

A CHILDHOOD OBESITY PREVENTION INITIATIVE: LEARNING FROM PARENTS BY  
IDENTIFYING KNOWLEDGE, ATTITUDES AND BARRIERS RELATED TO  
CHILDHOOD OBESITY

A THESIS

SUBMITTED IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF MASTERS OF SCIENCE  
IN THE GRADUATE SCHOOL OF THE  
TEXAS WOMAN'S UNIVERSITY

DEPARTMENT OF NUTRITION  
COLLEGE OF HEALTH SCIENCES

BY:

DANIELLE OLDENBURG, B.Sc.

DENTON, TEXAS

DECEMBER 2011

## ACKNOWLEDGEMENTS

I would like to express extreme gratitude to Dr. Brigitte Vittrup for her guidance, brilliance, and patience while leading this research project. The amount of time and support she bestowed upon me, a student from a different department, surpassed any and all expectations. Her intellect, experience, and patience have been central to the success of my thesis work.

I would also like to thank Dr. Owen Kelly, Dr. Nancy DiMarco, and Dr. Parakat Vijayagopal for serving on my thesis committee. All of you have provided invaluable guidance regarding this project, as well personally and professionally. I have enjoyed this experience alongside this committee.

I am grateful to have wonderful best friends, Kayse Boling and Darren McClure, who have accompanied me through hundreds of hours of studying and preparation for this project. The companionship alone was more than uplifting. Both of you have motivated me and helped me towards the finish line in many ways.

Lastly, I would like to thank my parents. I have no doubt that if my father, Tim Oldenburg, had never come into my life, I would not be pursuing this degree today. I enjoy the intellectual connection and likes we share. Thank you Dad for all of the years of support and virtuous influence you have given me. Thank you to my mother, Alice Oldenburg, for overcoming momentous obstacles in her life to create a better life for me. Every day when I count my blessings, I count her first, because everything else stems from her. And to John Johnston, thank you, John, for the continuous support you give me, with absolutely no obligation to do so.

## ABSTRACT

DANIELLE OLDENBURG

### A CHILDHOOD OBESITY PREVENTION INITIATIVE: LEARNING FROM PARENTS BY IDENTIFYING KNOWLEDGE, ATTITUDES AND BARRIERS RELATED TO CHILDHOOD OBESITY

DECEMBER 2011

Childhood obesity prevalence is rising all over the world. Excess caloric intake and decreased energy expenditure cause obesity over time. Health problems caused by childhood obesity are affecting children and adults. Parents and caregivers are often responsible for providing meals and shaping lifestyles of children. Parents were recruited from childcare centers in Texas and asked to complete an online survey. SPSS was used for statistical analysis. Fifty-eight participants completed the survey. Over 90% of parents were able to identify risks of childhood obesity. Almost all (87.7%) were likely to correctly state or overestimate current childhood obesity prevalence. However, participants felt that parents were the most responsible party. Parents stated time and cost as major barriers. Taste was most important when buying food ( $M=4.50$ ). Results show that parents are aware of the childhood obesity epidemic and the role that they play in it, but are not correcting the problem at home.

## TABLE OF CONTENTS

	Page
ACKNOWLEDGEMENTS.....	iii
ABSTRACT.....	iv
LIST OF FIGURES.....	vii
Chapter	
I. INTRODUCTION.....	1
Theoretical Perspective.....	1
Purpose.....	5
Hypotheses.....	5
II. LITERATURE REVIEW.....	7
Definition.....	7
Trends and Prevalence.....	8
Problems in Childhood.....	8
Implications for Adults Problems.....	13
Economic Problems.....	15
General Causes.....	15
Parents and Family.....	16
Diet.....	18
Physical Activity.....	24
Parental Knowledge.....	33
Parental Attitude.....	36
III. METHODOLOGY.....	40
Participants.....	40
Instrument Development.....	41
Procedure.....	44
Statistical Analysis.....	44
IV. RESULTS.....	45
Weight Characteristics.....	45
Food and Mealtime Characteristics.....	45
Influences on Meal Decision Making.....	46
Activity Level.....	48
Weight Concern.....	48
Knowledge Components.....	48
Contributors to Childhood Obesity.....	48

	Influences on Meal Decision Making.....	47
	Activity Level.....	48
	Weight Concern .....	48
	Knowledge Components.....	49
	Contributors of Childhood Obesity.....	49
	Perceived Barriers.....	50
	Prevention Efforts.....	50
V.	DISCUSSION.....	54
VI.	SUMMARY AND CONCLUSIONS.....	60
	REFERENCES.....	63
APPENDICES		
	Appendix A Data Set Tables.....	71
	Appendix B Recruitment Flyer.....	75
	Appendix C Questionnaire Used in this Study.....	77

## LIST OF FIGURES

FIGURES:	Page
1. Levels of parental weight concern for self and child.....	61
2. Parental weight control measures for self and child.....	61

## CHAPTER I

### INTRODUCTION

Childhood obesity is rising in incidence and prevalence all over the world (Dehghan, Akhtar-Danesh, & Merchant, 2005). Children are suffering more and more from serious diseases previously seen mainly in adults. These diseases include but are not limited to heart disease, diabetes, liver disease, and cancer (Abrams, 2008; Pietrobelli, Espinoza, & Cristofaro, 2008, and Weiderpass, Braaten, Magnusson, Kumle, Lund, & Adami, 2004). Because obesity is often the result of a lifetime of habits, it is essential to prevent obesity at a young age.

Obesity is caused by excess caloric intake and decreased energy expenditure over time. This can cause an excess of body fat that affects physical and/or mental health. Health problems caused by obesity are no longer a worry just for adults. More and more children are being affected in childhood by chronic disease as a result of excess obesity. Aside from health issues, childhood obesity can cause social, psychological, and economic hardships as well.

Parents and caregivers are often responsible for providing meals and shaping the lifestyle of children. It is essential to understand how parents feel about childhood obesity and diet related issues in order to combat childhood obesity. Assessing knowledge of parents may reveal disparities and create opportunities for future prevention plans. Most importantly, assessing barriers through the eyes of the parents can provide specific areas for intervention.

#### **Theoretical Perspective**

The ecology of childhood obesity stems from the relationships between humans and the relationships between humans and their environment. These relationships influence psychosomatic, cultural, and social behaviors of humans, with children being especially susceptible.

Bronfenbrenner introduces a bioecological theory in which there are five fundamental elements that compose the ecological structure that envelop humans (Berns, 2007). The microsystem, mesosystem,

exosystem, macrosystem, and chronosystem are realms of the environment that organize and dictate human development and life regimens, including diet and exercise.

1. The most basic level of Bronfenbrenner's theory is the microsystem. Microsystems are the most direct, and most important, relationships a child can have. Berns (2007) lists these relationships: child and family, child and peers, child and school, child and community, media, and all things that the child is directly involved with.
  - a. **Child and Family:** The family setting bestows an assortment of opportunities for the child, while simultaneously nurturing the child. The family plays the most important role in the child's development. Parents may be extraordinary food and health role models for children and/or may provide healthy foods for the child. Families may provide abundant opportunities for physical activity or exposition of health education. Regarding childhood obesity, the family situation may be reverse. Children may develop an over-eating disorder or stress-eating habits in a dysfunctional, abusive, or absent family setting. There are many ways the family can affect a child's health status.
  - b. **Child and Peers:** The peer setting is an environment in which children acquire a sense of self without adult influence through companionship. Children may assimilate likes and dislikes from watching their peers make decisions. Peers are a support system for the child. Food and activity choices can be highly influenced by a child's peers. A child's friends may support healthy or unhealthy habits. A group of friends may all decide to start an athletic team, while another group of friends may bond over food regularly. The sole reason a child participates in either of these two scenarios may be peer participation. Whether positive or negative, peers can influence food and activity choices that may become life habits.
  - c. **Child and School:** The school is a developmental setting for children regarding formal education. Schools provide a rigid learning environment that is infused with

rewards, motivation, and punishments. A school may or may not choose to have a mandatory health and/or nutrition classes for students. Schools also provide lunches, and sometimes breakfast. The food choices that students make at school will often be daily, even if they opt to bring a lunch from home. These selections may become routine. Schools may also choose to have required physical education classes and/or recess. Infusing activity into a child's life daily can be a positive habit forming technique, but it is not required.

- d. **Child and Community:** Whether or not patrons and neighbors are utilizing these resources can also affect a child's choices. Certain communities may be filled with fast food options, and/or lack safe places for children to play and exercise. Communities can respond to this by initiating change, or they may not. This creates the community setting for the child.
- e. **Child and Media:** Technology has spawned a great deal of new activities for children, including: books, music, television, video games, and computers. The media can be an avenue of modeling for a child. The media can be an opportunity of influence for the child. It can even be an educational pathway for children. The media can be a positive or negative influence for a child concerning childhood obesity. Advertisements may influence types of foods children want to eat, healthy or unhealthy. There may be shows or games that influence physical activity, such the Wii game system. However, the media is currently criticized for portraying unrealistic and unhealthy body types. Interestingly, Berns (2007) states that computers are also a gateway for relationships to form, through messenger and email programs. The media can influence a child greatly, especially with rapid and rising exposure to the above technological innovations.

- 2. The mesosystem is the element of connections between microsystems. Connections may exist between parents and school.

3. The exosystem is the next realm of the macrosystem. The macrosystem dictates what will be in the exosystem. The exosystem is honed down to the direct settings that surround a child. A child does not directly participate in the portion of his/her environment that is considered the exosystem, but the child is still affected by these circumstances. Berns (2007) gives the following exosystem examples: the parent's social network, parent's jobs, and the city government. The parent's social atmosphere may affect parenting style and rules of the household. The parental employment setting and coworkers may guide parenting styles. The city government can regulate zoning, including the location and amount of industries in relation to residential areas. If the parent has a high-demand, time-consuming job, and so does his/her peers, the parenting style may be fast-paced and stern. For these reasons, convenience foods may be a way of life for some children, without the option to choose anything different. An urban setting, including a voluminous industry and escalated amounts of roadways, may exacerbate the demand for convenience food. An urban setting may also hinder opportunities for physical activity by having limited access to community parks, decreased access to recreational opportunities, and increased exposure to fast food. The community regulates the direct resources a child has. The distance of grocery stores, fast food restaurants, and parks can influence food and activity opportunities for a child.
4. The macrosystem is the most all-encompassing level of the Bronfenbrenner model. The civilization and culture in which a human exists, and all resulting components, make up the macrosystem. The macrosystem is distinguished by fractions of reality that guide the exosystems, mesosystems, and microsystems. These elements include: way of life (culture and economics), patterns of community interaction (politics, economics, and technology), belief structures (religion and morals), and life transformation. Berns (2007) gives examples of the macrosystem including: the United States, Hispanic ethnicity, lower class, and Catholicism. Economically, the United States is a competitive capitalist nation. Culturally, the United States is very diverse and a large mix of traditions from across the world. The foods

and food choices available depend upon demand and business successes. A lower class family in the United States may resort to processed and fast food choices due to price. These food choices are often high in calories. A Hispanic family may resort to foods from their culture, which can include large, high calorie meals. Regimented Catholics who attend church weekly or biweekly may bond through worship and family meals often. Differences in macrosystems between people affect the way that an individual will behave, reason, consider, evaluate, and perceive the world. Unconscious beliefs can be engrained into a person or child in the macrosystem. Beliefs and practices regarding health, body image, food and physical activity are no exception. Adaptivity is a key component of the macrosystem.

5. The final realm of ecological structure is the chronosystem. The chronosystem are changes over time. For example, as the environment changes, humans will discover ways to survive, move forward, and advance society. Humans must eat to survive, people will eat what they can afford, and they will weigh their priorities to fit their life and needs. There are many situations in which a stable income and need for time will surpass a person's want for a healthier lifestyle.

Our study is one part of a larger study that is examining four groups of people who affect children's lives: parents, physicians, school administrators, and legislatures. Determining beliefs of these four groups will incorporate the microsystems, mesosystems, exosystems, and macrosystems of Broffebrenner's ecological theory.

### **Purpose**

The purpose of this research study is to determine the attitudes, knowledge, barriers, and support of prevention programs regarding childhood obesity as seen from the family setting.

### **Hypotheses**

- H<sub>1</sub> There will be significant differences in child food and mealtime characteristics between normal weight, overweight, and obese parents as measured by a one-day dietary recall.
- H<sub>2</sub> There will be significant differences in child food and mealtime characteristics between normal

weight, overweight, and obese children as measured by a one-day dietary recall.

- H<sub>3</sub> Cost will be the most significant influence on food purchases stated by parents.
- H<sub>4</sub> There will be a relationship between concern for one's own weight and concern for one's child's weight as measured by self-report.
- H<sub>5</sub> Childhood obesity knowledge will be low among parents as measured by correctly naming childhood obesity health risks and determining prevalence of childhood obesity in the US.
- H<sub>6</sub> Themes of barriers to childhood obesity will emerge from participants as measured by self-report.
- H<sub>7</sub> Themes of barriers to childhood obesity will emerge from participants as measured by self-report.

**Assumptions.** For this study, we assumed that childcare centers would distribute flyers as promised. We also anticipated that recipients of the flyer had access to a computer. We assumed that participants would answer honestly and to the best of their knowledge. Regarding the questionnaire, we assumed that it was suitable to obtain data. More specifically, in the questionnaire we assumed barriers to childhood obesity, proposed prevention efforts, responsible parties, and possible contributors to childhood obesity.

**Limitations.** All answers given by participants were self-reported. Participants may or may not answer truthfully.

**Delimitations.** Because participants were recruited from a small area in Texas, the results cannot be generalized to parents in other locations. All quantitative data was measured only by self-report. No terms in the survey were defined, leaving definitions to vary among participants. Surveys that were not completed were excluded from our study.

## CHAPTER II

### LITERATURE REVIEW

#### **Definition**

The words 'obesity' and 'overweight' have a wide range of meanings. The definition of childhood obesity has varied between audiences over the decades. Childhood obesity may be defined differently depending upon country or organization. It can be defined in a basic way, indicating that an obese child has excess body fat (Dehghan et al., 2005). The amount of extra body fat is debatable, but in general it is thought to be enough to cause physical and emotional health issues (James, 2004). It can also be defined in a more specific way, like a BMI greater than the 95th percentile for age/gender (Krebs, et al., 2007). It is important to precisely define the terms 'obesity' and 'overweight', because of the health problems that can generate from these weight issues. However, it is somewhat difficult to do this because children's body types are so different and change so rapidly. The measurements of childhood obesity are discussed below. In this paper, the term 'obese' will be defined by the Center for Disease Control (CDC) Body Mass Index (BMI) charts. These charts can be accessed online at: [http://www.cdc.gov/growthcharts/clinical\\_charts.htm](http://www.cdc.gov/growthcharts/clinical_charts.htm).

Unlike the definition of childhood obesity, there are much more defined practices to measure or diagnose childhood obesity. There are many ways to measure body fat, including underwater weighing, magnetic resonance imaging, skinfold thickness measuring, and bioelectrical impedance (Dehghan et al., 2005). However, it is unlikely that parents, schools, and/or health care providers will have these resources for use in normal child health screenings.

Waist circumference is a measurement that has growing research behind it (Krebs et al., 2007). It is a set of measurements that assess the most dangerous type of excess body fat: visceral. Visceral, or central body fat, is a specific risk factor for coronary heart disease and type II diabetes mellitus (Dehghan et al., 2005). There is not sufficient data to set specific waist circumference cut off points to create weight categories at this time (Krebs et al., 2007). Although waist circumference may be a useful tool in

measuring obesity in adults, it is unlikely that it will be useful for childhood obesity. The body types of prepubescent children are not reliable for this method.

### **Trends and Prevalence**

Childhood obesity is a growing epidemic in the developing world. Childhood obesity, along with its prevention and treatment has been compared to epic public health problems like smoking (Klein & Dietz, 2010). Childhood obesity is a multifaceted problem that is in dire need of a multifaceted solution.

Incidence of childhood obesity is seen in developed countries, but developing countries' childhood obesity prevalence are rising as well (Dehghan, et al., 2005). The increased prevalence of obese children continues in the United States, Canada, Germany, France, Finland, the United Kingdom, and China (Daniels et al., 2005). In the United States, approximately 25% of children are overweight (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). In 2008, the estimate of children who are obese was up to 16.9%. Interestingly, the percentage of obese children in the older age group was higher, indicating that the younger children (ages 0-5) may be significantly reducing the statistic. Starting at age 6, the percentage of obese children is 19.6% through age 11 (Ogden et al., 2010).

In the U.S., Greece, Japan, the United Kingdom, Spain, and France, childhood obesity has been generally increasing (Dehghan et al., 2005). Trends also emerge in age, gender, and ethnic categories of children. Younger children are much less likely to be overweight or obese than adolescents. In one study using National Health and Nutrition Examination Survey (NHANES) data, Mexican American boys, between the ages of 2 and 19 were more likely to be overweight or obese than girls (Ogden et al., 2010). At all levels, non-Hispanic black girls were more likely to have higher body mass index (BMI) than other females.

### **Problems in Childhood**

The rapid increase in both childhood and adult obesity has pushed the obesity problem to the forefront of the public's conscience. It has been stated that children and adolescents who are obese have an increased risk of developing cardiovascular problems, liver disease, and diabetes (McBride, 2010). However, it seems that prevention programs to keep the obesity epidemic from skyrocketing have only just

begun. First, it necessary to understand the health and psychosocial issues that can negatively affect their life spans in order to understand why prevention programs aimed at children are so important.

