patient jumped from a trended 50% to the 67% range, as was the situation of the child who increased his percentile by 17 points.

Limitations

The sample size of 50 children was a definite limitation of this study. Tampa is fortunate to have this clinic dedicated to children, but many children who frequent the clinic were necessarily excluded from this study based on physical and mental limitations. Analyses of the relationships would likely have yielded stronger results with a larger sample. Factor analysis and Cronbach's alpha analyses were insufficiently powered by this sample.

Time was another limitation of this study. The busy clinic was not always able to accommodate the principal investigator based on availability of privacy that was required to be accorded to participants. Data collection for this small sample took several months. Computer access to HIPPA-protected information is very important for health care providers, and clinics are becoming increasingly unwilling to grant direct access to patient records to someone not employed by the clinic, as was the case in this study. These factors contributed to the time constraints as the study needed to be completed within a doctoral program.

A limitation might have been the children's ability to respond. Some children may not have accurately entered their true responses. The screen time assessment seems to not take into account the advancement of technology. Listening to music is considered a sedentary activity, but many children listen to music while they are playing sports. Screen time assessment tools require revision according to advancement of technology in our daily lives. Another limitation

may have been that many of the OW/OB participants were being treated in the clinic for their excess weight, biasing some item responses on the questionnaires. Two of the children were 10; the researcher noted that 10-year old participants required longer time to complete questionnaires but not longer than five minutes more. All dyads completed all questionnaires in less than 25 minutes. Many of the children were visiting the clinic for well child follow-up, but collection of data surrounding their visit might have been helpful to screen for bias as many of the OW/OB children were coming in for monitoring in the Healthy Weight Clinic for their chronic excess weight.

Implications for Future Research

Future studies should look closely at parental OW/OB. These findings of such high self-reported levels of parental OW/OB for the majority of the healthy-weight children in the study do not bode well and could well be indicative of eventual diagnosis of OW/OB in the lean participants as they grow. E-KINDEX that looks at the obesogenic environment of children should look at the obesogenic environment of their caregivers—particularly as the adults seem to be more OW/OB than their children. Parents and children do reside in the same obesogenic environment to a certain extent other than when children are at school. Now that many schools in this country are providing both breakfast and lunch to a majority of students, the obesogenic environment is different for children than their parents. Perishable foods that are generally the healthiest are difficult to provide, resulting in processed food items being offered.

During data collection, the principle investigator accompanied the nurse practitioner during a patient visit (not the normal procedure) during which the provider noted her 11-year-old son had ‘increased’ from the 50th percentile level on the growth to the 68th percentile in just six months, a significant increase in the trended growth percentiles chart. Utilization of CDC growth

charts in combination with E-KINDEX assessment scores may allow parental counseling targeted to obesogenic environmental factors. For this child, healthy weight had increased 18% on the growth chart, and his E-KINDEX was positive for high risk for development for OW/OB. The child subsequently participated in the study and scored 32, significant for prediction of OW/OB. Mom was one of the few lean parents in this study and was surprised to be counseled by the nurse practitioner. This is an example of E-KINDEX scoring the obesogenic environment high but the child scored normal for BMIAG2, evidence of predictive validity, albeit only in one case.

Complexity of Diet

In reviewing the E-KINDEX questionnaires, it is evident that processed foods are not accurately assessed. These foods are well known in nutrition science to contribute to inhibited appetite and satiety signals as well as inhibition of fat digestion. While Dietary Quality E-KINDEX did not play a substantial role in contributing to significant relationships, processed foods may be linked to items in the Dietary Behavior subscale. Nutrition science has advanced since the Lazarou et al., (2010) study that implicates many of the chemicals in processed foods to the psychology of eating. Revision of the scale and further study may be needed. Lazarou conducted her study in Cyprus where the diet had become westernized but still contained elements of the Mediterranean diet (2011).

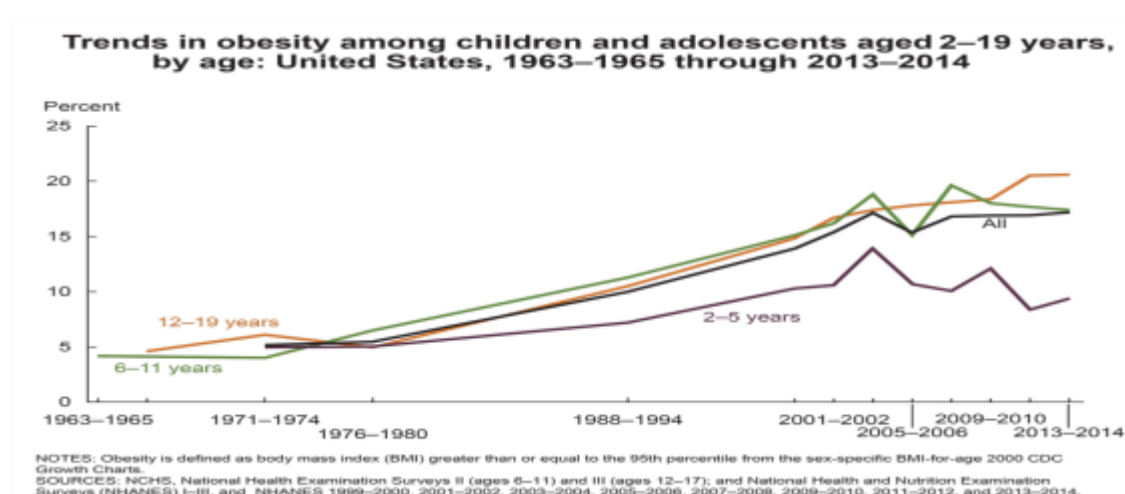
E-KINDEX is written for older children, but younger children can also be at risk. This scale should be transformed by a pediatric expert so that it can be administered to younger children. Another recommendation is to administer E-KINDEX to parents of the very young children.

This study may be considered as a pilot study for larger clinical trials. Persistence will be required in this area to identify and determine the factors most influential in the obesogenic environment. After all, there is no ‘Gold Standard’ measurement for the obesogenic environment as research is still relatively new, but the problem is urgent. New information released October 13, 2017 revealed that after some stabilization in OW/OB numbers, rates are on the rise again (CDC, 2017).

Implications for Clinical Practice

Obesity is growing world-wide among both adults and children. Prevention of onset of OW/OB is key to reduction in the rate of growth of the epidemic. Obesity is becoming recognized as incurable as less than 1% of patients can maintain weight loss after 1 year of non-invasive treatment. The National Center for Health Statistics (2015-2016) reports that 40% of adults and 19% of children are obese. Choose any trend line and it is immediately evident that the line is increasing. We have moved from a labor-intensive society in the past to a sedentary one today, and we eat many things that interfere with normal digestion and energy expenditure. The problem is illustrated in the National Health and Nutrition Examination Survey (NHANES) data from CDC (2016), (Figure 6).

Figure 6. Trends in Obesity among Children and Adolescents



The obesogenic environment also includes schools where children spend a great deal of their time. Information from this study should be disseminated to schools as a method to educate children, teachers, and their parents.

Clinical practitioners want to intervene in this crisis, and unfortunately, we still seem not to have the tools to do so. We do not exactly know the factors that have led to the epidemic as this study indicates. More evidence is needed about the factors contributing to this epidemic. The disease itself, and sequelae that include cardiac disease, diminished quality of life, diabetes, and innumerable personal burdens, as well as the financial cost for healthcare as a result, begs for solutions. The National Association of Pediatric Nurse Practitioners (2015) has issued a position statement charging pediatric nurse practitioners to begin screening for OW/OB at the preschool level. Primary care nurses as well as physicians are well-positioned to implement health promotion measures by the indicators of risk for OW/OB.

The first step in patient care for clinicians is assessment: E-KINDEX is a first step in assessment tools that can identify young people who are at risk so that if risk modification is possible, it is implemented. Those who suffer from OW/OB are motivated to work towards healthy weight. The evidence is in the advertising and dollars spent in pursuit of weight loss. Clinicians who can identify those at risk, and intervene to turn back this tide, can have a great impact on those who are prevented from becoming overweight.

REFERENCES

- American Medical Association House of Delegates (2013). Resolution: 420 (A-13). *Resolved that our American Medical Association recognize obesity as a disease state with multiple pathophysiological aspects requiring a range of interventions to advance obesity treatment and prevention*. Retrieved October 26, 2017 from <http://www.npr.org/documents/2013/jun/ama-resolution-obesity.pdf>
- Anthoine E, Moret L, Regnault A, Sébille V, Hardouin J-B. (2014), Sample size used to validate a scale: A review of publications on newly-developed patient reported outcomes measures. *Health and Quality of Life Outcomes*, 12, 2. doi:10.1186/s12955-014-0176-2.
- Barlow, S. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and obesity: Summary report. *Pediatrics*, 120, 164-192.
- Centers for Disease Control and Prevention (2002). Retrieved June 12, 2015 from <http://www.cdc.gov/obesity/data/trends.html>
- Centers for Disease Control and Prevention (2010). Retrieved June 12, 2015 from <http://www.cdc.gov/obesity/data/trends.html>
- Centers for Disease Control and Prevention (2014). Retrieved June 12, 2015 from <http://www.cdc.gov/obesity/data/trends.html>
- Centers for Disease Control and Prevention (2016). National Center for Health Statistics (NCHS). National Health and Nutrition Examination Survey Data. Hyattsville, MD: U.S.
- Centers for Disease Control and Prevention (2014). National Center for Health Statistics (NCHS). National Health and Nutrition Examination Survey Data. Hyattsville, MD: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, http://www.cdc.gov/growthcharts/percentile_data_files.htm
- Chaiton, M., Sabiston, C, O'Loughlin, J, McGrath, J., Maximova, K., & Lambert, M. (2009). A structural equation model relating adiposity, psychosocial indicators of body image and depressive symptoms among adolescents. *International Journal of Obesity*, 33, 588-596. doi:10.1038/ijo.2009.43
- Cole, T., Bellizzi M., Flegal, K., and Dietz, W. (2000) Establishing a standard definition for child overweight and obesity worldwide: international survey: *The British Medical Journal*, 6, (320), 1240-1243.

- Combs, J., Pearson, C., and Smith, G. (2011). A risk model for preadolescent disordered eating. *International Journal of Eating Disorders*, 44(7), 596-604.
- Craig, C., Marshall, A., Sjöström, M., Bauman, A., Booth, M. L., Ainsworth, B., & Oja P., (2003). International physical activity questionnaire: 12-Country reliability and validity. *Medicine and Science in Sports and Exercise*, 35(8), 1381-1395. doi: 10.1249/01.MSS.0000078924.61453.FB
- Davis, M., Gance-Cleveland, B., Hassink, S., Johnson, R., Paradis, G., Resnickow, K., et al. (2007). Recommendations for prevention of childhood obesity. *Pediatrics*, 120, 229-253.
- De Andrade, S. C., Barros, M.B., Carandina, L., Goldbaum, M., Cesar, C. L., and Fisberg, R. M. (2010). Dietary quality index and associated factors among adolescents of the state of Sao Paulo, Brazil. *The Journal of Pediatrics*, 156(3), 456-460.
- Deurenberg, P., Weststrate, J., & Seidell, J. (1991). Body mass index as a measure of body fatness: Age- and sex-specific prediction formulas. *British Journal of Nutrition*, 65(2), 105-114. doi:10.1079/BJN19910073
- Edwards, T., Huebner, C., Connell, F., and Patrick, D. (2002). Adolescent quality of life, part 1: Conceptual and measurement model. *Journal of Adolescence*, 25, 275-286.
- Elder, C., Ritenbough, C., Mist, S., Aickin, M., et al. (2007). Randomized trial of two mind-body interventions for weight-loss maintenance. *The Journal of Alternative and Complementary Medicine*, 13(1), 67-78.
- Ferrans, C., Zerwic, J., Wilbur, J.E., Larson, J. (2005). Conceptual model of health-related quality of life. *Journal of Nursing Scholarship*, 37 (4), 336-342.
- Feskanich, D., Rockett, H., and Colditz, G. (2004). Modifying the healthy eating Index to assess diet quality in children and adolescents. *Journal of the American Dietary Association*, 104, 1375-1383.
- Gidding, S., Dennison, B., Birch, L., Daniels, S., Gillman, M., Lichtenstein, A., et al. (2006). American Heart Association: Dietary recommendations for children and adolescents: a guide for practitioners. *Pediatrics*, 117, 544-559.
- Gutin, B. (2011) Diet vs exercise for the prevention of pediatric obesity: the role of exercise. *The International Journal of Obesity*, 35(1), 29-32. doi: 10.1038/ijo.
- Hagströmer, M., Oja, P., & Sjöström, M. (2006). The international physical activity questionnaire (IPAQ): A study of concurrent and construct validity. *Public Health Nutrition*, 9(6), 755-762. doi:10.1079/PHN2005898

- Haines, P. S., Siega-Riz, A. M., Popkin, B. M. (1999). The diet quality index revised: A measurement instrument for populations. *Journal of the American Dietetic Association*, 99(6), 697-704.
- Hullmann, S. E., Ryan, J.L., Ramsey, R.R., Chaney, J. M., and Mullins, L. L. (2011). Measures of general pediatric quality of life. *Arthritis Care and Research*, 63(11), 420-430; doi: 10.1002/acr.20637.
- Ihmels, M. A., Welk, G. J., Eisenmann, J. C., Nusser, S. M., and Myers, E. F. (2009). Prediction of BMI change in young children with the family nutrition and physical activity screening tool. *Annals of Behavioral Medicine*, 38, 60-68; doi: 10.1007/s12160-009-9126-3.
- Indrayan, A., and Sarmukaddam, S. (2001) *Medical Biostatistics*, 562. Boca Raton, FL: CRC Taylor and Francis.
- Jensen, C. D., and Steele, R. G. (2010). Validation of the perceptions of teasing scale (POTS) in a preadolescent sample: Associations with attitudes toward physical activity. *Children's Health Care*, 39, 249-265; doi: 10.1080/02739615.2010.515925
- Kirk, S. F., Penney, T. L., and McHugh, F. (2009). Characterizing the obesogenic environment: the state of the evidence with directions for future research. *International Association for the Study of Obesity: Obesity Reviews*, 11, 109-117; doi: 10.1111/j.1467-789X.2009.00611.x
- Katz, D. A., McHorney, C. A., & Atkinson, R. L. (2000). Impact of obesity on health-related quality of life in patients with chronic illness. *Journal of General Internal Medicine*, 15(11), 789-796. <http://doi.org/10.1046/j.1525-1497.2000.90906.x>
- Kolotkin, R., Zeller, M., Modi, A., Samsa, G., Quinlan, N. et al. (2006). Assessing weight-related quality of life in adolescents. *Obesity*, 14(3), 448-457.
- Lang, A., and Froelicher, S. S. (2006). Management of overweight and obesity in adults: Behavioral intervention for long-term weight loss and maintenance. *European Journal of Cardiology Nursing*, 5, 102-114.
- Lazarou, C., and Kouta, C. (2010). The role of nurses in the prevention and management of obesity. *British Journal of Nursing*, 19(10), 641-647.
- Lazarou, C., Panagiotakos, B. D., Spanoudis, G., and Matalas, A. (2009). Dietary and other lifestyle characteristics of Cypriot children: results from the nationwide CYKIDS study. *BMC Public Health*, 9, 147.
- Lazarou, C., Kalavana, T., and Matalas, A.L. (2008). The influence of parents' dietary beliefs and behaviours on children's dietary beliefs and behaviours, the CYKIDS study. *Appetite*, 51, 690-696.