Must and Strauss (1999) have stated that there are few organ systems that pediatric obesity does not affect. Even a young child can suffer from gallstones, sleep apnea, and cardiovascular risk if obese. Due to the presence of un-fused growth plates, obese children are also subject to orthopedic abnormalities, such as Blount's disease. An increase in bronchial hyperactivity among children has also been linked to obesity and may possibly be related to decreased physical activity tolerance in children, who are already at risk. Kidney and urinary issues, such as gallstones are seen more often in obese children, when compared to their healthy counterparts. For girls, menstrual abnormalities are commonly found among the obese. Girls have been observed to experience menarche before the age of 10, or have late or absent menstruation due to obesity. Polycystic ovary syndrome patterns have also been described in increasing amounts among obese girls. Yet, one of the most alarming facts researchers have found among obese children is that many of them have elevated blood pressure that can lead to cardiovascular disease in later life. Biro and Wien (2010) stated that obesity in childhood and adolescence brings about early puberty, earlier menarche, type 2 diabetes, metabolic syndrome in teens and adults, and obesity in adulthood.

Weiss, Shaw, Savoye, and Caprio (2009) conducted a cross-sectional study on 186 obese adolescents (106 females and 80 males) ranging from 6-18 years at baseline. All the children were obese, with a BMI at or higher than the 95th percentile for age and gender, and met the criteria for the risk of metabolic syndrome (MS), which is defined as a combination of cardiovascular risk factors. Obese children who maintained or lost some weight did not increase their risk of developing cardiovascular issues. However, those whose weight increased, which is common among severely obese youth, showed increased components of MS which potentially could lead to the diagnosis of MS.

Many risk factors have been recognized as contributors to cardiovascular disease (CVD) in obese individuals. These risks are often related to unhealthy diets, physical inactivity, and obesity (Rees, Thomas, Brophy, Knox & Williams, 2009). In a study by Cruz, Shaibi, Weigensberg, Spruijt-Metz, Ball,

and Goran (2005), the prevalence of type 2 diabetes, MS, polycystic ovarian syndrome, nonalcoholic fatty liver disease were all studied among obese children with crucial results.

The incidence of type 2 diabetes, once thought of as adult onset diabetes, has been increasing among obese youth. In the United States, there has been a significant increase in type 2 diabetes among minority populations, such as African Americans and Hispanics (Dabelea, Pettitt, Jones, & Arslanian, 1999). Therefore, it is important to understand that ethnic minorities might be at higher risk for developing type 2 diabetes when obese during childhood. Cruz et al. (2005) showed that 30% of Hispanic children with BMI's in the 85th percentile or higher were described as having MS. Thus, MS can be linked to obesity during childhood.

Nonalcoholic fatty liver disease is described as encompassing the whole spectrum of liver diseases (Cruz et al., 2005). Unfortunately, this is the most common liver disease in the United States and can also be directly linked to childhood obesity, particularly in those children who are obese and have type 2 diabetes (Clark, Brancati, & Diehl, 2002).

Overall, it must be noted that serious adverse health situations are seen in our obese youth today. As previously mentioned, childhood obesity has been linked to many negative health conditions which include: type 2 diabetes (thought to be adult onset until recently), metabolic syndrome, liver disease, and cardiovascular health risks. While these negative health outcomes are commonly mentioned, one must also remember the psychosocial issues that obese children are facing such as: self-esteem issues, peer problems, anxiety and depression.

According to Schwimmer, Burwinkle, and Varni (2003) obesity in childhood is considered to be one of the most stigmatizing and least socially acceptable conditions. Often times, these overweight and obese children are stigmatized due to beliefs and attitudes that are manifested through stereotypes, bias, and rejection from peers (Puhl & Latner, 2007). It is important to note, however, that these obese children are not just victims of social stigmas, but are also at a greater risk for peer victimization. According to Puhl and Latner (2007), peer victimization can either be physical (such as kicking and punching), or relational

(such as gossiping, teasing, and excluding). It is important to realize that negative beliefs from peer groups can impact the social development of obese youth.

Due to the social stigma overweight and obese children often endure, it has been argued that self-esteem and self-perception can be affected (Phillips & Hill, 1998). Lower self-esteem, therefore, might result in a situation where children lack the psychological resources to engage in health promoting behaviors that could increase their well-being. In a study by McCullough, Muldoon, & Dempster (2009), the self-perception/self-esteem of overweight and obese children was examined. A cross-sectional survey was administered to 211 eight and nine year olds, attending 6 mainstream primary schools in northern Belfast. The Self-Perception Profile for Children questionnaire assessed the children's self-perceptions of themselves, body mass index was recorded, and socioeconomic status was determined. The aim of the study was to examine the relationship between obesity and self-esteem in children through domains of their own self-perception. Results from this study showed that increased BMIs in children were associated with both lower self-perceptions of social acceptance by peers, as well as, more negative thoughts about their physical appearance. Many overweight and obese children are suffering from social stigmas and rejection by peers due to their weight. Alarming, overweight and obese impoverished, or lower socioeconomic children, are at an increased risk of having lower self-perceptions than their normal weight counterparts, as well as, their higher socioeconomic obese counterparts.

While parental support can help negate negative self-perceptions due to negative peer relationships in overweight and obese children, one must be aware that children with chronic health conditions, such as obesity, face numerous challenges that their healthy peers do not. Often times, these chronic health issues can lead to difficult peer relationships. Therefore, McCarroll, Lindsey, MacKinnon-Lewis, Chambers, and Frabutt (2009) examined children's health status and the quality of their peer relationships. Specifically, the researchers considered the children's level of social contact with peers, self-esteem, and social anxiety to determine if these characteristics affected the quality of peer relationships. The research sample included 268 children (138 boys and 130 girls), ages 11-12 years old. Family demographics, children's health status, peer contact, self-esteem, social anxiety, children's weight status, teacher reports, and

children's peer relationships were all measured during this study. Findings from this study were consistent with previous work. Chronically ill children were reported to engage in less pro-social behavior than their healthy counterparts. More specifically, chronically ill children reported less social contact with their peers. Physical limitations from diabetes and obesity may be a cause for the lower amounts of social contact. However, McCarroll et al. found that social stigma and stereotypical beliefs also might inhibit chronically ill children from interacting socially with their peers. McCullough et al. (2009) agreed with these findings, stating that often times, overweight and obese children suffer from social stigma and rejection from peers due to their weight status. Due to this potential rejection by peers, McCarroll et al. (2009) considered chronic illness a stressor that could increase a child's anxiety level when interacting with others.

Current links have found that experiencing peer victimization and rejection can lead to depressive symptoms in children. Researchers have found that obese children are more often targets of peer victimization than their non-obese peers. Adams and Bukowski (2008) conducted a study to see if obesity in childhood led to higher levels of depressive symptoms. Utilizing data from the National Longitudinal Survey of Children and Youth, the current study examined self-reports of peer victimization, physical descriptions, BMI, and depressive symptoms of 1,287 children over four years, starting when the children were between the ages of 12 and 13. Peer victimization predicted changes in BMI and depressive symptoms over the four year period. In other words, being obese (a risk factor for being victimized) may cause peer victimization. The peer victimization, in turn, can then cause the obese individual to form stronger negative self-concepts, which can entice further victimization. Due to this linked pathway between peer victimization and depressive symptoms, obese children and adolescents may be indefinitely victimized throughout their school days (Adams & Bukowski, 2008). These findings go along with the findings from McCarroll et al. (2009) and McCullough et al. (2009). Overweight and obese children were more likely to have fewer social interactions with peers, as well as, a greater chance of being victimized by fellow peers while in social situations. Victimization towards obese females caused more depressive symptoms and increases in BMI. Whereas in males, peer victimization caused more aggressive behaviors,

rather than depressive symptoms, as well as, decreases in BMI. However, while differences were found between genders, peer victimization has long term effects on how obese youth see themselves. Therefore, it is important to understand the negative effects of obesity and look towards prevention of such a stigmatized and potentially threatening life style.

### **Implications for Adult Problems**

The prevalence of child obesity has increased recently (Daniels et al., 2005). It produces negative outcomes when these children grow up. The crucial factors of the obesity epidemic among children and adolescents are genes and environmental factors (Biro & Wien, 2010). Several studies on childhood obesity have reported health problems in adulthood. In addition, adulthood obesity is likely associated with childhood obesity, and often depends on children's ages and duration of childhood obesity (Deshmukh-Taskar, Nicklas, Morales, Yang, Zakeri, & Berenson, 2006). Childhood obesity does not only affect children, it follows them into adulthood and the consequences of that are just as important as the current epidemic. Obese children and adolescents are more likely to become obese adults if they have severe obesity or if they have at least one obese parent.

Prevention of childhood obesity is a key strategy to avoid cardiovascular disease in adulthood (Viridis et al, 2009). Adults who have a history of childhood obesity suffer from severe diseases, such as: various cancers, cardiovascular disease, and inflammatory cytokines in adulthood.

Lee, Pilli, Gebremariam, Keirns, Davis, Vijan, Freed, Herman, and Gurney (2010) also indicated that the increase of BMI during childhood is correlated with adulthood obesity persistence. The results reveal that the duration of obesity during childhood leads to chronic diseases such as: type 2 diabetes, and decrease in life expectancy.

Weiderpass, et al., (2004) also found that childhood obesity has effects on adult's BMI and can lead to an increase of breast cancer in women. Changes in BMI during late adolescence and early adulthood can be a predictor of adult size and can increase the risk of premenopausal breast cancer in women.

A study by Abrams (2008) analyzed data from 277,000 children during a 46 year period to see what correlations were associated with childhood BMI and adulthood. Childhood BMI and the effect of

coronary heart disease (CHD) and the significant increase for each one unit for BMI score in adulthood were evaluated. Higher childhood BMI values elevated the risk of having a CHD event in adulthood, with risk increasing linearly in boys and girls. Obese children tend to be heavy in adulthood, in part because obesity promoting habits continued into adulthood. The study did not show significant differences in the probability of CHD events during adulthood, but did show an elevated difference when compared with non-obese subjects. In another study by Pietrobelli, et al. (2008), obese children tended to become obese adults with all the risks/comorbidities associated, such as diabetes and cardiovascular diseases among many others.

A study by Ludwig (2007) discussed the necessity to “reverse course” that we are currently headed in since the following generation seems to be destined to be fatter and sicker than their parents. Many times the short term effects of childhood obesity do not show, since children tend to be relatively healthy, so people dismiss obesity without looking at the long term effects. According to Hughes and Reilly (2008), several high-quality studies have reported that obesity in childhood and adolescence tends to persist into adulthood. Long term consequences of childhood obesity are; persistence of obesity, social and economic disadvantage, persistence of cardiovascular risk factors, and greater morbidity and increased risk of premature mortality.

Shockingly, the risk of dying by middle age is already two to three times as high among obese adolescent girls as it is among those of normal weight, even after other lifestyle factors are taken into account. Ludwig (2001), and his colleagues have predicted that pediatric obesity may shorten life expectancy in the United States by 2 to 5 years by midcentury- an effect equal to that of all cancers combined. In addition, carrying excessive weight early in life may develop irreversible biologic changes in hormonal pathways, fat cells, and the brain that increase hunger and adversely affect metabolism, also increasing the risk of obesity and its complications in offspring through non-genetic influences; a phenomenon termed perinatal programming (Ludwig, 2007). Ludwig mentioned that the costs of obesity are close to catastrophic, arising not only from increasing medical expenses but also from diminished worker productivity, caused by physical and psychological disabilities.

### **Economic Problems**

The economic burden of future obesity resulting from current adolescent overweight is projected to affect both young and middle-aged adults (Lightwood et al., 2009). High rates of adolescent overweight are projected to increase future adult obesity, resulting in future economic costs and health burdens, largely from productivity lost to premature death and disability among adults. When obese children reach adulthood, they are less likely than their thinner counterparts to complete college and are more likely to live in poverty (Ludwig, 2007). Businesses and individuals spend more money on obesity and obesity-related health problems compared to normal weight individuals. Worker output is higher among normal weight individuals than overweight individuals.

### **General Causes**

The causes of childhood obesity are multifactorial. There are numerous influences upon energy intake and expenditure, but intake and output are the elemental basis for the childhood obesity epidemic. For a multitude of reasons, children seem to be consuming higher amounts of calories per day. Food has changed from a notion of nourishment or survival and has become an idea of enjoyment (Dehghan et al., 2005). Fat is the highest calorie-per-gram element of food. There has been debate about whether the normal child diet in the US has an increased in amount of fat or not. Study results are mixed and Dehghan et al. (2005) found inconclusive results. Other studies contradict this idea, but it only takes a small amount of excess calories per day to create a significant condition after a few years. Decreasing energy expenditure as a cause of childhood obesity had been studied intensely. Children are less active than ever before (Boreham & Riddoch, 2001). Reasons for this include safety, cost, preference, and lack of opportunity. A small daily increase in physical activity will not offset a small daily increase in energy intake. Jogging one mile will burn a little more than 100 calories, while a child's fast food meal is over 700 calories. Some researchers and professionals have stated that the average person would not be able to offset the effects of the obesogenic environment solely by means of physical activity (Metcalf, Hosking, Jeffery, Voss, Henley, & Wilkin, 2011).

## **Parents and Family**

With such unnerving health consequences in adulthood and childhood, it is clear that childhood obesity is a critical and mounting health challenge. The high and increasing prevalence of childhood obesity has made prevention and treatment efforts imperative. With causes as broad as food and inactivity, there are numerous targets for prevention and treatment. In the case of children, intervention targets can include, but are not limited to, the adults that surround the child. The parents, family, and/or caregivers of children hold much of the responsibility of feeding the child, providing food, and providing activity opportunities.

Parents' behavior and choices can play a vital role in child weight status (Lindsay et al., 2006). Parents have the ability to heavily influence child eating habits. Parents have influence over meal components, food choices, and eating patterns at home. Parents also have the ability to heavily influence child physical and sedentary activity levels. These aspects of life can be altered positively or negatively dependent upon parents' knowledge regarding nutrition, dietary practices, and active and sedentary behavior practices.

Parental influence during childhood is so important because it shapes lifelong diet and exercise habits (Lindsay et al., 2006). Parents have the ability to promote preventative habits regarding childhood obesity. To create successful strategies to combat childhood obesity within the family, researchers must understand the causes and barriers of childhood obesity in the home setting. Support from family members of a healthy environment is important for change. Parents and role models can introduce healthy habits, support maintenance of these healthy habits, and reinforce good behaviors positively.

Several studies have shown that parent and offspring weight and BMIs are correlated. Fogelholm et al., (1999) and many other studies, found that child overweight was firmly linked to parent obesity (Fogelholm et al., 1999; Maffei et al., 1998; Heude et al., 2005, Washington et al., 2010). Maffei et al. (1998) found that obese children's mothers had a significantly greater BMI than mothers of non-obese children (Maffei, et al, 1998). However, this effect was not found particularly with fathers. Other studies

have also shown a relationship between mother and offspring weight (Heude et al., 2005). Alternatively, Perez-Pastor et al. (2009) found strong weight relationships between same sex parent-offspring pairs. After using numerous statistical means, parent weight remained the most intense indicator of child weight in males and females ages 8-12 (Maffèis, Talamini, and Tato, 1998). Heude et al. (2005) showed that parent-child adiposity is linked before the puberty period. Mothers' weights and BMIs showed positive correlations at offspring birth.

Perez-Pastor et al. (2009) showed that the likelihood of a child being overweight or obese increases if one parent is overweight or obese, and then escalates further if the child has two overweight or obese parents. This correlation increased with the children's age (from 5 years old to 8 years old).

Parent-offspring weight correlations intensify during puberty (Heude et al., 2005). Familial influences and practices may be substantially imprinted into the child by this age. Genetic factors may ensue strongly at this point, as well. Perez-Pastor et al. (2009) showed an increase in the parent-offspring BMI relationship from age 5 to age 8. Prevention efforts may work better if they are initiated at earlier ages.

One study investigated if there was a relationship of overweight between mothers and daughters or fathers and sons (Perez-Pastor, et al., 2009). There was no relationship between birth weight of the child and parental BMI. Parental BMI showed a strong relationship with child BMI by the age of 8, but the relationship was present even at the age of 5. Only 3% of children were obese if neither parent was obese. If one parent was obese, the percentage of child obesity rose to 17%. If both parents were obese, almost one-third (29%) of their children were obese. The correlation between same-sex child and parents BMI was much stronger than the opposite sex correlation. By the age of 8, the same-sex BMI correlation began to build importance. Perez-Pastor, et al. (2009) also found that obese children with an obese parent of the same sex kept putting on excess weight over the years, while children of normal weight parents of the same sex did not. The results of this study point to the environment and modeling of same-sex weight correlations between parents and children.

## **Diet**

Eating behaviors have changed immensely over the past few decades. In turn, eating behavior alterations have changed supply, demand, and availability of foods. Accessibility, convenience, advertising and marketing have played a considerable role in the upsurge of foods eaten away from home. As the environment changed, the caloric intake has changed as well. Increased energy intake, foods eaten away from home, and the absence of breakfast have triggered changes in macronutrient intake, meal intake, and food choices over time.

The daily recommended intake for children varies immensely in regards to daily total caloric intake. This total intake number ranges roughly from 500 calories to over 3000 (Panel on Macronutrients, 2002). The macronutrient breakdown on the daily calories is much more narrow and similar across age groups. Children need 25%-40% of their diets to be composed of fat, with more fat being needed for younger ages. Humans of any age should have a diet that is 45-65% carbohydrates. Protein should make up 5%-30% of a child's diet, with increased protein ranges for older children. See Table 1 for Macronutrient Information.

It is important to note the drastic difference in the total daily calories between boys and girls. Understanding that girls need less calories daily may be a strategy in prevention efforts for schools, families, and physicians.

**Actual intake.** Studies have pinpointed the macronutrient breakdown in child diets. Elliott et al. (2011), showed that their child participants had an average intake of protein, carbohydrate, and fat at 17%, 51%, and 32%, respectively (Elliott et al., 2002). These percentages fall into the recommended categories.

**Portion size.** Each human has a satiety signal that is sent in response to consumption. Children will feel "full" at some point. It has been shown that parent and environmental influence regarding portion sizes can affect satiety responses in children (Fisher & Kral, 2008). Restriction of food and amount of food may increase child preference for energy-dense and fat-dense foods. Parents generally feel confused about portion sizes. Portion sizes given to children fluctuate between families. In one study reporting on parent-determined portion sizes for children, there were wide deviations in the amounts of foods given to children

(Croker, Sweetman, & Cooke, 2009). Peas, pasta, and chicken were among the foods with the most unpredictable portion sizes. Encouragingly, foods that were more energy dense were given in smaller sizes. Mothers across this study were generally untroubled in regards to portion sizes. The common view was that children will only eat as much as they want. In fact, these mothers also expressed the opinion that they did not want further advice and/or it would not be followed concerning portion sizes. At least one mother, of a 14-year-old, stated that she had to control portion sizes for her daughter, because her daughter would eat endlessly (Croker et al., 2009).

**Fat intake.** Whether or not increased fat in the diet is a contributor to childhood obesity is still unclear. Studies show conflicting results. Some studies show that there is a positive correlation between child BMI and fat intake (Maffaeis, Pinelli, & Schutz, 1996; Tucker, Seljaas, and Hagar, 1997), while other studies show that there is no correlation, even though overall caloric intake is up (Elliot et al., 2011).

**Sugar sweetened beverage consumption.** Sugar-sweetened beverages (SSB) include many forms of juice, soda, sports drinks, flavored waters, commercial coffees, and more. Not only are these beverages saturated with sugar to make them taste better, some contain the appetite stimulant: caffeine. High fructose corn syrup (HFCS) is another common ingredient in SSB. HFCS is cheaper than raw sugar, and consequently, its use has been rising for decades in SSB and other food products (Coulston & Johnston, 2002; French, Lin, and Guthrie, 2003). The rise in childhood obesity has paralleled the rise in HFCS usage, and some researchers believe the two are linked (Grimm, Harnack, & Story, 2004). The American Dietetic Association (ADA) has speculated that SSB may not give strong feelings of fullness, leading to more SSB intake and no displacement of other caloric intake (American Dietetic Association, 2004). Researchers and health professionals view SSB as a contributing factor to the obesity epidemic, including childhood obesity.

SSBs have increased in popularity over the last few decades. Sodas and juice are often household beverage staples. SSB intake in children is increasing over time. Over three decades, adolescent sugar sweetened juice intake multiplied by 89% and soda intake upsurged 150%, according to one study (Putnam & Allshouse, 1999).

Intake of nutritious beverages, such as milk, water, vitamin-infused drinks, and drinks containing less sugar, by children also decreases with age. Carnegie, Young, and Pfeifer (2006) created a questionnaire and had child participants complete the survey. This questionnaire showed a positive correlation between SSB intake, grade level, and BMI. This indicates that as children get older, they are choosing to ingest more SSB. Another interesting finding in this study was that the oldest group tested, 5<sup>th</sup> grade, also had the lowest intake of water, milk, and juice. Older children are choosing soda at a higher rate than nutritious beverages. All of these findings were present even when correcting for self-reporting bias.

*Juice.* Juice as a child beverage has become a nutritional topic of interest in recent years. The American Academy of Pediatrics created juice guidelines for children (The Use and Misuse of Juice in Pediatrics, 2001). The health disadvantages of juice are often disguised by advertising and the word ‘fruit’, which has a healthy connotation. Parents are sometimes mindful of giving young children sodas and may see juice as an acceptable alternative. Juice is often sugar-sweetened, making it just as energy-dense as soda and other commercial beverages. Some parents also view juice as a serving of fruit for the day and/or view juice as a healthy dietary component. Juice consumption tends to rise over time in children.

Overweight children consumed less juice than normal weight children at the baseline measurements (Washington, Reifsnider, Bishop, Ethington, & Ruffin (2010). However, in 6 months, juice consumption sharply rose in the overweight child group compared to the normal weight children. Juice has become a substantially important issue regarding child weight in recent years. Studies have shown that juice intake is positively linked to child weight (Dennison, Erb, & Jenkins, 2002). There are juices that contain less sugar or sugar substitutes. Offering real fruit is another healthy alternative, while also persuading children to drink water. Juice should not be overlooked as a dietary component that can affect child weight.

As mentioned above, SSB intake may replace intake of more healthy beverages. Calcium is a mineral that is essential for life. Studies show that calcium intake decreases as children age (Bowman, 2002; Smiciklas-Wright, Mitchell, Mickle, Cook, Goldman, 2002). Optimal calcium intake is related to healthy body weights and BMI in adults. Keller, St-Onge, Faith, Kirzner, & Pietrobelli (2009) found that a higher intake of SSB in a laboratory meal setting resulted in a direct negative association with milk intake.

SSB intake was also negatively related to intake of total calcium at meals. This is especially important regarding childhood obesity, since studies have shown that increased dairy can reduce risk of children becoming overweight (Heaney, Davies, & Barger-Lux, 2002). Many studies have shown correlations between SSB ingestion and weight status. One study found that increased SSB intake was linked to child weight gain. Ludwig, Peterson, and Gortmaker (2001) found that each daily SSB serving markedly increased risk of overweight in children by 60%. Positive correlations between SSB intake and BMI exist (Carnegie et al., 2006). Lessening child SSB intake is related to lower frequency of childhood overweight.

Many adults tend to forget or choose not to acknowledge the energy density of SSB. Parents may be so focused on unhealthy and fast foods that they misjudge the damaging effects of sugar-sweetened beverages. In one study that asked parents how they could control their child's weight, only 3.5% said that they considered giving them less juice, Kool Aid, or soda (Myers and Vargas, 2000). Most of the parents who made changes for their child's health mentioned that they cut the amount of high-fat, high-sugar snacks, excluding SSB. Changing beverage options was the least preferred route from this group.

Van der Horst et al (2007), found associations between parenting styles and child SSB consumption. Adolescents who viewed their parents as more restrictive had lower SSB ingestion than other adolescents. These findings are the opposite of many other studies involving younger children (Birch & Fisher, 2000). The researchers suggested that it may be easier for parents to completely restrict foods or use influence when a child is younger, whereas parents may seem more strict when using more definite rules. Other findings in this study linked self-efficacy, attitude, and modeling from parents with SSB at a significant level. These results insinuate that parenting style can not only affect an adolescent's SSB intake, but his or her attitude toward SSB and self-perceived ability to stop drinking SSBs.

Parents play a role when encouraging or discouraging SSB consumption. Replacement of SSBs with a suitable alternative in the house can be a major resolution pertaining to child weight. Each normal serving of SSB (about 12 ounces) has calorie content between 100-200 calories. Preventing intake of multiple SSB in children can be very advantageous. Since children tend to drink more SSB as they get

older, adolescence is a vital time to implement these modifications. Parents can impose limits on child SSB intake, and help generate healthy weight status (Lindsay, Sussner, Kim, & Gortmaker, 2006). School and outside environments pose a risk, but this strategy can undeniably improve child health.

**Breakfast consumption.** Breakfast is considered to be healthy and advantageous, and research encourages this statement (Smith, 2010). Breakfast for children is no exception. Breakfast consumption, or lack thereof, may be a noteworthy component in childhood obesity prevention. Omission of breakfast may be interlinked to child overweight and obesity. One study that measured children and adolescents and breakfast consumption found an inverse relationship between breakfast consumption and weight. Children who ate breakfast had lower BMI's, with significant differences between the 9-18 year old boys and girls who ate breakfast and those who did not (Deshmukh-Taskar et al., 2010). Children who ate ready-to-eat cereal showed the lowest BMI z-scores.

**Cycle of food behaviors.** Studies show that food preferences and behaviors are passed down from parent to child. Children are tremendously receptive to the parent and household food behaviors. The variety of foods available at home also play a role in child preference (Dennison et al., 2002). This can be another factor that leads to the inheritance of obesity, a familial link that has been confirmed in research (Whitaker, Wright, Pepe, Seidel, Dietz, & William, 1997).

Making fruits and vegetables abundantly available at home will likely escalate a child's intake of these foodstuffs. Parents should keep in mind that modeling is also important, and parents should eat these foods in front of children (Lindsay et al., 2006). There are links between parent dietary modeling and child food choices.

The adults who surround and provide for children can have different views about diet, and that can be a barrier for parents as well. Some parents stated that there were discrepancies between their own views of child nutrition and their spouse's view of child nutrition (Dwyer et al., 2008). Children often notice these differences. One mother acknowledged a situation in which the child opposed her actions using the defense that their father did things differently regarding food. Grandparents came into play in this area as well. Grandparents, who are somewhat known for spoiling grandchildren, make sugary desserts and high fat

foods available for children in large amounts. One mother stated that she quarreled with her own mother incessantly, but her mother, “just doesn’t get it and doesn’t care”(Dwyer et al., 2008, page 341).

Apart from family members, other care taking adults can play a negative role. Childcare staff may encourage children to needlessly eat meals, or let children not eat their meals. In one situation, a child was allowed to eat only dessert, which dismayed the parent. Another parent expressed that the Westernized diet provided at childcare was making her son turn away from their healthier, cultural Chinese diet (Dwyer et al., 2008). In this case, this result was detrimental since the Chinese diet is known to be more healthy than the Westernized diet. Six percent of parents in the Myers and Vargas (2000), study stated that other adults prepared meals for their child. Identifying barriers and figuring out alternative options is a key strategy regarding childhood obesity in conjunction with other influential adults in a child’s everyday life.

When children eat at home, chances are high that the meal was prepared at home. Meals prepared at home are likely to be healthier than meals prepared outside of the home. Family meals eaten at home can be beneficial in a number of ways (Lytle, Hearst, Fulkerson, Murray, Martinson, Klein, & Samuelson, 2011). Studies have shown that family meals at home promote more nutritious eating habits. Family meals are usually comprised of higher fruit, vegetable, and grain content as opposed to meals eaten outside of the home. In general, these meals also contain less fat content. Increasing family meals should be a part of the parents role in fighting childhood obesity.

As children get older, number of family meals may decrease. Parents should be aware of this and create time for family meals as the child gets older.

Semmler, Ashcroft, Van Jaarsveld, Carnell, and Wardle (2009) conducted a 7-year research study on 428 children, in relation to obese parents and socioeconomic status. Both lean and obese lower socioeconomic (SES) parents influenced obesity in their children. Moreover, those obese children were more likely to become overweight teenagers, as well as, obese adults who encounter health problems.

Ziol-Guest, Duncan, and Kalil (2009) demonstrated that socioeconomic conditions in childhood relates to adult’s health. In addition, lower SES in childhood correlates with poor physical and mental

health in adulthood because of the lack of physical activity, stress, economic status, and health risk behaviors. This often leads to higher BMI levels in adults.

### **Physical Activity**

Physical activity is the second major component of energy balance. In general, physical activity levels drop as a person ages. This is true in the time period between childhood and adolescence, as well (Kim & Lee, 2009).

Myers and Vargas (2000) conducted a study in which parents were asked what interventions they would advocate to correct their child's weight, but only 5% of parents mentioned that they might increase their child's physical activity level. In regard to afterschool sports, mothers confirmed cost and time as the main obstacles to enrolling their children (Druon et al., 2008).

Parents can encourage children to participate in sports teams to aid in a healthier body weight (Lindsay et al., 2006). Children who participate in higher physical activity levels have been shown to have lower BMIs (Maffeis, Talamini, and Tato, 1998).

Activity levels may be influenced by encouraging children to play outdoors. Parents often feel like getting children outside is a barrier, due to unsafe play areas or unavailability of parks. Although research is somewhat lacking, a few studies have shown a correlation between parent activity level and child activity level (Cleland et al., 2005). In most cases, even having one active parent resulted in an increased activity level of the child when compared to children with no active parents. Role modeling is not the only way to increase child exercise, research has highlighted the benefits of parental encouragement of physical activity to the child, as well (Bauer, Laska, Fulkerson, & Neumark-Sztainer, 2011).

Fogelholm, Nuutinen, Pasanen, Myohanen, and Saatela, (1999) performed several measures of physical activity to determine if there was a relationship between parent activity level and child activity level. Children partook in about three times as much activity as their parents, on average. These results were discovered for obese children and their parents, as well as normal weight children and their parents. Perhaps due to school or higher energy levels, children usually have higher activity levels. Since this effect

was seen across child weight classes, those percentages may hold true if the parent increases activity levels as well.

There are links between parental activity levels and child activity levels. Children who reported having two active parents were involved in more sports than those with no active parent at a significant level (Cleland, Venn, Fryer, Dwyer, & Blizzard, 2005). These children also scored significantly higher on two athletic tests (1 mile run and physical work capacity). Children who only reported having one active parent also participated in more sports than children with inactive parents at a significant level. There was no difference regarding whether the active parent was the mother or father. Children will be more active even if they have only one active parent. Both parents being inactive will translate to an inactive child much of the time. Studies also found specific gender links of parent to child activity level. One study showed a direct link of physical activity between mother and son (Fogelholm et al., 1999). Parents are not always aware of the options and available resources that are available for children to increase physical activity (Dwyer et al., 2008). Parents who have their children enrolled in childcare do not always know of the childcare facilities (availability of gym, and outside toys) (Dwyer et al., 2008).

Weather is another challenge for additional physical activity. Parents conclude that winter is a difficult time to get children moving, since it may not be plausible to create outside activities (Dwyer et al., 2008). Rain also prevents going to the park, or running around outside.

While parents feel that they face many barriers supporting physical activity, parents can still play with their children, watch their children's activities, and/or arrange access to sports programs.

Parents should be resourceful in finding and encouraging children to participate in sports and exercise programs throughout childhood. Increasing child activity level can result in lower child weight, healthier BMI, and decreases in sedentary behavior. Parents of older children should particularly consider this approach to combating childhood obesity (Lindsay et al., 2006). Studies have shown that levels of physical activity decrease as children age. One study tested physical activity levels of third, fourth, and fifth graders. Fifth graders had significantly lower physical activity levels (Carnegie et al., 2006).

Not only are physical activity levels dropping, sedentary activity levels are rising among children .

Advances in technology, crime, and lethargy contribute to more sedentary activity in children. Hours spent watching television, playing video games, and using computers is rising and possibly displacing hours children spend playing outside. In fact, children watch television more than any other hobby

Although the hours spent participating in sedentary activity usually rise with age (Lindsay et al., 2006), younger children undeniably spend sedentary time in front of electronics. Half of United States children who are old enough to be in school already watch television each day. Children in single mother households watched significantly more hours of television versus two-parent households (Bowman, 2002). In one study, 11% of parents stated that overweight children would not have a good deal of energy for playing (Myers & Vargas, 2000). One study found an association between overweight and amount of hours of TV viewed daily (Dennison et al., 2002). This relationship was found in children between the ages of 1 and 6. Limiting screen time at all ages could be a key preventive strategy regarding childhood obesity (Lindsay et al., 2006). Maffeis, Talamini, & Tato (1996) found that obese children watched significantly more television than non-obese children in a four year longitudinal study. This study also discovered a positive correlation between television viewing time and BMI in children.

In contrast, studies have found a relationship between healthier child BMIs and body weights if they watched less TV. One group of researchers monitored young children (ages as low as 3) in their households and found that children who watched more hours of television participated in less physical activity. More television watching is usually associated with less physical activity time (Maffeis, Talamini, and Tato, 1998). Jones, Oakley, Gregory, & Cliff (2009) also found that overweight children spent more time in sedentary activity (including television watching and quiet play) and less time in physical activity than normal weight peers. This particular study also found that the amount of sedentary activity went up on weekends for overweight children.

Allowing television sets to be placed in a child's room may be detrimental to child weight. Children who had televisions in the bedroom were more likely to become overweight than those who did not (Dennison et al., 2002). Not providing children with their own television for their own bedroom can be

a key preventive strategy (Lindsay et al., 2006). However, some studies did not find a link between overweight and televisions in children's rooms (Jones et al., 2009).

The more time children spend in front of screens, the more they are exposed to food advertisements. The promotion of unhealthy eating and lifestyle habits may play a role in child weight status (Ludwig et al., 2001). The media is a stressor for parents regarding their children's diet. Children ask for the unwholesome food items that are advertised (Dwyer et al., 2008). Advertisements for fast food and video games may peak an interest in the child for those products (Ludwig et al., 2001). Advertisements do affect child food preference. These ads also cause confusion regarding child health knowledge and food. Limiting television viewing of children can be a key intervention for parents concerning childhood obesity (Lindsay et al., 2006). Limiting television viewing of children may cause an increase in physical activity, curbing negative media efforts, and betterment of child weight status.

Fogelholm et al. (1992) found that the relationship between child sedentary behavior and family sedentary behavior was much stronger than the relationship of physical activity between both groups. Studies have linked parent sedentary behavior to child sedentary behavior. Children are very receptive to parent modeling.

In accordance with social ecological theories, researchers have discovered that a child's home, school, and community environment all influence his/her desire to participate in physical activity (Berns, 2007). Factors including the levels of parental involvement, television viewing, neighborhood safety and accessibility to resources have all been linked to childhood obesity.