- Lazarou, C., Panagiotakos, B. D., Spanoudis, G., and Matalas, A. (2011). E-KINDEX: A Dietary Screening Tool to Assess Children's Obesogenic Dietary Habits. *Journal of the American College of Nutrition*, 30 (2), 100-112.
- Lazarou, C., and Newby, P. (2011). Use of Dietary Indexes among Children in Developed Countries. *American Society for Nutrition* 2, 295-303.
- Lazarou, C., Panagiotakos, B. D., Spanoudis, G., and Matalas, A. (2010). Physical activity mediates the protective effect of the Mediterranean diet on children's obesity status: the CYKIDS study. *The Nutrition Journal*, 26(61-67).
- Lazarou, C., and Soteriades, E. (2010). Children's physical activity, TV watching and Obesity in Cyprus: the CYKIDS study. *European Journal of Public Health*, 20, 70-77.
- Loucaides, C., Jago, R., and Theophanous, M. (2011). Physical activity and sedentary behaviors in Greek-Cypriot children and adolescents: a cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity*, 8(90), 1-11.
- Manios, Y., Kourlaba, G., Grammatikaki, E., Koubitski, A., Siatitsa, P., Vandourou, A., et al. (2010). Development of a lifestyle-diet quality index for primary schoolchildren and its relation to insulin resistance: the healthy lifestyle diet index. *European Journal of Clinical Nutrition*, 64, 1399-1406.
- McAdams, C. (2010) Clinical practice: The environment and pediatric overweight: A review for nurse practitioners. *Journal of the American Association of Nurse Practitioners*, 22, 460-467. xdoi:10.1111/j.1745-7599.2010.00537.x
- Meule A, and Vögele C. The psychology of eating. *Frontiers in Psychology*, 4, 215. doi:10.3389/fpsyg.2013.00215.
- Montesi, L., El Ghoch, M., Brodosi, L., Calugi, S., Marchesini, G., & Dalle Grave, R. (2016). Long-term weight loss maintenance for obesity: a multidisciplinary approach. *Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy*, 9, 37-46. <http://doi.org/10.2147/DMSO.S89836>
- Nadeau, K., Kolotkin, R., Boex, R., Witten, T., McFann, K.K., Zeitler, P., and Walders-Abramson, N. (2011). Health-related quality of life in adolescents with comorbidities related to obesity. *Journal of Adolescent Health*, 49, 90-92; doi: 10.1016/j.jadohealth.2010.10.005.
- National Association of Nurse Practitioners (2015). Position Statement on the Prevention and Identification of Overweight and Obesity in the Pediatric Population *Journal of Pediatric Health Care*, 29(4), 13-15.

- National Institutes of Health (2010). *Disease and Conditions Index: What are Overweight and Obesity?* Retrieved September 17, 2013 from <http://www.nhlbi.nih.gov/health/health-topics/topics/obe/>
- National Institutes Health (2010). *How are Overweight and Obesity Diagnosed?* Retrieved September 22, 2013 from <http://www.nhlbi.nih.gov/health/health-topics/topics/obe/diagnosis.html>
- Nunnally, J. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill.
- Ogden, C., Carroll, M., Kit, B., & Flegal, K. (2014). Prevalence of childhood and adult obesity in the United States, 2011-2012. *Journal of the American Medical Association*, 311(8), 806-814.
- Panagiotakos, D. (2009). Health measurement scales: Methodological issues. *The Open Cardiovascular Medicine Journal*, 3, 160-165.
- Pepe, M., Janes, H., Longton, G., Leisenring, W., and Newcome, P. (2004). Limitations of the odds ratio in gauging the performance of a diagnostic, prognostic, or screening marker. *American Journal of Epidemiology*, 159, 882-890.
- Redinger, R. (2007). The pathophysiology of obesity and its clinical manifestations. *Gastroenterology & Hepatology*, 3(11), 856-863.
- Schwimmer, J. B., Burwinkle, T. M., and Varni, J. W. (2003). Health-related quality of life of severely obese children and adolescents. *JAMA*, 289, 1813-1819.
- Seals, J. (2007). Integrating the transtheoretical model into the management of overweight and obese adults. *Journal of the American Academy of Nurse Practitioners*, 19, 63-71.
- Skevington, S., and McCrate, F. (2010). Expecting a good quality of life in health: Assessing people with diverse diseases and conditions using the WHOQOL-BREF. *Health Expectations*, 15, 49-62.
- Soeliman, F. A., & Azadbakht, L. (2014). Weight loss maintenance: A review on dietary related strategies. *Journal of Research in Medical Sciences: The Official Journal of Isfahan University of Medical Sciences*, 19(3), 268-275.
- Stilwell, V. (2015). Obesity is hurting the U.S. economy in surprising ways. *Bloomberg Financial News*. Retrieved July 18, 2016 from <http://www.bloomberg.com>.
- Swinburn, B., Egger, G., and Raza F. (1999). Dissecting obesogenic environments: the development and application of a framework for identifying and prioritizing environmental interventions for obesity. *Prevention Medicine*, 29, 563-570.

- Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics*. Boston: Pearson/Allyn & Bacon.
- Tsai, A. G., Williamson, D. F. and Glick, H. A. (2011). Direct medical cost of overweight and obesity in the USA: A quantitative systematic review. *Obesity Review*, 12(1), 50-61. Retrieved September 22, 2013 from <http://www.ncbi.nlm.nih.gov/pubmed/20059703>; doi: 10.1111/j. 1467-789x.
- Tsiros, M.D., Olds, T., Buckley, J. D., Grimshaw, P., Brennan, L., Walkley, J., et al., (2009). Pediatric review: Health-related quality of life in obese children and adolescents. *International Journal of Obesity*, 33, 387-400; doi: 10.1038/ijo.2009.42.
- U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Division of Nutrition and Physical Activity (1999). *Promoting physical activity: a guide for community action*. Retrieved August 15, 2017 from https://www.cdc.gov/nccdphp/dnpa/physical/pdf/pa_intensity_table_2_1.pdf.
- Woodward-Lopez, G., Ritchie, L.D., Gerstein, D. E., Crawford, P.B., Eds., (2006) in *Obesity: Dietary and Developmental Influences*, Boca Raton, FL: CRC Press.
- World Health Organization (2001). International classification of functioning, disability and health: short version. Retrieved October 16, 2013 from <http://www.who.int/mediacenter/en/>
- World Health Organization (2013). Obesity and overweight. *Factsheet*. Retrieved September 13, 2013 from <http://www.who.int/mediacentre/factsheets/fs311/en/>.
- World Health Organization (2016). Obesity and overweight. *Factsheet*. Retrieved September 13, 2013 from <http://www.who.int/mediacentre/factsheets/fs311/en/>.
- Zeller, M., and Modi, A. (2006). Predictors of health-related quality of life in obese youth. *Obesity*, 14(1), 122-130.

APPENDIX A:

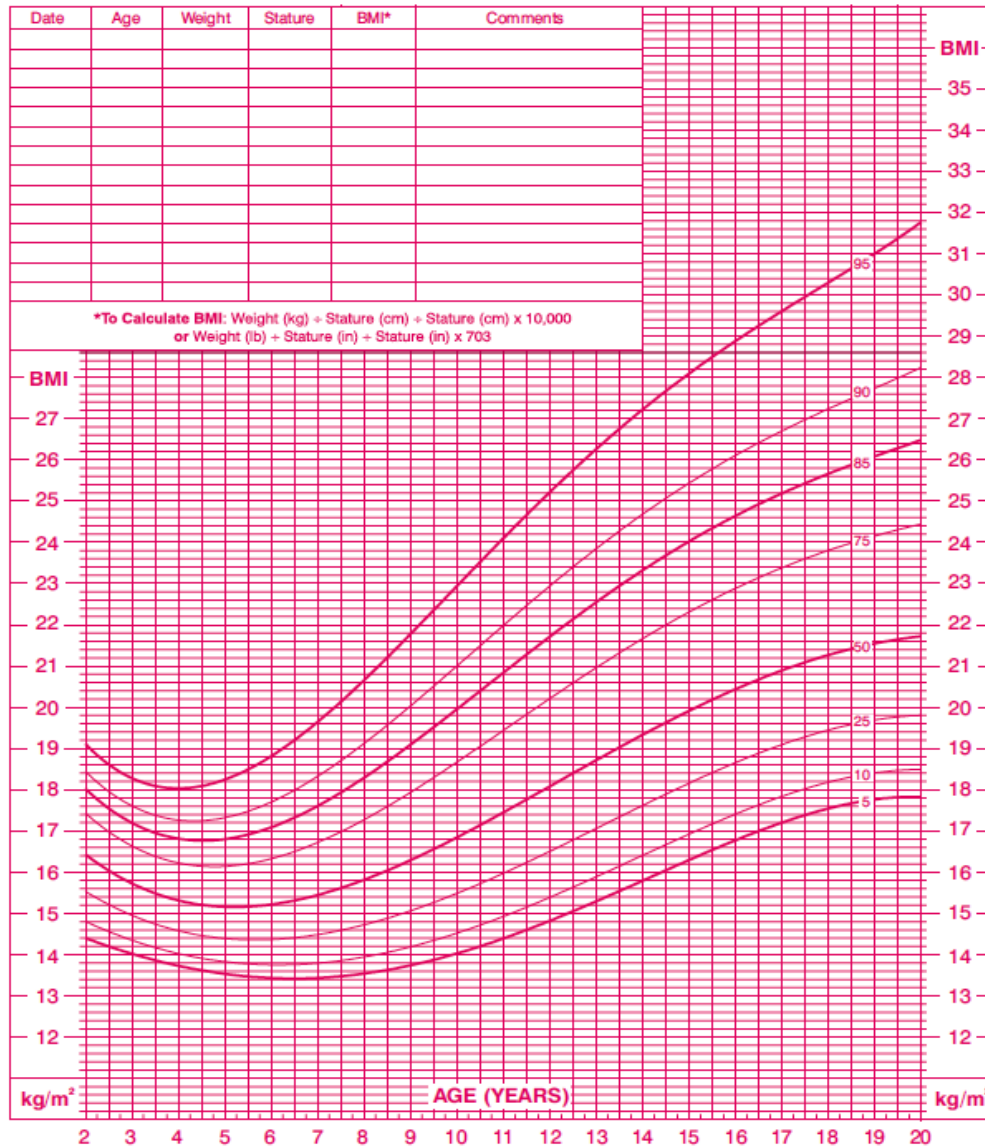
BMI FOR AGE AND GENDER PERCENTILES

2 to 20 years: Girls

Body mass index-for-age percentiles

NAME _____

RECORD # _____



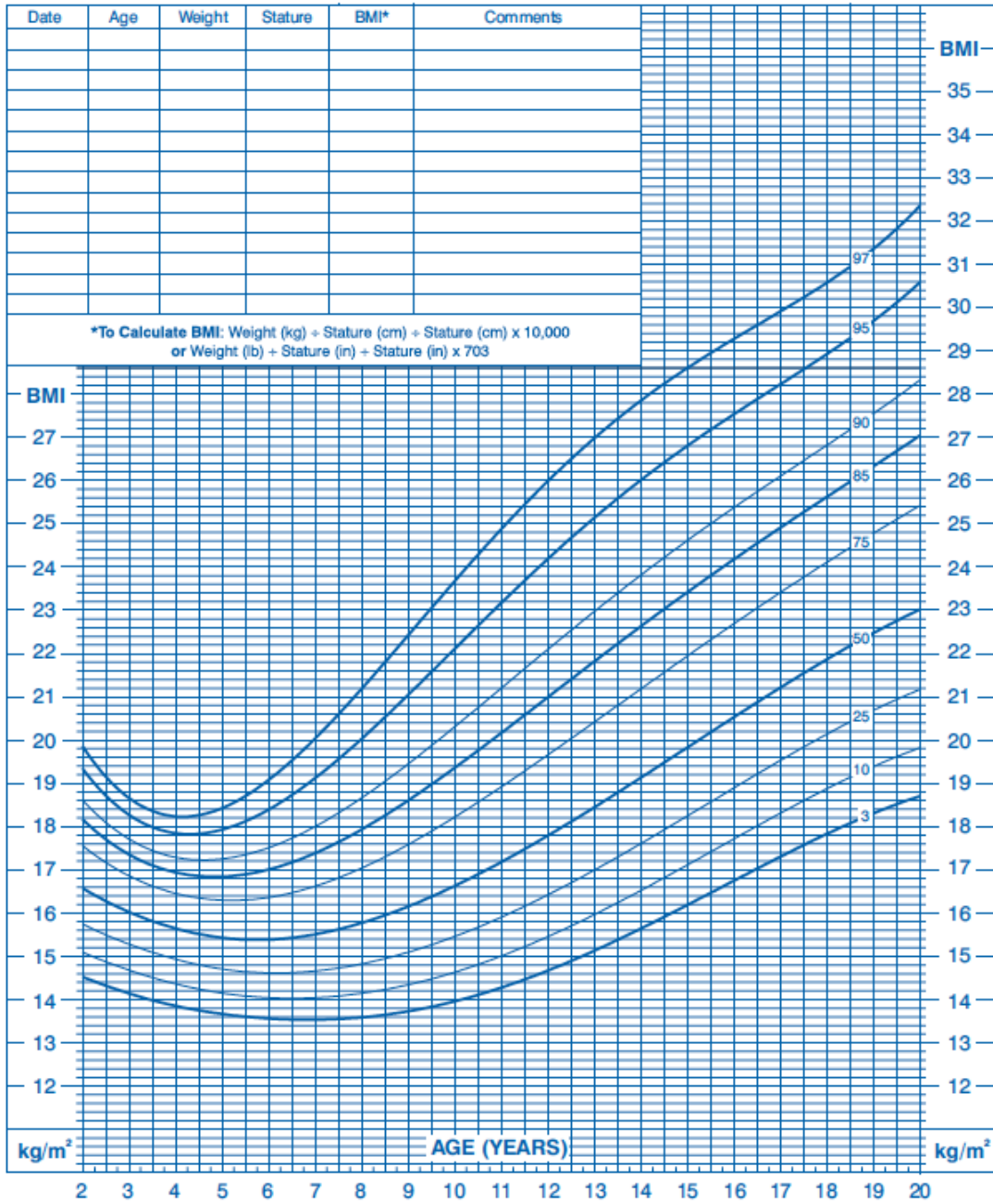
Published May 30, 2000 (modified 10/16/00).
 SOURCE: Developed by the National Center for Health Statistics in collaboration with
 the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>