Dwyer, Needham, Simpson, and Heeney (2008) conducted a qualitative study to examine parents' challenges in supporting physical activity among their preschool children. The researchers interviewed parental focus groups at three different childcare centers. Parents cited the following intrapersonal factors as challenges in supporting physical activity for their preschoolers: children preferred less active activities, children have problems following the rules in organized physical activity at the childcare center, and children have different personality traits that influence their preference for physical activity. Interpersonal factors included the parents' lack of time and energy to be active with their children, having differing

viewpoints from other influential adults in the child's life regarding physical activity, and their family structure. Other parents cited physical environment factors such as weather, lack of safety, and inaccessible resources as reasons that their children were not more physically active. Dwyer et al. concluded that parents need to serve as good role models in helping their children maintain a healthy weight.

Other research has also suggested that parents and the home environment are an important factor in a child's lifestyle choices. Spurrier, Magarey, Golley, Curnow and Sawyer (2008) conducted a study of 280 preschool children. Through direct observations and parent-report questionnaires, the researchers determined there was a significant correlation between involvement in organized sport and higher outdoor playtime for the children, and the frequency of mothers' walking and mothers involvement in organized sport. They also discovered that preschool children with greater backyard size and more outdoor play equipment spent more time involved in physical activity. The researchers concluded that parents can modify the home environment to encourage children to eat better and be more physically active.

Television viewing has also been linked to less physical activity and increased childhood obesity. Hancox and Poulton (2006) conducted a longitudinal study in which they examined the associations between BMI and television viewing hours. Assessing children every 2 years from age 3 to 15 years, the researchers found a significant positive correlation between BMIs and more television viewing. The relation between television viewing and increased BMI tended to vary among males and females. These correlations seemed to be stronger for girls, especially during adolescence. These findings suggest that children need to be encouraged to spend less time in front of the television and more time in physical activity.

Timperio, Salmon, Telford and Crawford (2005) researched the effects of neighborhood safety and accessibility on physical activity. Their study included school-aged children and their parents. The researchers used a cross-sectional survey design to assess parents' perceptions of their local neighborhood and perceived child access to local destinations within walking distance of their home, including cycle/walking tracks, friends' houses, parks/playgrounds, the post office, public transportation, school,

shops, and sports venues. The researchers also used questionnaires to examine ten to twelve year olds perceptions of their neighborhood. The height and weight of the children were measured privately at the child's school. The results showed that the majority of parents felt like their children had access to local destinations. Most parents were concerned about stranger danger and road safety. Among 10 to 12 year old children, parental concern about road safety was the only variable associated with obesity after adjusting for sex, socioeconomic status, and car ownership. Children whose parents were concerned about road safety were almost four times as likely as other children to be obese. This study emphasized that perceptions of safety can affect a child's level of physical activity.

Veugelaers, Sithole, Zhang and Muhajarine (2008) also conducted a study of fifth grade students and their parents to determine the correlation between neighborhood characteristics and childhood obesity. Using data from the Children's Lifestyle and School Performance Study and parent and child surveys, the researchers discovered that children with good access to playgrounds, parks, and more recreational facilities were more active and spent less time in front of the television or computer. Children in safe neighborhoods also engaged in more sports and unsupervised play. The researchers also observed a higher prevalence of obesity in children living in rural areas because of a lack of accessibility to recreational facilities. In a similar study, Potwarka, Kaczynski, and Flack (2008) found that children with a park or playground within 1 km of their homes were almost five times more likely to be classified in a healthy weight category than children without playgrounds or parks nearby.

All of these studies suggest that a child's weight is greatly affected by parental involvement and their surroundings. Parents need to encourage their child's physical activity by being good role models, limiting television and computer usage, making sure their child has access to recreational facilities, and ensuring that their child feels safe in their neighborhood.

One study showed that two-thirds of students with normal BMIs participated in 30 minutes of exercise daily. This is in contrast to the participants who fell into the overweight category, with only 50% reporting 30 minutes of exercise daily (Carnegie et al., 2006). Forty-two students participated in the Carnegie et al. (2006) study. One of the many important findings from this study was that physical activity

decreases as age increases in students. The researchers explained that freedom of choice increased for older students. Students may opt out of playing outside, playing in organized sports, or taking a physical education class.

Managing children's eating can be very tough for parents and caregivers. Parents have many different ideas about healthy diets and healthy diet components. Even when parents are educated about optimal child diets, they may not agree. A frequent line of reasoning against following standardized guidelines for child diets in one study was the ideology that every child is different from each other as well as different from time to time, indicating that needs will be considerably different (Crocker et al., 2009). Parents also believed that food intake will be much greater during times of growth spurts. Parents regress to unhealthy foods for several reasons.

Results from studies that investigate amount and type of child energy intake produce extremely varied results. Parents are responsible for making food available to their children. Children can only eat what they have access to. For this reason, Gable and Lutz (2000) tested relationships between household income, parent education, and number of daily meals with aspects of food availability. There was no relationship between availability fruits and vegetables, breads, meats, dairy, snacks, or sweets with household income, parent education, or number of daily meals. A positive relationship between number of meals and fruits and vegetables was the only relationship seen in this section of testing. Relationships were tested between types of food eaten by children and food availability. As expected, parents who reported having higher levels of sweets in their house had children who consumed higher amounts of sweets, fatty foods, and junk foods. Interestingly, parents who reported higher amounts of bread had children who consumed less junk foods. Children who consumed higher amounts of junk food were more likely to have increased time watching TV. Bowman (2002) measured food security between children with one parent (female) or two parents (male and female). Single mother households scored lower in food security. This study also showed a significant difference in the amount of money spent on groceries per week. One interesting and applicable finding from this study was that single mother households did not have a lower amount spent on fast food or carry out meals. This indicates the importance of cost and time for single

mother families. They are spending less on groceries, which may mean less spent on expensive fruits and fresh foods, and spent instead on fast food (compared to two-parent families). Multiparent families also spent more on foods eaten away from home (fast food and carry out). This may be an area to moderate when making an effort to curb child weight problems. Children in female-headed households ingested significantly higher amounts of overall energy, total fat, and saturated fat. These children also drank more sugar sweetened carbonated beverages. However, both groups had high levels of added sugar. Therefore, if a parent is single with children, they can know what barriers and problems single-parent families have regarding childhood obesity and fight it more efficiently.

Because energy surplus is a cause of childhood obesity, studies have investigated differences in diets of children in different weight classes. Washington et al. (2010) found that overweight children consumed a significantly increased amount of carbohydrates (bread, specifically), protein, and total calories than normal weight children. Overweight children had a remarkable increase in calories over this 6 month survey period, with juice, meat, and protein triggering a 300 calorie per day difference in normal weight and overweight child diets.

Parents can offer healthy foods but children must be somewhat receptive to eating healthier foods. Resistance to nutritious eating by children is another difficulty that parents have. Some parents described situations in which their children absolutely reject consuming vegetables (Dwyer et al., 2008). At other households, children sometimes refuse to eat vegetables at home because they had to eat them during the day. Parents have also described their children as “picky eaters”, and express that pleasing them is easier than the alternative. There were even reports of children refusing to eat at all, or completely erratic likes and dislikes. Some children have a strong preference for the way foods are prepared This creates barriers because the parent has to take time to prepare dishes a certain way to keep the child happy. Some parents reported that their children liked fruit and vegetables peeled and uncooked, and some refused to eat them when they were components of a certain dish. These factors in particular are countered with parents’ acquiescence. On the other hand, some parents with picky children just predict that their children’s tastes will change for the better with time. This implies a less vigilant effort is being made in those situations.

One-third of parents have reported that their child cries when not given food on demand (Myers & Vargas, 2000). Mothers have also conveyed that there are numerous periods of stress, which make it even harder to manage their children's eating (Druon, Fraser, & Alexander, 2008). Learning to deal with resistance to healthy foods can be a useful tool for parents.

Peer influence can affect child food intake. Children may eat what their peers eat more readily. This is a possible reason that certain foods are eaten by children. In one study, a parent mentioned a scenario in which children ate vegetables at childcare but not at home (Dwyer et al., 2008). Peer influence may also be a reason that certain foods are not eaten.

Some parents utilize a reward system that involves food. For example, if a child eats his/her whole meal, then he/she would be permitted to eat dessert. Other parents feel that they battle with their children over food so often that the occasional bad meal or food item is acceptable.

Since parents believe that schools and childcare facilities serve healthy meals, they feel less obligated to keep a strict healthy menu at home. Parents believe they can be more lenient at mealtimes because of that fact coupled with the above mentioned barriers (Dwyer et al., 2008).

Taste preferences differ among age groups (Chauhan, Donald, Basu, Hawrysh, & Gee, 1987). Children tend to like salty and/or sweet foods that are high calorie. They tend to dislike sour or bitter foods. However, food habits are created through repeated actions. Taste and appetite differences show up very early in a child's life, and parents' persuasion is influential during this time. Children who like vegetables are likely to eat more vegetables growing up.

Studies have shown that children acquire fondness for foods that are presented during positive social situations (Hardus, van Vuuren, Crawford, & Worsley, 2003). It can also be expected that children are more likely to disapprove of foods presented in a negative social setting. Creating a positive environment around healthy foods can be a target intervention technique. However, in one study found parents did not think that a negative parental attitude towards eating and physical activity had much to do with childhood obesity (Hardus et al., 2003). If more studies can show that a positive atmosphere can encourage healthful eating, this tactic can be taught to parents and used as a healthy lifestyle strategy.

Mealtimes may not be considered a fun activity by children. A parent recanted about her child singing childcare songs at the dinner table, because that's what they did at daycare (Dwyer et al., 2008). Making healthy eating fun can inspire children to eat well.

Barlow & Chang (2007) showed a significant relationship between childhood obesity (not overweight) and parental aggravation. When other factors were weighted, this relationship disappeared. This indicates that surplus child weight is related to the parental uneasiness. These variables include chronic medical and emotional conditions of the child and lower socioeconomic status of the family (Barlow and Chang, 2007).

### **Parental Knowledge**

One of the most basic obstructions to a healthy child weight is whether or not caregivers can correctly identify if their child is at risk for becoming unhealthy. Many parents and caregivers cannot correctly determine their child's weight class. In multiple studies, parents were not able to categorize their children's weight class correctly (Myers & Vargas, 2000). Using underweight, normal weight, overweight, or obese, as defined by the CDC BMI growth charts for children, parents of overweight and obese children incorrectly labeled them most of the time. In one study, 35% of parents of obese children did not categorize their child as obese. Forty-five percent of parents (who had at least an overweight child) said that their child's weight was "fine". Seven percent stated that they were "a little" overweight. Parents may underestimate child weight because they do not know clinical definitions of "overweight" (Lampard, Bryne, Zubrick, & Davis, 2008). Parents may underestimate child weight because social norms are changing. Children may look like many of their peers, but many children are now overweight. The 'look' of childhood obesity can also be deceiving. Parents often base weight concern off of their child's looks. The child "looking okay" was one reason for decreased concern in the study by Rich et al, (2005). Parents also stated that their children were not overweight because they were tall or "big boned".

If parents' can correctly categorize their child's weight class, they are more likely to be concerned and able to identify higher weight levels in their child (Lampard et al., 2008). Parents of obese children are

often aware of their child's health problem in these cases. It is often bridging the gap between knowledge and action generates many challenges (Druon et al., 2008).

Not all parents are unaware and/or unconcerned about their child's weight. Many studies have reported knowledge and concern of parents regarding their child's weight (Druon et al., 2008; Lampard et al., 2008; Rich et al., 2005). Of these parents who have anxiety and worry connected to their child's weight, many report other barriers that keep them from implementing change within their households (Rich et al., 2005).

Many studies have shown that parents' perception of their child's weight status is not paralleled with standard BMI weight categories. Underestimation of child weight is common among parents (Lampard, et al., 2008). One study showed that over half (51%) of obese children's parents underestimated their child weight by putting them in the incorrect BMI category, while parents of overweight children did so only slightly less (44%). Underestimation of child weight declined as parental concern went up. Overestimation is much less common, occurring 5% or less across groups. Therefore, if parents can be educated on weight classes and correctly place their child in a weight class, they will become more concerned. This may provoke parental interventions.

Parents also knew that their child's overweight was not a short-term issue (Jackson, McDonald, Mannix, Faga, & Firtko, 2005). Some parents expressed that they had child weight concerns for five years. While it is useful that parents know this, it may create a barrier. Knowing that a child's weight is a long-term issue also means that altering child weight will also be long-term. However, some parents think that their child will change over time, or "grow out of it". Maffei, et al., (1998) performed a longitudinal study over 4 years measuring many variables, including child weight. From baseline to end point, there was no significant difference in child weight.

If parents are educated well on child weight issues, and have a high level of concern, the next step is to know how to improve the situation. Defining a "healthy diet" may be difficult for the average caregiver. Parents agree, across the board, that children consuming a healthy diet are very important

(Croker et al., 2009). It is also widely known among parents that multiple servings of fruits and vegetables are important parts of a balanced diet (Croker et al., 2009).

Total energy intake may be a more unclear concept. Counting calories may not be a tool that parents often contemplate doing. In the Croker et al.'s (2009) study, parents admitted to not evaluating a child's diet by meal, but by day or week basis. At the end of the day or week, many calories (and full meals) have been ingested. It only takes a small amount of calories per day to contribute to child overweight. Parents that view the overall diet of their child as "healthy" may need to narrow their focus further.

Knowing the causes and outcomes of childhood obesity is key for parents. Understanding what causes childhood obesity can promote favorable and valuable lifestyles changes in the family setting. Identifying adverse health outcomes related to childhood obesity can create incentive for the parent to begin modifying the family lifestyle.

Parents were able make connections between weight status and causative factors in one study (Jackson et al., 2005). Parents cited reasons for their child's excess weight to be due to slow metabolism, genetics, eating habits, and family and culture dynamics. Parents who participate in knowledge-based studies often mention genetic predisposition as a reason for childhood obesity. Some parents stated that culture was a major reason for higher weights among their children. These parents stated that food was a large part of family gatherings, or that a certain culture had a weighted role in children's relationships with food. Over half of the parents in one study stated that surplus intake of fast food and that the media advertising unhealthy foods were central causes of childhood obesity (Hardus et al., 2003). In some studies, parents were able to share their opinions on what caused their child's overweight. One parent stated that she remembered giving her son extra bottles when he was a baby (Jackson et al., 2005). She believed that was one reason for her son's increased weight.

Concerned parents generally know that there are health consequences to childhood obesity. Over ninety-two percent of parents answered that they were aware of the fact that there are health consequences, but only one-third of these parents could name one specifically (Rich et al., 2005). In another study, 78% of

parents in one study stated that they knew that overweight children were more likely to develop heart problems in the future (Myers & Vargas, 2000).

### **Parental Attitude**

Even before changes in diet and activity can be addressed, parent attitudes and concerns may need to be the initial focus. Many parents may not feel any level of concern or worry for a child's unhealthy weight status. Management of child weight will depend largely on the extent of parental concern regarding overweight and obesity (Lampard et al., 2008). In one study that measured parental concern, 48% of parents of overweight children had no concern for their own child's weight. Majority of overweight children's parents rated themselves as having no concern, all other categories (including some concern, and high concern) had less responses. The second highest category was "little concern", in which 34% of the parents of overweight children selected. Another study showed similar results, with 50% of their participants not worried about their own overweight child's weight status (Rich et al., 2005). Not surprisingly, more parents indicated concern when their child was in the obese classification (Lampard et al., 2008). The percentages of no- and little- concern decreased in the parents of the obese child group, but are still present (5% and 13%). Some parents were still not distressed when their children fit into the highest weight classification. Furthermore, only half of the parents of obese children rated themselves as "very" concerned about their child's weight. In general, concern went up between weight classification groups. Parents of overweight children had more concern than those of normal weight children, and parents of obese children had the greatest amount of concern, which is expected. Interestingly, Lampard et al. (2008) found that there was no significant difference in obese children's parental concern, in terms of whether or not the parent was seeking obesity treatment for the child. These results suggest that a high level of concern will not prompt parents to seek treatment for their obese child. This may be due to lack of child physical ailments. In one study, a common parent attitude towards child health is to consider their child healthy due to lack of illness (Rich et al., 2005). If parents have any level of concern for their child's weight, it may be offset when the parent cannot see actual painful signs of this condition.

However, concerns regarding a parent's own child and another child may be different. At least one study showed that a fifth of parents who are not concerned about their own children's weights, were in fact concerned with other children's weights (Rich et al., 2005). Some of these people simply did not believe their child was overweight, and overall categorized them as, "fine". This study raises an interesting question, "why are these parents concerned about the weight of other children and not their own?" Perhaps parents do not worry when there is a lack of any other physical ailment. Parents may not want to worry about child weight because of the amount of growth and development a child may have ahead of them (Lampard et al., 2008). Many parents in many studies have concluded that their child will "grow out of it" (Rich et al., 2005). Parents are quick to downplay weight status if they believe their child is eating acceptably and/or is reasonably physically active. As mentioned above, it is likely that children who are overweight or obese will stay that way into adolescence and adulthood.

Other parents worry about their child's obesity because of the current social incidences that are taking place (Jackson et al., 2005). Parents have expressed concern because their child was confronted with unkind nicknames, exclusion from certain criteria, mockery, bullying, and uninvited remarks by family and friends. Parents have repeatedly stated that they do not want to affect their child's self-esteem in a negative way (Druon et al., 2008). Mother's in the Druon et al. (2008) study specifically related their own weight-esteem linkages to their children. Their own unsettled matters create barriers for change. Adversely, other studies have shown that parents did not think self-esteem was a major issue in childhood obesity (Myers & Vargas, 2000). A surprisingly low number of parents in one study stated that they thought obese children would have trouble making friends. Even if these qualms are not health related, some level of concern is favorable for motivation of change. Parent education on the risks of child obesity may be a beneficial prevention technique. Education that includes health information as well as social stigmas connected to obesity might be the most valuable.