2 to 20 years: Boys
Body mass index-for-age percentiles

NAME _____

RECORD # _____



Published May 30, 2000 (modified 10/16/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2000).
<http://www.cdc.gov/growthcharts>



APPENDIX B

PHYSICAL ACTIVITY LEVEL QUESTIONNAIRE

Please answer the following statements by drawing a circle around the number of times in the last 7 days you have completed the following physical activities. Please try to be correct. There are no right or wrong answers.

Physical Activity Index

| | | | | | | | | | |
|----|--|------------------|------------------|--------------------|---------------------|---------|---------|---------|---------|
| 1. | In the past 7 days, I have done easier activities that did not make me sweat or breathe hard (walking, slow biking, skating or scootering for example) | None | 1 time | 2 times | 3 times | 4 times | 5 times | 6 times | 7 times |
| 2. | The usual time I did these easier activities above usually lasted | Less than ½ hour | Less than 1 hour | Less than 1 ½ hour | More than 1 ½ hours | | | | |
| 3. | In the past 7 days, I have done harder activities that made me sweat or breathe hard (running, playing basketball or football, swimming, fast biking, for example. | None | 1 time | 2 times | 3 times | 4 times | 5 times | 6 times | 7 times |
| 4. | The usual time I did these harder activities above usually lasted | Less than ½ hour | Less than 1 hour | Less than 1 ½ hour | More than 1 ½ hours | | | | |

APPENDIX C

RECRUITMENT BROCHURE



KIDS DIETARY INDEX AND QUALITY OF LIFE

Are you interested in healthy nutrition and your child's feeling of well being?

Please consider allowing your child aged 10 to 18 to take part in a research study about nutrition habits and self-image.

OBJECTIVE

This research study will test whether a questionnaire can help doctors and nurse practitioners identify children whose habits might cause them to become overweight. The study will also see if there is a relationship between weight and feelings of well being.

Children who are interested should be generally healthy, can be normal weight or overweight, be able to read English at the 3rd grade level, and not have a mental or physical disability that requires help from others. Parents must give permission and children must agree.

Questionnaires about nutrition habits, physical activities, and self-image can be completed within 15 to 30 minutes. A \$10.00 target Gift Card will be given to those who complete the questionnaires.

Patricia Hall, a PhD student at University of South Florida College of Nursing, is in charge of the study and can be contacted as below.

Patricia Hall MSN/Ed, RN PhD Candidate
USF College of Nursing
12901 Bruce B. Downs Blvd, MDC 22
phall@health.usf.edu
920-819-8854
IRB#: 0029711



USF/EDN

APPENDIX D

PARENTAL INFORMED CONSENT



Consent to Participate in Research & Parental Permission for my Child to Participate in Research and Authorization to Collect, Use and Share my Child's Health Information

Pro #00029711

The following information is being presented to help you and your child decide whether or not you would like to be a part of a research study. Please read this information carefully. If you have any questions or if you do not understand the information, we encourage you to ask the researcher.

We are asking you to take part, and to allow your child to take part, in a research study called: **E-KINDEX.**

The person in charge of this study is Patricia Hall, RN, PhD student. She is being guided in this research by Dr. Susan McMillan from the University of South Florida College of Nursing. However, other research staff may be involved and can act on behalf of the person in charge.

The study will be take place here at the clinic You will be asked to complete 2 questionnaires which will take about 15-30 minutes. That is all.

Purpose of the study:

By doing this study, we hope to find out about eating habits that are healthy and unhealthy, and how being overweight affects how a person feels about themselves.

Why are you & your child being asked to take part?

You are being asked to take part in this research study because we want to learn about which habits of children cause a healthy weight and which ones cause too much weight. Our study also wants to learn how much a person's weight affects their feelings of well-being. If you take part in this study, you will be one of about 50 parent-child groups at this site.

Study Procedures:

All children, even those who are age 18, who take part in the study will need a parent to take part as well, even though the parent will not fill out the surveys for the study.

If you and your child take part in this study, you will be asked to provide your current height, weight, gender, age, and their opinion on family eating habits to the researcher. Your child will be asked to complete 3 surveys all of which will take about 15-30 minutes of your time. The researcher will remain with you and your child in order to answer any questions that may come up. That is all.

Total Number of Participants

About 50 parent-child groups will take part in this study at this clinic. This study is only being done at this clinic.

Alternatives / Voluntary Participation / Withdrawal

If you decide not to let your child take part in this study and you do not participate, that is okay. Instead of being in this research study you and your child can choose not to participate.

You and your child should only take part in this study if both of you want to. You or your child should not feel that there is any pressure to take part in the study to please the study investigator or the research staff.

If you or your child decide not to take part:

- You will not be in trouble or lose any rights you would normally have.
- You will still get the same services or health care benefits you would normally have.
- You can still get regular treatments from your regular doctor.
- You do not have to participate in this research study and may stop even after you have started filling out the survey.

You can decide after signing this informed consent form that you no longer want your child or yourself to take part in this study. We will keep you informed of any new developments which might affect your willingness to participate or allow your child to continue to participate in the study. However, you and your child can decide to stop taking part in the study for any reason at any time. If you and/or your child decide to stop taking part in the study, tell the study staff as soon as you can.

Benefits

You and your child will receive no benefit(s) by participating in this study.

Risks or Discomfort

To the best of our knowledge, your participation in this study will not harm you. Although we have made every effort to try and make sure this doesn't happen, you may find some questions on the written survey may upset you. If so, you can stop the study right away and we will tell you and your parent or guardian about other people who may be able to help you with these feelings.

Compensation

Your child will receive a \$10.00 Target gift card for taking part in this study. If you or your child stop participating before the study is over, the payment you receive will be based on the amount of time you were in the study. If you or your child stop the study once you start it, the minimum compensation you will receive is a \$5.00 Target gift card.

Cost

It will not cost you anything to participate and to let your child take part in the study.

Privacy and Confidentiality

We will keep you and your child's study records private and confidential. Certain people may need to see your study records. Anyone who looks at your records must keep them confidential. These individuals include:

- The research team, including the Principal Investigator, faculty advisor, research nurses, and all other research staff.
- Certain government and university people who need to know more about the study, and individuals who provide oversight to ensure that we are doing the study in the right way.
- Any agency of the federal, state, or local government that regulates this research.
- The USF Institutional Review Board (IRB) and related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance.

We may publish what we learn from this study. If we do, we will not include you or your child's name. We will not publish anything that would let people know who you are.

You can get the answers to your questions, concerns, or complaints.

You can ask questions about this study at any time. You can talk with your parents, guardian or other adults about this study. You can talk with the person who is asking you to volunteer by calling or texting Patricia Hall at 920-819-8854 or emailing phall@health.usf.edu.

If you have questions about you or your child's rights, complaints, or issues as a person taking part in this study, call the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu.

Authorization to Use and Disclose Protected Health Information (HIPAA Language)

The federal privacy regulations of the Health Insurance Portability & Accountability Act (HIPAA) protect your identifiable health information. By signing this form, you are permitting the University of South Florida to use your child's health information for research purposes. You are also allowing us to share your child's health information with individuals or organizations other than USF who are also involved in the research and listed below.

The following groups of people may also be able to see your child's health information and may use that information to conduct this research

- The medical staff that takes care of your child and those who are part of this research study;
- Each research site for this study: this site is the only site conducting the study.
- The USF Institutional Review Board (IRB) and the USF Pediatric Clinic/Healthy Weight Clinic its related staff who have oversight responsibilities for this study, including staff in USF Research Integrity and Compliance and the USF Health Office of Clinical Research;
- Data Safety Monitoring Boards or others who monitor the data and safety of the study;
- There may be other people and/or organizations who may be given access to your personal health information, including health care providers at the USF Pediatric Clinic/Healthy Weight Clinic. Anyone listed above may use consultants in this research study, and may share your child's information with them. If you have questions about who they are, you should ask the study team. Individuals who receive your child's health information for this research study may not be required by the HIPAA Privacy Rule to protect it and may share your child's information with others without your permission. They can only do so if permitted by law. If your child's information is shared, it may no longer be protected by the HIPAA Privacy Rule.

By signing this form, you are giving your permission to use and/or share your child's health information as described in this document. As part of this research, USF may collect, use, and share the following information that include collection and analysis of the data obtained from the health record and E-KINDEX surveys.

- Your child's research record
- All of your child's past, current or future medical and other health records held by USF, other health care providers or any other site affiliated with this study as they relate to this research project.

You can refuse to sign this form. If you do not sign this form your child will not be able to take part in this research study. However, your child's care outside of this study and benefits will not change. Your authorization to use your child's health information will not expire unless you

revoke (withdraw) it in writing. You can revoke this form at any time by sending a letter clearly stating that you wish to withdraw your authorization to use your child's health information in the research. If you revoke your permission:

- Your child will no longer be a participant in this research study;
- We will stop collecting new information about your child;
- We will use the information collected prior to the revocation of your authorization. This information may already have been used or shared with others, or we may need it to complete and protect the validity of the research; and
- Staff may need to follow-up with your child if there is a medical reason to do so.

To revoke this form, please write to:

Principal Investigator Patricia Hall
For IRB Study # 00029711
3900 38th Way S.
St. Petersburg, FL 33711

While we are conducting the research study, we cannot let you see or copy the research information we have about your child. After the research is completed, you have a right to see the information about your child, as allowed by USF policies. You will receive a signed copy of this form.

Consent to Participate and Parental Permission for My Child to Participate in this Research Study and Authorization to Collect, Use and Share His/Her Health Information for Research

I freely give my consent take part and to let my child take part in this study and authorize that his/her health information as agreed above, be collected/disclosed in this study. I understand that by signing this form I am agreeing to take part in and to let my child take part in research. I have received a copy of this form to take with me.

Signature of Person and Parent of Child Taking Part in Study

Date

Printed Name of Person and Parent of Child Taking Part in Study

Statement of Person Obtaining Informed Consent

I have carefully explained to the person taking part in the study what he or she can expect from their participation. I confirm that this research subject speaks the language that was used to explain this research and is receiving an informed consent form in their primary language. This research subject has provided legally effective informed consent.

Signature of Person Obtaining Informed Consent

Date

Printed Name of Person Obtaining Informed Consent

APPENDIX E

ASSENT OF CHILDREN TO PARTICIPATE IN RESEARCH



Assent of Children to Participate in Research

Pro #00029711

Title of study: Validation of the Electronic Kids Dietary Index (E-KINDEX) Screening Tool for Early Identification of Risk for Overweight and Obesity (OW/OB) and Associations with Quality of Life Perceptions in a Pediatric Population

Why am I being asked to take part in this research?

You are being asked to take part in this research study because we want to learn about which habits of children cause a healthy weight and which ones cause too much weight. Our study also wants to learn how much a person's weight affects their feelings of well-being. If you take part in this study, you will be one of about 50 people at this site.

Who is doing this study?

The person in charge of this study is Patricia Hall, RN, PhD student. She is being guided in this research by Dr. Susan McMillan from the University of South Florida College of Nursing. However, other research staff may be involved and can act on behalf of the person in charge.

What is the purpose of this study?

By doing this study, we hope to learn about eating habits that are healthy and unhealthy, and how being overweight affects how a person feels about themselves.

Where is the study going to take place and how long will it last?

The study will be take place here at the clinic You will be asked to complete 2 questionnaires which will take about 15-30 minutes. That is all.

What will you be asked to do?

The E-KINDEX survey will ask you a series of questions regarding how frequently you eat certain foods, how frequently you eat at home or in restaurants, who you eat with, and if advertising affects your choices. Other questions are about how much you watch TV, play video games, and exercise or play sports.

The second survey will ask you questions about how you feel about yourself and your weight.

What things might happen if you participate?

To the best of our knowledge, your participation in this study will not harm you.

Although we have made every effort to try and make sure this doesn't happen, you may find some questions we ask may upset you. If so, we will tell you and your parents or guardian about other people who may be able to help you with these feelings.

Is there benefit to me for participating?

We cannot promise that you will receive benefit from taking part in this research study.

What other choices do I have if I do not participate?

You do not have to participate in this research study and may stop even after you have started filling out the survey.

Do I have to take part in this study?

You should talk with your parents or guardian and others about taking part in this research study. If you do not want to take part in the study, that is your decision. You should take part in this study because you want to volunteer.

Will I receive any compensation for taking part in this study?

You will receive a \$10.00 Target gift card for taking part in this study. If you stop participating before the study is over, the payment you receive will be based on the amount of time you were in the study. If you stop the study once you start it, the minimum compensation you will receive is a \$5.00 Target gift card.

Who will see the information about me?

Your information will be added to the information from other people taking part in the study so no one will know who you are.

No one, not even the people who are doing this study, will know that the information you provide comes from you.

Can I change my mind and quit?

If you decide to take part in the study you still have the right to change your mind later. No one will think badly of you if you decide to stop participating. Also, the people who are running this study may need for you to stop. If this happens, they will tell you when to stop and why.

What if I have questions?

You can ask questions about this study at any time. You can talk with your parents, guardian or other adults about this study. You can talk with the person who is asking you to volunteer by calling or texting Patricia Hall at 920-819-8854 or emailing phall@health.usf.edu. If you think of other questions later, you can ask them. If you have questions about your rights as a research participant you can also call the USF IRB at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu.

Assent to Participate

I understand what the person conducting this study is asking me to do. I have thought about this and agree to take part in this study. I have been given a copy of this form.