On the other hand, parental concern that is present stems from many different sources. Some parents are concerned because a health care professional has specifically stated that their child has a weight-related problem (Rich et al., 2005). Prompting healthcare providers to speak with parents about

weight may urge parents to make lifestyle changes. Other caregivers were alarmed simply because their adult peers expressed disquiet. Child current and future health was another rationale for parental uneasiness with their child's weight. Sometimes a certain event can provoke concern. Parents stated that weight-linked comments from outsiders often sparked their concern (Jackson et al., 2005). Also, mothers stated that shopping for their children caused concern, since the child was no longer able to fit into age-appropriate clothing. Seeing class pictures and child's relation to peers also sparked concern among parents. Some parents have watched how their own child reacts to food when in a group setting. Parents have reported lack of child self-control when watching other siblings, or children at parties, act differently towards food. One parent mentioned that her child would camp out near the food during get-togethers, while other children just ran to and from the table a time or two. Predictors of parental concern included underestimation of child's weight status, child health-related quality of life, and child BMI (Lampard et al., 2008). If parents thought that their child's weight was interfering with involvement with peers, and/or leisure activities. This implies that parents are not as concerned about future health problems, but more concerned about problems with immediate affects. In this same study, parent BMI and the parent's concern level about their own weight did not correlate to concern about their child's weight in one study.

Aside from concern about actual child weight, parents have other fears and apprehension to implementing weight-related lifestyle changes into their own homes. Putting children on diets is often viewed negatively by parents (Druon et al., 2008). Parents sometimes believe that talking to their children about weight and/or restricting eating could cause eating disorders. Even if parents are not worried about development of an eating disorder, they still predict that weight-reduction related practices will hurt self-esteem and/or body image. These worries override the obesity worries, since mothers can easily acknowledge causes of their child's obesity. Negative self-esteem and social issues emerged as central themes concerning parent worries about child weight. Some parents do not want to change behavior because they think it will affect the child's overall happiness. Parents may also worry about their child's view of them if they begin to change the child's life in a way that the child dislikes. Mothers reported that they did not want to be remembered as a controlling and over assertive parent if they forced their obese

child to change their eating habits. Parents may be torn between the physical and mental well-being of their child. The role of the parent can be very perplexing relating to child weight.

In society, weight is an extremely taboo subject matter. This level of taboo may increase when weight is related to children. Many parents will downplay or offset speaking of their child's health problem by pointing out academic success (Druon et al., 2008). The parents then speak of the health problem like a choice. Parents stated that they would choose academic success over athletic success in a recent study. It is feasible that children can be academically and athletically successful. Encouraging parents to accept this view can be supported by schools and media.

Parents and caregivers play the biggest role at home regarding child weight status from the beginning of a child's life. When the child is very young, the parent is the sole provider of food. This time period is key for intervention. As the child gets older, the parental influence regarding food and exercise lessens (Lindsay et al., 2006). Dietz, Stern, & The American Academy of Pediatrics (1999) stated that the offering presentation of foods that are healthy is the role of the parent. On the other hand, it is the child's role to determine portion size that is consumed.

It is crucial for parents to implement changes and promote healthy living at an early age. Reasons for loss of dietary authority may include: media, school influence, peer influence, less attention to family, environmental changes, and more time constraints. Older children are exposed to obesogenic environments outside of the home, and have more control over their own food and activity choices. Parents and household adults can face more challenges regarding child weight as the years pass, but can keep the home a healthy environment, nevertheless. Although parents play such a significant role in child weight status, the parent role should be coupled with communal efforts to fight combat childhood obesity (Lindsay et al., 2006).

Research uncovering obstacles and barriers to parents regarding child weight are important tools. The information learned can aid prevention efforts.

## CHAPTER III

### METHODOLOGY

This study was approved by the Texas Woman's University Institutional Review Board. A \$10 Wal-Mart gift card was used as an incentive.

#### **Participants**

The target population was parents of young children, ages below 11, in the select cities in North Texas. The cities included Dallas, Garland, Richardson, Aubrey, Denison, Keller, Mesquite, Sachse, Oak Point, Sanger, and Denton. Over half, 53.6%, of participants were from Denton, with 16.1% of participants from Dallas as the two leading cities. Parents were recruited through childcare centers. Childcare centers were located through the Texas Department of Family and Protective Services website database. Search criteria were based on the location of the center. All childcare centers that had email addresses in the above cities were contacted via email. A total of 63 centers were emailed, with 7 bounce backs. Ten centers responded by email. Twenty-eight centers were also contacted by phone. Of these centers, 25 agreed to participate in this study. Each center signed a research consent form. Two centers preferred to have a representative of our study personally hand flyers out to the parents. See Appendix A. The other centers wanted the flyers dropped off for their own manner of distribution. 1432 flyers were given out total. The first page of the online study was an informed consent page, of which the participant had to agree to proceed. Sixty-four participants chose to participate. Six surveys were discarded for not being complete. In total, sixty four participants contributed to our study. A total of fifty eight surveys were used for data analysis.

Of the 58 participants, 83.9% who completed the online survey stated that they were a mother (female), 12.5% stated that they were a father (male), and 3.6% classified themselves as the primary caretaker of the child (including "aunt and adoptive parent" and "grandmother guardian"). An overwhelming majority of our participants were female. The mean age of participants was  $32.5 \pm 8.5$  years of age. Most of our participants attempted at least some college (69.6%), with 37.5% obtaining at least a

Bachelor's degree. The majority of our participants were married or cohabitating (64.3%), with a low level of divorce (7.1%), and about a third being single (28.6). Participants were mostly employed full-time (69.6%). A relatively large group of participants were full-time students on financial aid (10.7%). 8.9% stated that they were unemployed by choice, and only 1.8% said they were unemployed, not by choice. Most participants listed their income between \$40,000 and \$60,000 per year. The mean body mass index (BMI) for our participants was  $27.72 \pm 8.3$ .

Participants were asked to complete the survey with one child in mind. A total 58.9% of focal children were female. The mean age of the subject children was  $5.36 \pm 2.4$  years old. The age range for subject children was 2 through 11 years. Majority of children were between ages 3 and 5, with the largest group being age 3.

### **Instrument Development**

The survey questionnaire was developed based on the literature review, feedback from two committee members, the researcher's previous experience in two specialized nutrition programs based in elementary schools in Arkansas, and previously published instruments that assessed knowledge, attitudes, and barriers about childhood obesity. Input from committee members was communicated by emails, individual meetings, and group meetings (Kaiser Family Foundation, 2004). See Appendix B.

Childhood obesity facts and causes were used to generate questions as well as activity guidelines for adults and parents. The questionnaire had seven objectives, (1) to obtain demographic data about participants and their children, (2) to measure diet and activity habits of participants children, (3) to uncover behaviors of parents and children surrounding meals and feeding children, (4) to determine the knowledge of parents regarding healthy behaviors and facts about childhood obesity, (5) to determine the attitudes and level of concern parents have regarding childhood obesity, (6) to discover what barriers parents face involving childhood obesity, and (7) to establish which preventative actions parents would be willing to take regarding childhood obesity.

Traditional demographic information was asked only about the participants, including marital status, education level, employment status, and income level. Conventional demographic questions were

asked about participants and their children, such as age, gender, height, and weight. There were 14 typical demographic questions, 6 of which were multiple choice and 8 of which were fill in the blank with a character limit. As for relationship with the child, we included mother, father, and an open option for other primary caretakers. In addition to standard demographic questions, participants were asked about doctor visits and physician advice about themselves and their children. A total of 6 additional demographic questions were asked. All 6 of these questions were multiple choice. In an effort to prevent bias, demographic questions about weight and healthcare provider advice were placed at the end of the survey.

To measure diet and activity levels, we asked a total of 46 questions. These questions were about daily physical activity level, daily sedentary activity level, dietary components, and weekly meal patterns. Twenty of these questions were a numbered ratio scale (0-7) indicating the number of times a certain behavior took place. Ten of these questions were fill in the blank to indicate measures of time. Sixteen of these questions were on an ordinal scale measuring diet components as “too low”, “about right”, or “too high”, with an option “don’t know”.

Twelve questions were presented to determine behaviors of parents and children regarding meal time habits (including sit down dinners, fast food, restaurant behavior, etc.), weight control efforts, portion size regulation, and child food preferences. Four of these questions were presented as interval scales determining how often a behavior took place. Five of these questions were open ended, allowing participants to answer however they chose. Three of these questions were nominal scaled as “yes” or “no”. Lastly, there was one ratio question verifying the number of dinner meals eaten at home.

We asked a total of 14 questions to ascertain the knowledge of parents pertaining to childhood obesity and healthy lifestyle. Most of these questions (9) were open-ended to prevent any sort of guidance toward to correct answer. These questions queried about defining a healthy diet, proper daily exercise amounts for adults and children, definitions of key terms, proportions of the population that are overweight or obese, and health risks related to childhood obesity. A set of 5 questions was represented in an interval scale, measuring healthy servings of food groups needed daily.

Attitude and concern questions in this survey centered on several topics. Reasons for buying fast

food, opinion on food portions for adults and children, opinions on restaurant nutrition, reasons for choosing a restaurant, reasons for buying food for the household, major contributors to childhood obesity, affiliate responsibility concerning childhood obesity, societal burden of childhood obesity, concern for child weight, concern for own weight, and ability to recognize overweight in self and/or child. Sixteen of these questions were presented as a Likert scale, ranging from “1= Not Important” to “5- “Very Important.” Nine questions were multiple choice, with one of the multiple choice questions having a fill in the blank option. Two questions were nominal scaled as “yes” or “no.” Two questions were completely open-ended to ensure that contributors to childhood obesity and communal burdens were not led in any direction, and so that all possible answers could be included.

Questions related to barriers of childhood obesity were aimed at defining childhood obesity barriers in the United States (US) as observed by parents by letting them answer freely, and by presenting options that have been questioned as contributors of childhood obesity. Twenty-four of these questions were displayed in a Likert scale format, with 1 being “Very Little” [contribution] and 5 being “A Lot” [large contributor]. One question was left open ended to ensure all possible responses could be obtainable. A total of twenty-five questions were used to learn about childhood obesity barriers as reported by parents.

The prevention portion of this questionnaire consisted of 35 questions. These questions included several options of childhood obesity prevention effort suggestions from various sources. Thirty-one of these questions were presented in a 1-5 Likert scale representing how significant each option would be in reducing childhood obesity or how willing the participant would be to support these measures. Three questions were open ended to ensure that we would be able to detect any and all prevention measures in which parents would be willing to partake. One multiple choice question was paired with an open ended question to determine, in general, if the participant had an interest in getting involved with childhood obesity and how (in case it was not listed in the prior questions).

The questionnaire was revised by one family sciences health professional and one nutrition health professional for content validity and strength. These experts were both faculty members at Texas Woman’s University in their respective departments. After a large question pool was reviewed, 182 questions were

chosen. Feedback and critique was rendered by the reviewers and used to make modifications and adjustments to the survey instrument to facilitate lucidity, simplicity, and comprehension for participants. Once the format was approved, it was then transferred to PsychData. The survey in its entirety can be viewed in Appendix B.

### **Procedure**

A flyer was originally given to participants containing the website link for the survey. The flyer also included information about the study, including contact information if a paper copy was preferred (See Appendix A). Due to low response rate, the survey was made available for 16 weeks. A total of 64 people began our survey. Fifty-eight surveys were completed.

### **Statistical Analysis**

Statistical analysis was completed using SPSS version 19. Descriptive statistics, including frequencies, means, standard deviations, and mode were used to summarize data. Chi Square test, Pearson correlation, and ANOVA were used. A factor analysis was used to determine if parents were likely to support prevention efforts based on a certain premise. Statistical significance was defined as  $p > 0.05$ .

## CHAPTER IV

### RESULTS

#### **Weight Characteristics**

We used self-reported height and weight to determine BMI. Reported height was converted to inches, and weight was given in pound units. With pounds and inches determined, the following formula was used to establish BMI:  $703 * (\text{pounds} / \text{inches}^2)$ . This equation can be found on the CDC website at: [http://www.cdc.gov/healthyweight/assessing/bmi/adult\\_BMI/index.html](http://www.cdc.gov/healthyweight/assessing/bmi/adult_BMI/index.html). Using exact BMIs, we placed participants into one of three categories, normal weight, overweight, or obese. The 'normal weight' category included underweight. Differentiating between normal weight and underweight holds no significance in this study. Therefore, 'normal weight' was defined as a BMI of 24.99 and below. Overweight was categorized as 25.00-29.99. Obese was categorized as a BMI of 30 and above. These are the guidelines stated on the CDC website, mentioned above. Overweight and obese parents made up about 60% of our subject sample. About 40% of participants were normal weight. The mean body mass index (BMI) for our participants was  $27.7 \pm 8.3$ . When asked to state whether or not participants felt they were overweight, only 16.3% misinterpreted their weight class. Of these, most of the incorrect assessments came from normal weight participants who felt that they were overweight.

#### **Food and Mealtime Characteristics**

Approximately 91% of our participants stated that their children ate breakfast five to seven times a week. Over 40% stated that their children never buy lunch from the school cafeteria, but many of the children were kindergarten-aged. Most participants declared that their child eats out for dinner only one or two times per week (73.2%), but only 55.3% indicated that their child eats cooked dinners at home five or more times weekly. The average number of home cooked dinners in our group was very high ( $M=4.54$ ,  $SD=1.46$ ). Most subjects (66.1%) cited eating at sit-down restaurants as a family one to three times per month. Almost half (44.1%) of our sample revealed that they take their child to get fast food at least once a week, and 33.8% take their children to get fast food 1 to 3 times per month. Most children had a snack or

dessert with meals at least a few times a week. Only 21.4% of parents stated that their child never has desserts or snacks with any meal. Almost half (48.2%) of the parents in our survey stated that their child never has soda, while 35.7% stated that their child only drinks soda one or two times per week.

Our survey included a short diet-recall portion in which we gave ten dietary options and asked parents to select the number of servings of each their child had the day before. The items with the highest number of servings were milk ( $M=2.07$ ,  $SD=1.28$ ), fruits ( $M=2.07$ ,  $SD=1.15$ ), and veggies ( $M=1.95$ ,  $SD=1.02$ ). The least consumed items were cans of non-diet soda ( $M=0.09$ ,  $SD=0.28$ ), fast food snacks or meals ( $M=0.64$ ,  $SD=1.15$ ), and sugary snacks ( $M=1.04$ ,  $SD=0.89$ ).

When asked if children should finish everything on their plate, 66.1% of our participants stated no. Ten percent of participants wrote comments on this question. Half of these answers were something to the effect of, 'I try to make my child eat an adequate amount, but only until he/she is full and not if it is going to cause sickness'. Only 16.1% of parents said that their child refuses what is served 'often' or 'all the time'.

### **Influences on Meal Decision Making**

Most parents thought that children's fast food (71.4%) and restaurant portion sizes (58.9%) were "just right". A very small amount of parents ever stated that portion sizes were too small, in any portion-size related question (7.1-8.9%). However, our participants did state that they thought adult portion sizes were too large. Parents also believed that adult and child menus offered "some" nutritious options, as opposed to "most" or "none". Participants were asked to weight the importance of five different factors regarding purchasing food for the household. Taste was the most important factor ( $M=4.50$ ,  $SD=0.68$ ), followed by whether or not children will like food items ( $M=4.13$ ,  $SD=0.68$ ). Taste was not rated below a 3 on the 5-point scale by any participant. Convenient preparation was least important to our participants ( $M=3.63$ ,  $SD=1.04$ ). When these elements were compared across adult BMI categories, the order of importance changed slightly. Overweight parents placed less importance on all elements influencing purchases except taste. Obese parents cared less about nutritional value and ability to buy healthy meals than normal weight or overweight parents. Obese parents cared more about taste, child preference, price,

convenient location, and convenient preparation than any other group. Parents of obese children considered price the most important factor when buy food.

### **Activity Level**

Amount of exercise per week was high for parents and children, with parents averaging almost 5.5 hours of exercise per week. Parents reported that their children exercised a mean of 11 hours per week. The average time children spend time outside playing was about 2.5 hours ( $M=159.03$  minutes). The average time spent watching TV was also about 2.5 hours ( $M=152.88$  minutes).

### **Weight Concern**

Participants were asked if they were concerned with their own weight as well as their child's weight. Answer choices included: Not at all concerned, a little concerned, somewhat concerned, and very concerned. Most parents (85.2%) expressed some level of concern for their own weight. Conversely, less than half of parents (45.6%) expressed any level of concern for their child's weight, even though 56.1% of the children were in fact overweight or obese. A Pearson correlation showed a significant positive relationship between parents' level of concern for their own weight and for their child's weight,  $r(52)=.49$ ,  $p < .05$ . When results were divided into parent and child weight classification, obese parents with obese children had the highest level of concern for their child's weight,  $M=2.80$ , as expected. Overweight adults with overweight children had the lowest level of concern for their child's weight,  $M=1.00$ . Refer to Figure 1.

Participants were asked if they have ever tried to control their own weight, or their child's weight. Answer choices were "yes" or "no" only. While 92.6% of parents stated that they have tried to control their own weight at some point, only 22.8% said they have ever tried to control their child's weight. See Table 2. After performing a Chi-Square test, there was no significant relationship found between parent self-weight control measures and parent child weight control measures,  $p = 0.242$ .  $\chi^2(1) = 1.37$ ,  $ns$  ( $p > 0.05$ ). Refer to Figure 2.