Name of person agreeing to take part in the study

Date

Printed name & Signature of person providing information (assent) to subject

Date

APPENDIX F

IMPACT OF WEIGHT ON QUALITY OF LIFE IN KIDS (IWQOL-KIDS) QUESTIONNAIRE

Please answer the following statements by circling the number that best applies to you in the past seven days. Be as open as possible. There are no right or wrong answers

| Physical Comfort | | ALWAYS TRUE | USUALLY TRUE | SOMETIMES TRUE | RARELY TRUE | NEVER TRUE |
|-------------------------|--|--------------------|---------------------|-----------------------|--------------------|-------------------|
| 1. | Because of my weight, I avoid using stairs whenever possible. | 1 | 2 | 3 | 4 | 5 |
| 2. | Because of my weight, it is hard for me to bend over to tie my shoes or to pick something up off the floor. | 1 | 2 | 3 | 4 | 5 |
| 3. | Because of my weight, it is hard for me to move around. | 1 | 2 | 3 | 4 | 5 |
| 4. | Because of my weight, it is hard for me to fit into seats in public places (e.g., movie theaters, desks at school, booths in restaurants). | 1 | 2 | 3 | 4 | 5 |
| 5. | Because of my weight my knees or ankles hurt. | 1 | 2 | 3 | 4 | 5 |
| 6. | Because of my weight, it is hard for me to cross my legs. | 1 | 2 | 3 | 4 | 5 |

| Body Esteem | | ALWAYS TRUE | USUALLY TRUE | SOMETIMES TRUE | RARELY TRUE | NEVER TRUE |
|--------------------|--|--------------------|---------------------|-----------------------|--------------------|-------------------|
| 7. | Because of my weight, I am ashamed of my body. | 1 | 2 | 3 | 4 | 5 |
| 8. | Because of my weight, I don't like myself very much. | 1 | 2 | 3 | 4 | 5 |
| 9. | Because of my weight, I try not to look at myself in mirrors or in photographs. | 1 | 2 | 3 | 4 | 5 |
| 10. | Because of my weight, I have a hard time believing compliments that I receive from others. | 1 | 2 | 3 | 4 | 5 |
| 11. | Because of my weight, I am lacking in self-confidence. | 1 | 2 | 3 | 4 | 5 |
| 12. | Because of my weight, I avoid activities that involve wearing shorts or a bathing suit. | 1 | 2 | 3 | 4 | 5 |
| 13. | Because of my weight, it is very difficult for me to buy clothing. | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|-----|--|---|---|---|---|---|
| 14. | Because of my weight, I don't like to change my clothes or undress in front of others. | 1 | 2 | 3 | 4 | 5 |
| 15. | Because of my weight, I am embarrassed to try out for activities at school. | 1 | 2 | 3 | 4 | 5 |

| Social Life | | ALWAYS TRUE | USUALLY TRUE | SOMETIMES TRUE | RARELY TRUE | NEVER TRUE |
|--------------------|---|--------------------|---------------------|-----------------------|--------------------|-------------------|
| 16. | Because of my weight people tease me or make fun of me. | 1 | 2 | 3 | 4 | 5 |
| 17. | Because of my weight people talk about me behind my back. | 1 | 2 | 3 | 4 | 5 |
| 18. | Because of my weight people avoid spending time with me. | 1 | 2 | 3 | 4 | 5 |
| 19. | Because of my weight people stare at me. | 1 | 2 | 3 | 4 | 5 |
| 20. | Because of my weight, I have trouble making or keeping friends. | 1 | 2 | 3 | 4 | 5 |
| 21. | Because of my weight people don't think I'm very smart. | 1 | 2 | 3 | 4 | 5 |

| Family Relations | | ALWAYS TRUE | USUALLY TRUE | SOMETIMES TRUE | RARELY TRUE | NEVER TRUE |
|-------------------------|--|--------------------|---------------------|-----------------------|--------------------|-------------------|
| 22. | Because of my weight family members treat me differently from the way they treat other people. | 1 | 2 | 3 | 4 | 5 |
| 23. | Because of my weight family members talk about me behind my back. | 1 | 2 | 3 | 4 | 5 |
| 24. | Because of my weight one or more people in my family reject me. | 1 | 2 | 3 | 4 | 5 |
| 25. | Because of my weight my parents aren't proud of me. | 1 | 2 | 3 | 4 | 5 |
| 26. | Because of my weight family members make fun of me. | 1 | 2 | 3 | 4 | 5 |
| 27. | Because of my weight family members don't want to be seen with me. | 1 | 2 | 3 | 4 | 5 |

APPENDIX G

DEMOGRAPHIC QUESTIONNAIRE: E-KINDEX

PARENT-CHILD DYAD NUMBER _____

We live in the: _____ City _____ Country

Parent 1:

Gender: _____ Female _____ Male _____ Other

I feel our family eating habits are:

Good: _____ Very Good: _____ Average: _____ Need Improvement: _____

Height: _____ Weight: _____ Age: _____

Parent 2:

Gender: _____ Female _____ Male _____ Other

I feel our family eating habits are:

Healthy: _____ Mostly Healthy: _____ Somewhat Healthy: _____ Not Healthy: _____

Height: _____ Weight: _____ Age: _____

Child:

Gender: _____ Female _____ Male _____ Other

I feel our family eating habits are:

Good: _____ Very Good: _____ Average: _____ Need Improvement: _____

Height: _____ Weight: _____ Age: _____

APPENDIX H

ELECTRONIC KIDS DIETARY INDEX QUESTIONNAIRE

Please answer the following statements by drawing a circle around how often you think each statement is true for you **all the time**. There are no wrong answers.

Food Groups E-KINDEX

| | | | | | |
|-----|--|-------|-----------|-----------|----------------|
| 1. | In the past 7 days, I have eaten Bread | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 2. | In the past 7 days, I have eaten grains besides bread (rice, pasta, mac and cheese for example) | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 3. | In the past 7 days, I drank fruit juices and ate whole fruits | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 4. | In the past 7 days, I have eaten vegetables | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 5. | In the past 7 days, I drank milk and ate yogurt | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 6. | In the past 7 days, I have eaten legumes: (seeds, nuts, black beans) | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 7. | In the past 7 days, I have eaten fish and seafood | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 8. | In the past 7 days, I have eaten meat (chicken, beef, pork for example) | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 9. | In the past 7 days, I have eaten salted and smoked meats and foods (packaged deli meats, hot dogs, bacon for example). | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 10. | In the past 7 days, I have sweets and junk foods (candy, potato chips, Doritos for example) | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 11. | In the past 7 days, I drank soda or sugary drinks | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 12. | In the past 7 days, I have eaten foods that are fried | Never | 1-2 times | 3-5 times | ≥ 6 times |
| 13. | In the past 7 days, I have eaten foods that are grilled | Never | 1-2 times | 3-5 times | ≥ 6 times |

APPENDIX I

ELECTRONIC KIDS DIETARY INDEX

Please answer the following statements by drawing a circle around how often you think each statement is true for you **all the time**. There are no wrong answers.

Dietary Behaviors E-KINDEX

| | | | | | |
|----|--|-------|-----------|-------|------------|
| 1. | I think my diet is healthy | Never | Sometimes | Often | Very often |
| 2. | I think my weight is above normal | Never | Sometimes | Often | Very often |
| 3. | I have tried to be on a diet | Never | Sometimes | Often | Very often |
| 4. | I feel guilty when I eat something that is not healthy | Never | Sometimes | Often | Very often |
| 5. | I feel guilty when I eat something I know is fattening | Never | Sometimes | Often | Very often |
| 6. | My parents want me to eat all my food, clean my plate. | Never | Sometimes | Often | Very often |
| 7. | I eat something I like even if I am not hungry | Never | Sometimes | Often | Very often |
| 8. | I eat things I know are fattening | Never | Sometimes | Often | Very often |

APPENDIX J

ELECTRONIC KIDS DIETARY INDEX

Please answer the following statements by drawing a circle around how often you think each statement is true for you **all the time**. There are no wrong answers.

Dietary Habits E-KINDEX

| | | | | | |
|----|--|-----------------|------------------------|-------------------------|-------------------------|
| 1. | I eat breakfast | Almost daily | 2 to 4 times in a week | Once a week | 1 to 3 times in a month |
| 2. | I have eaten in a fast food or other restaurant in the past 2 days | Never | Once | 2 or more times | |
| 3. | I eat my least favorite food if I know it is healthy | Almost daily | 1 to 4 times in a week | 1 to 3 times in a month | Seldom |
| 4. | I eat meals with my family | Almost daily | 1 to 4 times in a week | 1 to 3 times in a month | Seldom |
| 5. | I eat meals by myself | Almost daily | 1 to 4 times in a week | 1 to 3 times in a month | Seldom |
| 6. | I eat snacks in school | Almost daily | 1 to 4 times in a week | 1 to 3 times in a month | |
| 7. | I eat this number of snacks and meals every day | 2 to 3 in a day | 4 to 5 in a day | More than 6 in a day | |
| 8. | I eat some foods because they are advertised | Yes | No | | |
| 9. | I eat whatever foods are prepared in my home | Yes | No | | |

APPENDIX K

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE SCORING PROTOCOL

IPAQ is a categorical score.

Three categories of physical activity were defined for the IPAQ short.

Category One - Low physical activity level:

- Those individuals who did not meet criteria for categories two or three below were put in this category and considered to have a low physical activity level.

Category Two: Moderate physical activity level:

- At least 30 minutes of vigorous intensity activity per day for three or more days per week
OR
- At least 30 minutes of moderate intensity activity per day for 5 or more days per week
OR
- Five or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum Total physical activity of at least 600 MET minutes per week.

Category Three- High physical activity level:

- Vigorous-intensity activity on at least three days achieving a minimum total physical activity of at least 1500 MET-minutes per week OR
- Five or more days of any combination of walking, moderate-intensity or vigorous intensity activities achieving a minimum total physical activity of at least 3000 MET-minutes per week.

APPENDIX L

SCREEN TIME QUESTIONNAIRE

Please answer the following statements by drawing a circle around the number of hours every day you usually spend doing the following activities. Please try to be correct. There are no right or wrong answers

Sedentary Behaviors

| | | | | | | | |
|----|--|------|------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1. | I usually watch TV | None | Less than 1 hour a day | Less than 2 hours a day | Less than 3 hours a day | Less than 4 hours a day | More than 4 hours a day |
| 2. | I usually am on the computer (include watching videos, playing video games, browsing websites, and doing homework) | None | Less than 1 hour a day | Less than 2 hours a day | Less than 3 hours a day | Less than 4 hours a day | More than 4 hours a day |
| 3. | I usually talk or message on the phone | None | Less than 1 hour a day | Less than 2 hours a day | Less than 3 hours a day | Less than 4 hours a day | More than 4 hours a day |
| 4. | I usually listen to music | None | Less than 1 hour a day | Less than 2 hours a day | Less than 3 hours a day | Less than 4 hours a day | More than 4 hours a day |
| 5. | I am usually in the car or bus | None | Less than 1 hour a day | Less than 2 hours a day | Less than 3 hours a day | Less than 4 hours a day | More than 4 hours a day |

APPENDIX M

LETTER OF SUPPORT USF PEDIATRIC CLINIC



February 10, 2017

Ms. Patricia Hall
phall@health.usf.edu
12901 Bruce B. Downs Blvd., MDC 22
Tampa, FL 33612

Dear Ms.Hall:

I have reviewed your proposed research entitled, "Validation of the Electronic Kids Dietary Index (E-KINDEX) Screening Tool for Early Identification of Risk for Overweight and Obesity (OW/OB) and Associations with Quality of Life in a Pediatric Population".

I understand that your study that will involve recruitment of 50 to75 participants aged 10 to 18 who, with their parents, agree to complete 2 questionnaires, E-KINDEX and IWQOL-Kids. These surveys, Electronic Kids Dietary Index and Impact of Weight on Quality of Life in Kids are 30 and 27 items respectively, and, along with a short demographics form, can be completed in less than 30 minutes.

I support this research endeavor. Please feel free to contact me if there any questions or concerns.

Sincerely,

A handwritten signature in black ink, appearing to read "DEN".

Denise Edwards, MD
Assistant Professor of Pediatrics and Internal Medicine
Director, USF Healthy Weight Clinic
USF Morsani College of Medicine

UNIVERSITY OF SOUTH FLORIDA
DEPARTMENT OF PEDIATRICS • COLLEGE OF MEDICINE • INTERNAL MEDICINE AND PEDIATRICS
South Tampa Center for Advanced Health Care • 2 Tampa General Circle, 2nd Floor • Tampa, FL 33606-3475
(813) 259-8700 • FAX (813) 250-2101 • www.myhealthcare.usf.edu

APPENDIX N

IRB APPROVAL



RESEARCH INTEGRITY AND COMPLIANCE
Institutional Review Boards, FWA No. 00001669
12901 Bruce B. Downs Blvd., MDC035 • Tampa, FL 33612-4799
(813) 974-5638 • FAX(813)974-7091

5/17/2017

Patricia Hall
College of Nursing
3900 38th Way S
St. Petersburg, FL 33711

RE: Expedited Approval for Initial Review

IRB#: Pro00029711

Title: Validation of the Electronic Kids Dietary Index (E-KINDEX) Screening Tool for Early Identification of Risk for Overweight and Obesity (OW/OB) and Associations with Quality of Life Perceptions in a Pediatric Population

Study Approval Period: 5/15/2017 to 5/15/2018

Dear Ms. Hall:

On 5/15/2017, the Institutional Review Board (IRB) reviewed and **APPROVED** the above application and all documents contained within, including those outlined below.

Approved Item(s):

Protocol Document(s):

[Protocol Guidelines E-KINDEX for expedited IRB application](#)

Consent/Assent Document(s)*:

[AssentForm 5/1/2017.pdf](#)

[E-KINDEX SB Adult Minimal Risk Consent >18 years.pdf](#)

[E-KINDEX SB Combined Consent and Parental Permission with HIPPA 5/10/2017.pdf](#)

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve

only procedures listed in one or more of the categories outlined below. The IRB may review research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(5) Research involving materials (data, documents, records, or specimens) that have been collected, or will be collected solely for nonresearch purposes (such as medical treatment or diagnosis).

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Research Involving Children as Participants: 45 CFR 46, Subpart D

This research involving children as participants continues to be approved under 45 CFR 46.404: Research not involving greater than minimal risk.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John Schinka, Ph.D., Chairperson
USF Institutional Review Board

ABOUT THE AUTHOR

Patricia Ann Hall received an Associate Degree in Nursing from Northeastern Wisconsin Technical Institute in 1980, and a Bachelor of Science Degree from the University of South Alabama in 2004. Her clinical experience includes specialization in cardiac critical care, and Critical Care Transport Team to include fixed and rotor wing transport of critical care patients for EAGLE III (Emergency and Ground Life Express) in Green Bay, Wisconsin. After earning the Master's Degree in Nursing with a Specialty in Health Science Education from the University of Phoenix, Ms. Hall joined the faculty of the University of South Florida College of Nursing as an instructor in the undergraduate program. Her teaching and research interests continue to focus on pediatric obesity and cardiac intensive care.