### **Knowledge Components**

Participants were asked, in open-ended form, to name health risks associated with childhood

obesity. Each answer was counted and a scale was made. Of the 58 participants, 159 total answers were given. Stating 0 to 2 risks named was coded as ‘little knowledge of health risks’, 3 to 5 risks named was coded as ‘average knowledge of health risks’, and 6 or more risks named was coded as ‘high knowledge of health risks’. The average number of answers given per participant was 2.74. This data was then correlated with participant BMI classification. A Pearson correlation showed a negative significant relationship between BMI and health risk knowledge related to childhood obesity,  $r(49) = 0.018, p < 0.05$ .

Participants were asked what percentage of US children are overweight. We believed that most participants would include ‘obese’ children in this estimate, so the correct answer was deemed 31.7%, based on CDC information. If participants named 25 to 35 percent, the answer was considered correct. Over one-third (31.6%) of participants approximated prevalence correctly. Most parents (56.1%) overestimated the overweight percentage, and a small amount (12.3%) underestimated the percentage of overweight US children. The average guess was higher than the actual percentage ( $M=42.03, SD=19.83$ ). Normal weight parents were less likely than overweight or obese parents to get the answer correct. However, when a Chi Square test was performed, it did not show a relationship at the significant level,  $p < .05$ .

### **Contributors to Childhood Obesity**

Using a 5-point Likert scale, we asked participants to evaluate how much responsibility each of eight groups have in addressing childhood obesity in the US. Parents rated themselves (or caregivers) as having the most responsibility ( $M=4.57, SD=1.01$ ). A high percentage, (78.6%) of participants gave caregivers the highest rating, 5 (“A Lot”). Schools followed in responsibility level ( $M=3.86, SD=1.18$ ). Government ( $M=2.66, SD=1.48$ ) and genetics ( $M=2.98, SD=1.15$ ) were established as having the least responsibility.

Again using a 5 point Likert scale, we offered 24 possible contributors to child obesity and asked parents to assess which contribute “Very Little” and which contribute “A Lot” to childhood obesity. The top four perceived contributors to childhood obesity were overconsumption of fast foods ( $M=4.5, SD=0.75$ ), overconsumption of high-calorie foods at home ( $M=4.47, SD=0.86$ ), lack of physical activity

outside of school ( $M=4.43$ ,  $SD=0.86$ ), and parents lack of knowledge about the risk factors associated with child obesity ( $M=4.43$ ,  $SD=0.76$ ). Our participants believed that genetics ( $M=2.79$ ,  $SD=1.10$ ), lack of safe cycling and walking paths ( $M=3.41$ ,  $SD=1.43$ ), and lack of safe places for children to play ( $M=3.50$ ,  $SD=1.35$ ) were the least contributors of the 24 choices.

### **Perceived Barriers**

Parents were asked a series of questions regarding barriers to childhood obesity. First, parents were asked an open-ended question in which they could state any and all major barriers they face in regards to child weight status. When parents were able to input their own answers, our 58 participants gave 160 answers. The most popular answer category was regarding parents. Over 21% of our participants listed parents as barriers to childhood obesity in many of the following ways: lazy, set in their ways, not controlling portions, lacking diet education, setting a bad example, not assertive, not enough family dinners at home, lack of concern by parents, and/or keeping unhealthy traditions. Many parents believe that cost and the child are barriers for healthy eating. Time, food industry, school, and government were all listed as barriers by our participants. Following that, we listed 24 specific barriers and asked participants to rate how much each contributes to childhood obesity on a scale of 1 “Very Little” to 5 “A Lot”. Over consumption of fast food was the highest cited perceived barrier that participants felt that they faced ( $M= 4.59$ ,  $SD= 0.75$ ). This was followed by overconsumption of high calorie foods at home ( $M= 4.47$ ,  $SD= 0.86$ ) and parents’ lack of knowledge about the risk factors associated with childhood obesity ( $M= 4.43$ ,  $SD= 0.78$ ). Of the twenty four options we gave, parents put the least emphasis on genetics ( $M=2.79$ ,  $SD= 1.10$ ). When compared across child BMI categories, overconsumption of fast food was in the top three perceived barriers for parents of children in each weight category (normal weight, overweight, and obese).

### **Prevention Efforts**

Participants were asked a series of questions regarding childhood obesity prevention initiatives. These questions included two open-ended questions, asking participants to share what they believed parents/caretakers or others (schools, healthcare providers, food industry, government, and media) could do to prevent childhood obesity. These were placed before any other prevention effort questions to avoid

leading the participants or giving them ideas for answers. The following 15 questions were potential actions that could be taken in society to combat childhood obesity. Participants were asked to rate how beneficial each would be in reducing childhood obesity on a scale of 1- "Very Little" to 5- "A Lot." Sixteen prevention questions were additional prospective actions for which participants were asked to choose their own level of support. These questions were also ranked on a Likert scale, with 1 being "Definitely would NOT support" and 5 being "Definitely WOULD support." Participants were also asked about their willingness to take an active role in affecting state and federal policies to improve childhood obesity prevention and/or management.

In the first prevention question, participants were asked to state their suggestions on what parents/caregivers can do to reduce or prevent childhood obesity. The question was open ended, and the 58 participants gave a total of 164 various suggestions. There were three main categories that emerged: Parent Behavior Change, Encouragement of Child Behavior Change, and Education Efforts. Most answers (53.7%) were within the Parent Behavior Change category. Suggestions included making the house a healthy food environment, being a healthy role model for children (by way of diet and exercise), make rules around food and exercise, and one even prompted to take action toward the government. Encouraging the child to change behaviors was also highly recommended. Forty three parents thought that urging the child to change (without changing themselves) would be beneficial to fight child obesity. Encouraging children to increase activity level in some way was the most common idea. While some participants believed parents themselves should get educated, most education answers were geared at children. Teaching nutrition knowledge to the child was cited 23 times.

Participants were then asked to rate various items on how significant each would be in reducing childhood obesity. Items included weight concerns, food consumption, food costs, media, knowledge, and policies (see Appendix B). These 15 items were scaled 1- "Very Little" to 5- "A Lot." Of the 15 items presented in this section of the questionnaire, school related initiatives were the most supported. Overall, parents believed that schools serving more healthy foods ( $M=4.40$ ,  $SD=0.86$ ), schools providing healthy eating and exercise programs ( $M=4.38$ ,  $SD=0.93$ ), and increasing physical education requirements in

schools could be the most significant weight moderating components ( $M=4.38, SD=0.88$ ). An additional 5% tax on high-fat/high-sugar foods was deemed the item least likely to help reduce childhood obesity ( $M=2.57, SD=1.40$ ). A univariate ANOVA showed that parents with an overweight child were significantly more likely to support “More time set aside for well child visits- with slight additional cost for the patient” when compared to parents of normal weight or obese children,  $F(2,40) = 4.23, p < .01$

Participants were asked to rate the level of support they would grant toward 16 specific prevention efforts on a Likert scale of 1 to 5. A selection of 1 denoted “Definitely would NOT support,” while 5 represented “Definitely WOULD Support.” The most supported measures were: (1) requiring schools to teach students healthy eating and exercise habits ( $M = 4.05, SD = 1.05$ ), (2) increased access to recreational facilities in the community paid for with tax payer money ( $M = 3.88, SD = 1.17$ ), and (3) allowing only healthy foods in vending machines ( $M = 3.79, SD = 1.09$ ). The least supported measures were (1) more time set aside for well child visits by a physician with cost to patient ( $M = 2.64, SD = 1.22$ ), (2) requiring schools to weigh students regularly and send parents a health report card ( $M = 2.66, SD = 1.32$ ), and (3) adding a 5% tax on high-fat/high-sugar foods ( $M = 2.79, SD = 1.37$ ).

The 16 prevention support items were subjected to an exploratory factor analysis with Varimax rotation. Four factors were extracted, explaining a total of 62% of the variance. The four factors represented the following themes: Community Responsibility and Cost, Individual Responsibility and Cost, School Activity Measures, and School Food Measures. Factor loadings for the items in all four factors can be found in Table 2. Once the four factors emerged, we tested to see if education level and/or level of weight concern were correlated in any way. In all four categories, parents who had completed at least a college degree were more willing to support prevention efforts than those with less education. See Table 3. Parents with lower education, and who also did not have any level of concern for their child’s weight were more likely to support community responsibility prevention efforts, as compared to highly educated parents who were concerned about their child’s weight. Parents who had no concern for their child’s weight, and had some college or less education level, were significantly more likely to support community responsibility prevention efforts than higher educated parents who had concern about their child’s weight.

When asked how willing they would be to take an active role in affecting state and federal policies, parents of obese children were willing to take the most active role ( $M=2.57$ ,  $SD= 0.441$ ), followed by parents of overweight children ( $M=2.78 \pm .441$ ), and parents of normal weight children expressed the least interest ( $M=3.00$ ,  $SD= 0.767$ ). When asked to explain their answer in response to this question, many parents stated that time and lack of adequate power were barriers to getting involved. One parent said, “It seems like such a futile effort to try. You would have to have some position of power to make any difference, I think.” Many answers were conflicting: “I just choose to stay out of the middle of that” versus “I want help in any way I can to help my child.” Many parents also stated that they felt change at the federal or state level was too high, and that the changes should be made at home.

## CHAPTER V

### DISCUSSION

This study revealed several important findings. Mealtime characteristics varied greatly among families. Almost half of participants stated that their child never buys lunch from the school cafeteria, and even less children brought a sack lunch to school. However, many of the children were under school age. The young mean age of children (about 5 years old) may also explain the low number of times eating out per week and the high level of eating dinners at home. Even with the young average age of children, almost half of our adult sample (44.1%) took their child to get fast food at least once a week. Almost 80% of our participants took their children to get fast food at least once a month. Prevalence of fast food may increase as children get older. Almost half of children never consumed soda, and this may also be related to the low age of children in our study. When asked to recall diet items consumed on the previous day, participants' answers stayed consistent, with soda and fast food being consumed least. Milk, fruits, and foods high in fiber were consumed the most according to the participant recall. Considering the very high prevalence of breakfast, the low prevalence of buying lunch, and the low prevalence of eating out for dinner, it is likely that a high number of healthy options are consumed (i.e. milk, fruits, and fiber-rich foods). Also showing consistency was the low frequency of dessert per week (73.2% of children had dessert 3 or less times per week), and the reporting of low consumption of sugary snacks in the diet recall section ( $M=2.14$ ,  $SD=1.10$ ). Most parents (66.1%) stated that they did not try to force their children to finish everything on their plate. However, a significant relationship was found between child BMI category and whether or not the parent made the child eat everything on their plate. Aside from extra calories eaten after the child is satiated, compelling a child to clean their plate may create a detrimental lifelong habit of doing so. Finding a balance between a stubborn child and an adequate amount of food is key for parents. This may be easier than parents think, considering less than 20% of parents stated that their child refuses what they serve always or often. Perhaps portion size education could be a helpful tool when determining how much a child should eat. Most parents thought that children's fast food portions were "just right". Portion sizes for children have

increased over time. This may indicate that parents are unaware of proper portion sizes for children. An alternative to making a child finish all of his/her food would be for parents to have their child eat the correct portions for his/her age. When determining which foods would be purchased for the household, taste and whether or not the child would like the foods were most important to parents. These results varied from our hypothesis. We speculated that price would be the most important influence when purchasing foods. Taste as a reason for food choice led across all parental BMIs, with obese parents caring the most about taste. Obese parents also cared the least about choosing foods that were healthy or nutritional as compared to normal weight parents or overweight parents. Taste was the most influential factor when choosing foods for the day, but parents stated fast food and high calorie foods at home as two top barriers. These two findings exacerbate one another. Interestingly, parents of obese children considered price the most important factor when buying food. This indicates that the lower price of junk food is a contributor to childhood obesity. Mealtime characteristics showed important relationships in our study.

The reported amount of exercise in our study was extremely high for parents and children. We did not believe that BMIs of either group (parents of children) reflected the amount of exercise reported by participants. We believe that participants overestimated the amount of exercise accomplished by themselves and their children. If the amount of exercise is accurate, daily caloric intake may be very high in our sample group. Parents may have been incorrectly miscalculating physical activity at school or with other care takers. The amount of sedentary activity was consistent with other surveys. Regarding physical activity, a number of barriers exist for parents to overcome. Dwyer et al. (2008) showed that children may prefer sedentary activity over physical activity, although our results did not reflect this. Other physical activity barriers not found in our study include: children having trouble playing organized games because of failure to follow rules, children not wanting to get involved in activities because of the social aspect of playing with others causing anxiety, shy children, children with disabilities, and children tired after school. Parental fatigue was stated in our study as well as others (Dwyer et al., 2008). Parents are busy during the day, and feel tired when they come home. At times, parents may even encourage sedentary behavior so that they can have a break.

As expected, most parents (85.2%) had some level of concern for their own weight. A Pearson correlation showed that parents who were concerned with their own weight were significantly more likely to be concerned with their child's weight, and obese parents with obese children had the highest level of concern among different groups. However, general concern for child weight was low in our study. Although 56.1% of children were obese or overweight, only 45.6% of parents showed any level of concern. This finding reflects a slight tendency of parents to underestimate child weight. Still, this difference is minor. Taking action against childhood obesity may be more of a barrier for parents than knowledge of child weight issues. Over 90% of parents stated that they have tried to control their own weight, but less than 23% stated that they had ever tried to control their child's weight. Statistically, no significant relationship was found between weight control efforts. This may imply that weight control efforts are a normal part of adult life, and do not trigger parents to control child weight. Most of our participants were females who have had children, which may have skewed answers to this particular question.

Parents exhibited an overall high level of knowledge regarding weight in this study. Most parents were able to correctly guess their own weight class. Parents were more likely to guess their child's weight class incorrectly, showing a knowledge discrepancy regarding child obesity (versus adult obesity). However, when parents were asked what percentages of children are overweight in the US, they tended to overestimate. This may mean that parents are aware that there is a childhood obesity epidemic but are unable to apply that knowledge to their own children. This is consistent with weight concern data. Parents are perceptive to childhood obesity, but may not be willing to confront their child or enforce lifestyle changes. Most parents were also able to name at least one health risk associated with childhood obesity. Most parents were able to name a heart condition as a risk factor, showing that many parents are knowledgeable about weight's relationship with cardiovascular disease. Very few parents named a risk factor related to bone health or self-esteem. A significant negative relationship was shown, however, between adult BMI and knowledge. This was expected. Risk factor knowledge in our study was high, yet parents declared 'lack of parent knowledge of risk factors' very high among barriers.

When addressing the responsibility and contributors of childhood obesity, results were somewhat

surprising. In this study, parents rated themselves as holding the most responsibility in childhood obesity. Schools were the second most responsible party, according to parents. Parents thought genetics had the least amount of responsibility. When choosing from options we gave them, high calorie food and decreased exercise were ranked as high contributors. Genetics was once again the least responsible for childhood obesity according to parents. This shows that our participants believe that the environment plays a large role in child obesity, and parents are aware of their role in that environment. The results of many interventions and studies show that child weight status can be affected positively by increasing the parents' food and activity knowledge, modeling AND encouraging healthy lifestyle habits, and having a healthy weight themselves (Lindsay et al., 2006). Not only do good practices and modeling encourage and augment better health for children, unhealthy practices and modeling facilitate unhealthful routines for children.

Concerning barriers, answers varied widely, and in some cases, endorsement of a barrier in our sample was high, but support of a related prevention effort was low. Parents named fast food and high calorie foods at home as two of the most collective barriers in our group. In most cases, especially parents of younger children, caregivers are the source of these foods. Although fast food and high calorie foods at home were the two most common cited barriers, parents did not support taxing of these foods. 'Healthy foods unavailable' was one of the least supported barriers. Once again, participants in our study have acknowledged their own role in childhood obesity by admitting that healthy foods are available, perhaps just not chosen. Participants often stated cost and time issues when they were asked to freely express barriers. This may indicate a high need for healthy options at fast food restaurants and healthy options for convenience foods purchasable at the grocery store. Interestingly, these results stayed similar when results were cross examined by child BMI category. Time is a barrier mentioned by parents in other studies as well (Dwyer et al., 2008). Barriers regarding time include: children will not easily tolerate the time it takes parents to cook, children prefer to eat dinner as soon as they get home, parents who have more than one child battle with the fact that the children want to eat at different times, work and school take up too much of the parents' time, healthier foods taking more time to prepare, and more. This may be a situation in which convenience foods, fast foods, and other less healthy but quicker options play a role, although

convenience was not stated a leading influence on food purchase. The food industry offers many quick-fix options that are not usually healthier options. Since parents in our study believed that they held much of the responsibility surrounding childhood obesity, and knowledge levels were high, time may be the major issue keeping parents from combating childhood obesity. Safety as a barrier was ranked somewhat low in our study. Of 24 answer choices, safety measures were in the bottom five. This is somewhat contradictory to findings of other studies. Safety is often a source distress for parents. It is unlikely that parents would intentionally place their child into situations in which they fear harm for the child. Mothers have expressed a conflict between increasing exercise and safety (Jackson et al., 2005). There may also be gender differences in parental perceptions of child safety (Rich et al., 2005). Many (82%) of the parents in the Rich et al. (2005) study reported having a safe place for their child to play. However, half of these respondents indicated that the safe place for play was inside the home, which is not ideal for exercise. Location and recruitment may be one reason that safety was not stated as a childhood obesity exercise barrier in our study.

Four patterns emerged from the prevention efforts we presented to participants. Parents were most likely to support measures that could be described as ‘community measures’. These suggestions included allowing only healthy foods in vending machines, restricting TV advertisements of unhealthy foods, increased access to recreational facilities in the community paid for with tax payer money, increased access to community education programs about nutrition and healthy eating paid for with tax payer money, and more time at doctor visits with no cost to the patient. This finding is interesting, because participants were later asked if they were willing to become active at the legislative level and many subjects expressed that they did not think that they could be helpful at this level, or had time. Also notable is the fact that taxing fast foods was not highly supported in our study. Participants would be willing to use their own money to increase areas for exercise, but not to pay more for food. This may specify changes in diet and/or food routines are the most difficult for parents to achieve. Individual cost and responsibility measures were another pattern that emerged in prevention efforts. Once again, parents answer in support of spending more of their own money. Although schools were not rated high in responsibility or barriers, parents did support

using schools in prevention efforts. One school pattern emerged specifically in changing physical activity measures and another in altering food procedures.

This study revealed discrepancies in parental knowledge of their own weight class, their child's weight class, the obesity epidemic regarding adults and children, exercise recommendations, and risks associated with child obesity.

## CHAPTER VI

### SUMMARY AND CONCLUSIONS

- H1 There will be significant differences in food and mealtime characteristics between normal weight, overweight, and obese parents. *This hypothesis is accepted.*
- H2 There will be significant differences in food and mealtime characteristics between normal weight, overweight, and obese children. *This hypothesis is accepted.*
- H3 Cost will have the biggest influence on food decision making. *This hypothesis is rejected.*
- H4 There will be a relationship between concerns for one's own weight and concern for his/her child's weight. *This hypothesis is accepted.*
- H5 Childhood obesity knowledge will be low among parents. *This hypothesis is rejected.*
- H6 Themes of barriers to childhood obesity will emerge from participants. *This hypothesis is accepted.*
- H7 Themes of prevention efforts to childhood obesity will emerge from participants. *This hypothesis is accepted.*

#### **Conclusions**

Educational programs are essential to help change dietary patterns. Interventions demanding healthy lunches in schools and providing children and adults with regular exercise programs along with research could be a start to helping fight against obesity. Parents are becoming more aware of child weight issues, and need to increase knowledge about preventative strategies.

#### **Limitations**

Location was the primary limitation in this study. This study was done only in North Texas, with majority of participants from highly urbanized and similar cities. Certain aspects of demographic data did not represent the US population (highest level of education, marital status, etc.) and are consequently not able to be generalized. Another limitation was our specific way of recruiting. Because we recruited parents from childcare centers, diversity may have been altered due to ability to afford child care. The survey was also

online, which may have created sample bias. Lastly, there may be a high level of reporting bias in our study. Children did not fill out our survey directly, but parents were inquired about their children's eating habits. Also, diet recall is a technique which is self-reported memory.

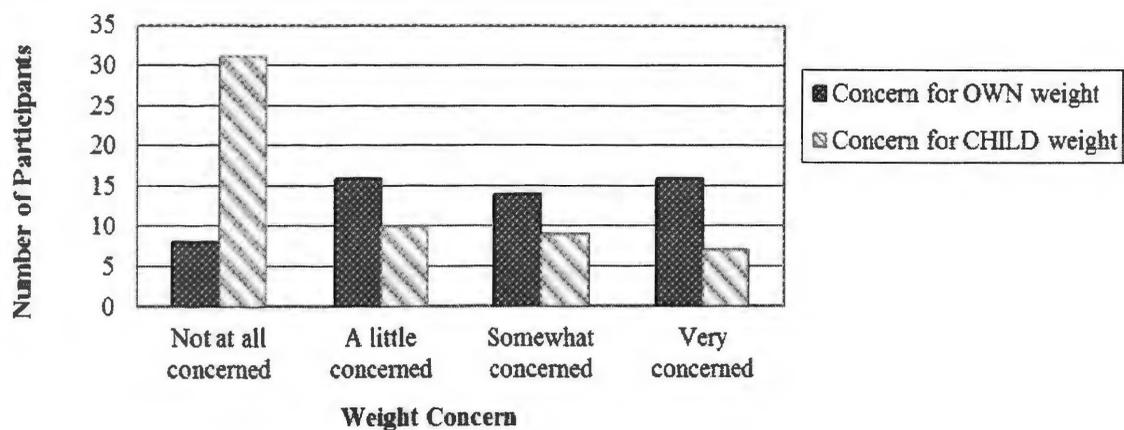


Figure 1. Levels of parental weight concern for self and child.

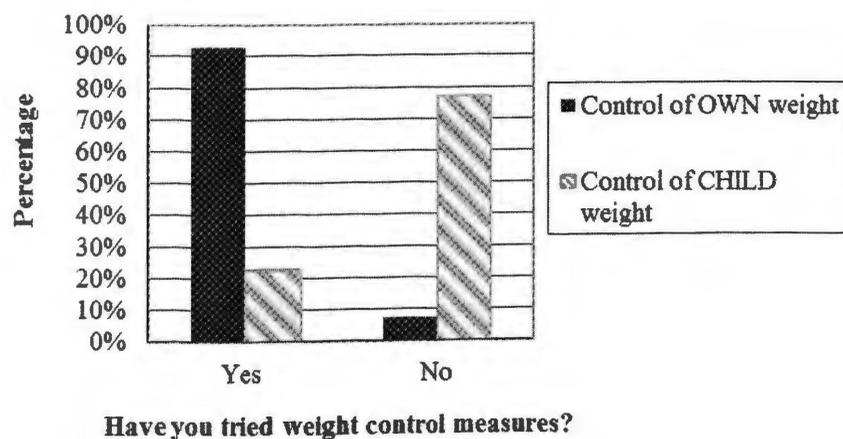


Figure 2. Parental weight control measures for self and child

## REFERENCES

- Abrams, J. (2008). Childhood Obesity -- A Looming Disaster. *Travel Medicine Advisor*, 18(3), 15-16.
- Adams, R., & Bukowski, W. (2008). Peer victimization as a predictor of depression and body mass index in obese and non-obese adolescents. *Journal of Child Psychology and Psychiatry*, 49(8), 858-866. doi:10.1111/j.1469-7610.2008.01886.x
- American Dietetic Association [ADA]. (2004). Position of the American Dietetic Association: Use of nutritive and nonnutritive sweeteners. *American Dietetic Association*, 104, 255-275.
- Barlow, S. E., & Chang, J. (2007). Is parental aggravation associated with childhood overweight? An analysis of the national survey of children's health 2003. *Acta Paediatrica* (Oslo, Norway: 1992), 96(9), 1360-1362.
- Bauer, K. W., Laska, M. N., Fulkerson, J. A., & Neumark-Sztainer, D. (2011). Longitudinal and secular trends in parental encouragement for healthy eating, physical activity, and dieting throughout the adolescent years. *Journal of Adolescent Health*, 49(3), 306-311. doi:10.1016/j.jadohealth.2010.12.023
- Birch, L. & Fisher, J. (2000). Mothers' child-feeding practices influence daughters' eating and weight. *American Journal of Clinical Nutrition*, 71, 1054-61.
- Biro, F. M. & Wien, M. (2010). Childhood obesity and adult morbidities. *American Journal of Clinical Nutrition*, 91(5), 1499S-1500S. doi: 10.3945/ajcn.2010.28701B
- Boreham, C., & Riddoch, C. (2001). The physical activity, fitness and health of children. *Journal of Sports Sciences*, 19(12), 915-929. doi:10.1080/026404101317108426
- Bowman, S. (2002). Beverage choices of young females: Changes and impact on nutrient intakes. *Journal of American Dietetic Association*. 102; 1234-1239.

- Carnegie, D., Young, J., & Pfeiffer, M. (2006). Analysis of beverage consumption and physical activity of children in grades 3-5. *Missouri Journal of Health, Physical Education, Recreation & Dance, 16*, 72-79.
- Chauhan, J., Donald, E., Basu, T., Hawrysh, Z., & Gee, M. (1987). Age-related olfactory and taste changes and interrelationships between taste and nutrition. *Journal of the American Dietetic Association, 87*(11), 1543-1550.
- Clark, J., Brancati, F., & Diehl, A. (2002). Nonalcoholic fatty liver disease. *Gastroenterology, 122*(6), 1649-57.
- Cleland, V., Venn, A., Fryer, J., Dwyer, T., and Blizzard, L. (2005). Parental exercise is associated with Australian children's extracurricular sports participation and cardiorespiratory fitness: A cross-sectional study. *International Journal of Behavioral Nutrition and Physician Therapy, 2*(3), 1-9.
- Coulston, A., and Johnson, R. (2002). Sugar and sugars: myths and realities. *Journal of the American Dietetic Association, 102*(3), 351-353.
- Crocker, H., Sweetman, C., & Cooke, L. (2009). Mothers' views on portion sizes for children. *Journal of Human Nutrition & Dietetics, 22*(5), 437-443.
- Cruz, M., Shaibi, G., Weigensberg, M., Spruijt-Metz, D., Ball, G., & Goran, M. (2005). Pediatric obesity and insulin resistance: chronic disease risk and implications for treatment and prevention beyond body weight modification. *Annual Review of Nutrition, 25*, 435-468.
- Dabelea, D., Pettitt, D.J., Jones, K.L., & Arslanian, S.A. (1999). Type 2 diabetes mellitus in minority children and adolescents. An emerging problem. *Endocrinology and Metabolism Clinics of North America, 28*(4), 709-729.
- Daniels, S., Arnett, D., Eckel, R., Gidding, S., Hayman, L., Kumanyika, S., Robinson, T., Scott, B., St. Jeor, S., & Williams, C. (2005). AHA scientific statement: Overweight in children and adolescents; Pathophysiology., consequences, prevention, and treatment. *Circulation, 111*(15), 1999-2012.

- Dehghan, M., Akhtar-Danesh, N., & Merchant, A. (2005). Childhood obesity, prevalence and prevention. *Nutrition Journal, 4*, 24-24.
- Dennison, B., Erb, T., and Jankins, P. 2002. Television viewing and television in bedroom associated with overweight risk among low-income preschool children. *Pediatrics, 106*(6), 108-1035.
- Deshmukh-Taskar, P., Nicklas, T., O'Neil, C., Keast, D., Radcliffe, J., & Cho, S. (2010). The relationship of breakfast skipping and type of breakfast consumption with nutrient intake and weight status in children and adolescents: the National Health and Nutrition Examination Survey 1999-2006. *Journal of the American Dietetic Association. 110*:869-878.
- Dietz, H., Stern, L., & American Academy of Pediatrics, Elk, Grove Village. (1999). Guide to your child's nutrition: Making peace at the table and building healthy eating habits for life.
- Druon, V., Fraser, J., & Alexander, C. (2008). Mothers' knowledge, beliefs and attitudes towards their obese and overweight children living in rural north-west of new south wales. *Australian Journal of Rural Health, 16*(6), 387-388.
- Dwyer, J., Needham, L., Simpson, J., & Heeney, E. S. (2008). Parents report intrapersonal, interpersonal, and environmental barriers to supporting healthy eating and physical activity among their preschoolers. *Applied Physiology, Nutrition & Metabolism, 33*(2), 338-346. doi:10.1139/H07-195
- Elliot, S.A., Truby, H., Lee, A., Harper, C., Abbott, R. A., and Davies, P. S. W. (2011). Associations of Body Mass Index and Waist Circumference with: energy intake and percentage energy from macronutrients, in a cohort of Australian children. *Nutrition Journal. 10*:(58).
- Fisher, J. O., & Kral, T. V. E. (2008). Super-size me: Portion size effects on young children's eating. *Physiology & Behavior, 94*(1), 39-47. doi:10.1016/j.physbeh.2007.11.015
- Fogelholm, M., Nuutinen, O., Pasanen, M., Myöhänen, E., & Säätelä, T. (1999). Parent-child relationship of physical activity patterns and obesity. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity, 23*(12), 1262-1268.

- French, S., Lin B., and Guthrie, J. (2003). National trends in soft drink consumption among children and adolescents age 6 to 17 years: prevalence, amounts, and sources, 1997/78 to 1994/98. *Journal of the American Dietetic Association*, 103(10), 1326-1331.
- Gable, S., & Lutz, S. (2000). Household, parent, and child contributions to childhood obesity. *Family Relations*, 49(3), 293-300.
- Grimm, G., Harnack, L., & Story, M. (2004). Factors associated with soft drink consumption in school-aged children. *Journal of the American Dietetic Association*, 104, 1344-1349.
- Hancox, R., & Poulton, R. (2006). Watching television is associated with childhood obesity: but is it clinically important? *International Journal of Obesity*, 30(1), 171-175. doi:10.1038/sj.ijo.0803071
- Hardus, P., van Vuuren, C., Crawford, D., & Worsley, A. (2003). Public perceptions of the causes and prevention of obesity among primary school children. *International Journal of Obesity & Related Metabolic Disorders*, 27(12), 1465-1471. doi:10.1038/sj.ijo.0802463
- Heaney, R., Davies, K., and Barger-Lux M. (2002). Calcium and weight: clinical studies. *Journal of the American College of Nutrition*, 21, 152S-155S.
- Heude, B., Kettaneh, A., Rakotovo, R., Bresson, J., Borys, J., Ducimetière, P., & Charles, M. (2005). Anthropometric relationships between parents and children throughout childhood: The fleurbaix-laventie ville santé study. *International Journal of Obesity*, 29(10), 1222-1229. doi:10.1038/sj.ijo.0802920
- Hughes, A., & Reilly, J. (2008). Disease Management Programs Targeting Obesity in Children: Setting the Scene for Wellness in the Future. *Disease Management & Health Outcomes*, 16(4), 255-266.
- Jackson, D., McDonald, G., Mannix, J., Faga, P., & Firtko, A. (2005). Mothers' perceptions of overweight and obesity in their children. *Australian Journal of Advanced Nursing*, 23(2), 8-13.
- James, P. (2004). Obesity: The worldwide epidemic. *Clinics in Dermatology*, 22(4), 276-280. doi:10.1016/j.clindermatol.2004.01.010.

- Jones, R. A., Okely, A., Gregory, P., & Cliff, D. (2009). Relationships between weight status and child, parent and community characteristics in preschool children. *International Journal of Pediatric Obesity, 4*(1), 54-60. doi:10.1080/17477160802199984
- Kaiser Family Foundation (2004). *San Jose Mercury News*, 1-46. Retrieved from:  
<http://www.kff.org/kaiserpolls/upload/Survey-on-Childhood-Obesity-Summary-and-Chartpack.pdf>.
- Keller, K. L., St-Onge, M., Faith, M. S., Kirzner, J., & Pietrobelli, A. (2009). Increased sweetened beverage intake is associated with reduced milk and calcium intake in 3- to 7-year-old children at multi-item laboratory lunches [electronic resource]. *Journal of the American Dietetic Association, 109*(3), 497-501.
- Kim, Y. & Lee S. (2009). Physical activity and abdominal obesity in youth. *Applied Physiology of Nutrition Metabolism, 34*, 57-58.
- Klein, J. & Dietz, W. (2010). Childhood obesity: The new tobacco. *Health Affairs, 29*(3), 388-392.  
doi:10.1377/hlthaff.2009.0736
- Krebs, N., Himes, J., Jacobson, D., Nicklas, T., Guilday, P., & Styne, D. (2007). Assessment of child and adolescent overweight and obesity. *Pediatrics, 120S*, 193-228.
- Lampard, A. M., Byrne, S. M., Zubrick, S. R., & Davis, E. A. (2008). Parents' concern about their children's weight. *International Journal of Pediatric Obesity, 3*(2), 84-92.
- Lindsay, A. C., Sussner, K. M., Kim, J., & Gortmaker, S. (2006). The role of parents in preventing childhood obesity. *Future of Children, 16*(1), 169-186.
- Lightwood, J., Bibbins-Domingo, K., Coxson, P., Wang, Y., Williams, L., & Goldman, L. (2009). Forecasting the future economic burden of current adolescent overweight: an estimate of the coronary heart disease policy model. *American Journal of Public Health, 99*(12), 2230-2237.
- Ludwig, D. (2007). Childhood Obesity — The Shape of Things to Come. *New England Journal of Medicine, 357*(23).

- Ludwig, D., Peterson, K., & Gortmaker S. (2001). Relation between consumption of sugar-sweetened drinks and childhood obesity: a prospective, observational analysis. *Lancet*, (9255), 505-508.
- Lytle, L., Hearst, M., Fulkerson, J., Murray, D., Martinson, B., Klein, E., & Samuelson, A. (2011). Examining the relationships between family meal practices, family stressors, and the weight of youth in the family. *Annals of Behavioral Medicine*, 41(3), 353-362. doi:10.1007/s12160-010-9243-z
- Maffeis, C., Pinelli, L., & Schutz. (1996). Fat intake and adiposity in 8 to 11 year-old obese children. *International Journal of Obesity*, 20, 170-174.
- Maffeis, C., Talamini, G., & Tato, L. (1998). Influence of diet, physical activity and parents obesity on children's adiposity: A four-year longitudinal study. *International Journal of Obesity*, 22(8), 758-764.
- McBride, D. (2010). Childhood obesity. *Practice Nurse*, 39(11), 40-45.
- McCarroll, E., Lindsey, E., MacKinnon-Lewis, C., Chambers, J., & Frabutt, J. (2009). Health status and peer relationships in early adolescence: the role of peer contact, self-esteem, and social anxiety. *Journal of Child and Family Studies*, 18, 473-485. doi:10.1007/s10826-008-9251-9
- McCullough, N., Muldoon, O., & Dempster, M. (2009). Self-perception in overweight and obese children: A cross-sectional study. *Child: care, health and development*, 35(3), 357-364. doi:10.1111/j.1365-2214.2008.00924.x
- Metcalf, B. S., Hosking, J., Jeffery, A., Voss, L., Henley, W., & Wilkin, T. (2011). Fatness leads to inactivity, but inactivity does not lead to fatness: A longitudinal study in children (EarlyBird 45). *Archives of Disease in Childhood*, 96(10), 942-947.
- Must, A., & Strauss, R. (1999). Risks and consequences of childhood and adolescent obesity. *International Journal of Obesity & Related Metabolic Disorders*, 23(2), 2-11.
- Myers, S., & Vargas, Z. (2000). Parental perceptions of the preschool obese child. *Pediatric Nursing*, 26(1), 23-30.

- Ogden, C., Carroll, M., Curtin, L., Lamb, M., & Flegal, K. (2010). Prevalence of high body mass index in US children and adolescents, 2007-2008. *Journal of the American Medical Association*, 303(3), 242-249.
- Panel on Macronutrients, Subcommittees on Upper Reference Levels of Nutrients and Interpretation and Uses of Dietary Reference Intakes, and the Standing Committee on the Scientific Evaluations of Dietary Reference Intakes (2002). Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids (Macronutrients). *Circulation*. 2005;111:1999-2012.
- Perez-Pastor, E., Metcalf, B. S., Hosking, J., Jeffery, A. N., Voss, L. D., & Wilkin, T. J. (2009). Assortative weight gain in mother–daughter and father–son pairs: An emerging source of childhood obesity. longitudinal study of trios (EarlyBird 43). *International Journal of Obesity*, 33(7), 727-735. doi:10.1038/ijo.2009.76
- Phillips, R.G. & Hill, A.J. (1998). Fat, plain, but not friendless: Self-esteem and peer acceptance of obese pre-adolescent girls. *International Journal of Obesity*, 22, 287-293.
- Pietrobelli, A., Espinoza, M., & De Cristofaro, P. (2008). Childhood obesity: Looking into the future. *Angiology*, 59(30S-33S). doi:10.1177/0003319708318788
- Potwarka, L. R., Kaczynski, A. T., & Flack, A. L. (2008). Places to play: Association of park space and facilities with healthy weight status among children. *Journal of Community Health*, 33(5), 344-350. doi:10.1007/s10900-008-9104-x
- Puhl, R.M., & Latner, J.D. (2007). Stigma, obesity, and the health of the nation's children. *Psychological Bulletin*, 133(4), 557-580. doi:10.1037/0033-2909.133.4.557
- Putnam, J. & Allshouse, J. (1999) Food consumption, prices, and expenditures, 1970-1997. *Food and Consumers Economics Division, Economic Research Service, US Department of Agriculture. SB-939*, 1-189.

- Rees, A., Thomas, N., Brophy, S., Knox, G., & Williams, R. (2009). Cross sectional study of childhood obesity and prevalence of risk factors for cardiovascular disease and diabetes in children aged 11-13. *BMC Public Health, 9*(86), 86-91. doi:10.1186/1471-2458-9-86
- Rich, S. S., DiMarco, N. M., Huettig, C., Essery, E. V., Andersson, E., & Sanborn, C. F. (2005). Perceptions of health status and play activities in parents of overweight Hispanic toddlers and preschoolers. *Family & Community Health, 28*(2), 130-141.
- Schwimmer, J.B., Burwinkle, T.M., & Barni, J.W. (2003). Health-related quality of life of severely obese children and adolescents. *Journal of the American Medical Association, 289*(14), 1813-1819. doi:10.1001/jama.289.14.1813
- Semmler, C., Ashcroft, J., Van Jaarsveld, C. H. M., Carnell, S., & Wardle, J. (2009). Development of overweight in children in relation to parental weight and socioeconomic status. *Obesity, 17*(4), 814-820. doi:10.1038/oby.2008.621
- Smiciklas-Wright, H., Mitchell, D., Mickle, S., Cook, A., & Goldman, J. (2002). Foods commonly eaten in the United States: Quantities consumed per eating occasion and in a day, 1994-1996. *US Department of Agriculture, Agricultural Research Service, 252*. 1-152.
- Smith, A. P. (2010). An investigation of the effects of breakfast cereals on alertness, cognitive function and other aspects of the reported well-being of children. *Nutritional Neuroscience, 13*(5), 230-236
- Spurrier, N. J., Magarey, A. A., Golley, R., Curnow, F., & Sawyer, M. (2008). Relationships between the home environment and physical activity and dietary patterns of preschool children: A cross-sectional study. *International Journal of Behavioral Nutrition and Physical Activity, 5*(31), 1-12. doi:10.1186/1479-5868-5-31
- Timperio, A., Salmon, J., Telford, A., & Crawford, D. (2005). Perceptions of local neighbourhood environments and their relationship to childhood overweight and obesity. *International Journal of Obesity, 29*(2), 170-175
- The use and misuse of fruit juice in pediatrics. (2001). *Pediatrics, 107*(5), 1210.

- Tucker, L., Seljaas, G., & Hager, R. (1997). Body fat percentage of children varies according to their diet composition. *Journal of the American Dietetic Association*, 97:981-986.
- Van der Horst, K., Kremers, S., Ferreira, I., Singh, A., Oenema, A., and Brug, J. (2007). Perceived parenting style and practices and the consumption of sugar sweetened beverages by adolescents. *Health Education Research*, 22,(2);295-304.
- Veugelers, P., Sithole, F., Zhang, S., & Muhajarine, N. (2008). Neighborhood characteristics in relation to diet, physical activity and overweight of Canadian children. *International Journal of Pediatric Obesity*, 3(3), 152-159. doi:10.1080/17477160801970278
- Virdis, A., Ghiadoni, L., Masi, S., Versari, D., Danghini, E., Giannarelli, C., Salvetti, A., & Taddei, S. (2009). Obesity in the childhood: A link to adult hypertension. *Current Pharmaceutical Design*, 15(10), 1063-1071. doi:10.2174/138161209787846900
- Washington, P. S., Reifsnider, E., Bishop, S. L., Ethington, M. D., & Ruffin, R. E. (2010). Changes in family variables among normal and overweight preschoolers. *Issues in Comprehensive Pediatric Nursing*, 33(1), 20-38. doi:10.3109/01460860903486531
- Weiderpass, E., Braaten, T., Magnusson, C., Kumle, M., Vainio, H., Lund, E., & Adami, H-O. (2004). A prospective study of body size in different periods of life and risk of premenopausal breast cancer. *Cancer Epidemiology, Biomarkers & Prevention*, 13(3),1121-1127.
- Weiss, R., Shaw, M., Savoye, M., & Caprio, S. (2009). Obesity dynamics and cardiovascular risk factor stability in obese adolescents. *Pediatric Diabetes*, 10, 360-367. doi:10.1111/j.1399-5448.2008.00504.x
- Whitaker, R., Wright, J., Pepe, M., Seidel, K., Dietz, W. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *New England Journal of Medicine*, 337(13), 869. doi:10.1056/NEJM199709253371301
- Ziol-Guest, K. M., Duncan, G. J., & Kalil, A. (2009). Early Childhood poverty and adult body mass index. *American Journal of Public Health*, 99(3), 527-532. doi:10.2105/AJPH.2007.130575

APPENDIX A  
Data Set Tables

Table 1

*Recommended Macronutrient Intake for Children*

<b>Macronutrient</b>	<b>Age (or Gender)</b>	<b>Recommended Percent of Diet (%) or Total Amount</b>
Fat	1-3 years	30-40%
Fat	4-8 years	25-30%
Carbohydrate	All ages	45-65%
Protein	1-3 years	5-20%
Protein	4-18 years	10-30%
Kilocalories	Boys; 0-16 years	570-3152
Kilocalories	Girls; 0-16 years	520-2368

\*Information in this chart was collected from the Panel on Macronutrients, 2002.

Table 2.

*Childhood Obesity Preventative Measures with Factor Loadings.*

FACTOR LOADINGS			
Component			
COMMUNITY RESPONSIBILITY AND COST	INDIVIDUAL RESPONSIBILITY AND COST	SCHOOL ACTIVITY MEASURES	SCHOOL FOOD MEASURES
Allowing only healthy foods in school vending machines .502	Additional 5% tax on high-fat/high-sugar foods (which would increase the cost of fast food meals and some groceries) .640	More physical education courses in the school curriculum (by replacing other courses currently on the curriculum) .682	Removing all vending machines from schools .577
Restricting TV advertisements of unhealthy foods .517	More time set aside for well child visits (with slight additional cost for the patient) .704	More physical education courses in the school curriculum (by extending the school day) .658	Higher-cost school lunches in exchange for healthier meals .770
More time set aside for well child visits (without additional cost for the patient) .805	Increased access to fee-for-service community education programs about nutrition and healthy eating .737	Requiring schools to teach students healthy eating and exercise habits .663	Removing toys from fast food children's meals .409
Increased access to recreational facilities in the community (parks, trails, sports courts, etc.) paid for with tax payer money .732	Increased access to fee-for-service recreational facilities in the community .647	Requiring schools to weigh students regularly and sending parents a health report card .625	
Increased access to community education programs about nutrition and healthy eating, paid for with tax payer money .737			

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Table 3.

*Childhood Obesity Prevention Support Patterns Among Participants with Different Education Levels.*

<b>Factor</b>	<b>Education Level</b>	<b>Mean and Standard Deviation</b>
Community Responsibility and Cost*	Some College or Less	$M=3.37, SD=0.94$
	College Degree or More	$M=3.76, SD=0.81$
Individual Responsibility and Cost*	Some College or Less	$M=2.65, SD=0.73$
	College Degree or More	$M=3.15, SD=0.98$
School Physical Activity Measures	Some College or Less	$M=3.36, SD=0.91$
	College Degree or More	$M=3.43, SD=0.91$
School Food Measures*	Some College or Less	$M=2.67, SD=1.03$
	College Degree or More	$M=3.28, SD=1.04$

\*=Significant at  $p<0.05$  in Test of Between Subject Effects MANOVA.

**APPENDIX B**  
**Recruitment Flyer**

# **SURVEY PARTICIPANTS WANTED**

## **PARTICIPATE IN A SURVEY ABOUT CHILDREN'S HEALTH**

**ABOUT THE STUDY:** The purpose of this study is to obtain a realistic picture of young children's health and to learn about obstacles and barriers to childhood obesity prevention as experienced by families and communities.

**WHO WE ARE:** Researchers at Texas Woman's University, Departments of Family Sciences and Nutrition & Food Sciences.

**WHO WE NEED:** Families with children ages 3-10 years.

**WHAT IS INVOLVED:** Parents will be asked to fill out an anonymous online survey which takes about 30 minutes to complete. If you would like a paper survey, please inform your child care center's director.

**BENEFITS TO YOU:** A \$10 gift card for completing the survey. (\*only one survey per family)

**QUESTIONS:** Contact Brigitte Vittrup at [bvittrup@twu.edu](mailto:bvittrup@twu.edu) or 940-898-2624

### **READY TO GET STARTED?**

Online Survey Web Address:

<https://www.psychdata.com/s.asp?SID=140585>

\*There is a potential risk of loss of confidentiality in all e-mail, downloading and internet transactions. However, no identifying information is requested, and all surveys are downloaded onto a secure computer

APPENDIX C

Questionnaire Used in this Study

## **KNOWLEDGE, ATTITUDES, & BARRIERS RELATED TO CHILDHOOD OBESITY PARENT SURVEY**

The purpose of this study is to obtain a realistic picture of young children's health and to gain information about obstacles and barriers experienced by families and communities.

By completing this survey, you agree to participate in this study and to allow the Principal Investigators to use the results in conference presentations and/or research publications. However, information is collected anonymously; therefore, the information you provide cannot be linked to your name or personal information.

Participation is voluntary. A decision not to participate will not affect your current or future relationship with your child's school/daycare center or Texas Woman's University.

You will be asked about personal health related information. You are free to refuse any question you do not feel comfortable answering.

There is a potential risk of loss of confidentiality in all e-mail, downloading, and internet transactions. However, surveys will be downloaded onto a secure computer which is only accessible to the Principal Investigators.

It is expected to take approximately 30 minutes to complete this survey.

\*At the end of the survey, you will be given the opportunity to enter your name and contact information to receive a \$10 gift card. Please note that the contact information you provide will be collected at an external survey site, not connected to the site on which you enter your answers to the survey questions. Thus, there will be no way of linking your contact information to your answers.

Thank you in advance for completing this survey. Should you have any questions about this project, or the results of the survey, please contact one of the Principal Investigators: Brigitte Vittrup, 940-898-2624, BVittrup@twu.edu, or Owen Kelly, 940-898-2645, OKelly@twu.edu.

\* Alternate text for paper/pencil version:

When you have completed the survey, you are eligible for a \$10 gift card. Please put your survey in the envelope provided and put it in the mail. After a few days, you may contact Danielle Oldenburg at dani.shannon15@gmail.com or 940-898-2624 with your participant number (listed at the top of the survey). She will verify that your survey has been received (by verifying the survey number only) and will mail out your gift card. Please note that mailing addresses will NOT be stored along with the surveys, and thus your name and address will not be linked with your survey answers.

**KNOWLEDGE, ATTITUDES, & BARRIERS RELATED TO CHILDHOOD OBESITY  
PARENT SURVEY**

Please fill out this survey for your child between the ages of 3 and 10 years. If you have more than one child in this age group, please choose child to focus on for this survey.

How old is your child? \_\_\_\_\_

What is your child's gender? \_\_\_ Male \_\_\_ Female

What is your age? \_\_\_\_\_

Are you the child's: \_\_\_ Mother \_\_\_ Father \_\_\_ Other: \_\_\_\_\_

What is your marital status?

- \_\_\_ Single, never married
- \_\_\_ Separated/Divorced
- \_\_\_ Widowed
- \_\_\_ Married/Cohabiting

What is the highest level of education you have completed?

- \_\_\_ Less than high school
- \_\_\_ High school or GED
- \_\_\_ Associate's degree or some college
- \_\_\_ Bachelor's degree
- \_\_\_ Master's degree
- \_\_\_ Doctoral degree

If you hold a college degree, what was your major? \_\_\_\_\_

What is your employment status?

- \_\_\_ Employed full time
- \_\_\_ Employed part time
- \_\_\_ Full-time student on financial aid
- \_\_\_ Unemployed, by choice
- \_\_\_ Unemployed, not by choice

What is your total household income (before taxes)?

- \_\_\_ Less than \$10,000
- \_\_\_ \$10,000 - \$20,000
- \_\_\_ \$20,000 - \$30,000
- \_\_\_ \$30,000 - \$40,000
- \_\_\_ \$40,000 - \$50,000
- \_\_\_ \$50,000 - \$60,000
- \_\_\_ \$60,000 - \$70,000
- \_\_\_ \$70,000 - \$80,000
- \_\_\_ \$80,000 - \$90,000
- \_\_\_ \$90,000 - \$100,000

- \$100,000 - \$110,000
- \$110,000 - \$120,000
- \$120,000 - \$130,000
- \$130,000 - \$140,000
- \$140,000 - \$150,000
- More than \$150,000

In what city do you live? \_\_\_\_\_

Has your child seen a pediatrician or family practitioner for a well-child visit in the past year?

Yes  No

If so, how recent was the last visit?

- Within the past week
- Within the past month
- Within the past 2-3 months
- Within the past 4-6 months
- More than 6 months ago

Have you seen your primary care physician within the past year?  Yes  N

If so, how recent was the last visit?

- Within the past week
- Within the past month
- Within the past 2-3 months
- Within the past 4-6 months
- More than 6 months ago

In an average week, how many evening meals (dinner/supper) do you eat together as a family?

0      1      2      3      4      5      6      7

In an average week, how many hours or minutes does your child spend engaged in physical activity?

\_\_\_\_\_

In an average week, how many hours or minutes do you spend exercising?

\_\_\_\_\_

Do you believe that children should finish everything on their plate before leaving the table?

Yes  No

How often does your child refuse to eat what you serve him/her?

Never       Rarely       Sometimes       Often       All the time

If your child refuses to eat his/her meal, what do you do?

---



---



---

How often do you let your child choose what he/she eats for breakfast, lunch, or dinner?

Never       Rarely       Sometimes       Often       All the time

If your child is given a choice of what to eat, what kind of food does he/she choose most often?

---



---

In an average week how many times does your child:

Eat breakfast	0	1	2	3	4	5	6	7
Buy lunch at school cafeteria	0	1	2	3	4	5	6	7
Bring a sack lunch to school	0	1	2	3	4	5	6	7
Eat out for dinner	0	1	2	3	4	5	6	7
Eat prepackaged or prepared meal (TV dinner, take-out, etc.)	0	1	2	3	4	5	6	7
Eat dinner cooked at home	0	1	2	3	4	5	6	7
Have second helpings at dinner	0	1	2	3	4	5	6	7
Eat meal or snack in front of the TV	0	1	2	3	4	5	6	7
Eat a snack or dessert with the meal (cookie, chips, pudding, ice cream)	0	1	2	3	4	5	6	7
Drink soda	0	1	2	3	4	5	6	7

Thinking about yesterday, how many servings of each did your child have?

Cans of non-diet soda	0	1	2	3	4	5+	Don't know
Servings of other sugary drinks (kool aid, punch, juice, energy drinks)	0	1	2	3	4	5+	Don't know
Servings of fruit	0	1	2	3	4	5+	Don't know
Servings of vegetables	0	1	2	3	4	5+	Don't know
Fast food snacks or meals	0	1	2	3	4	5+	Don't know
Foods high in fiber	0	1	2	3	4	5+	Don't know
High sodium/salty foods	0	1	2	3	4	5+	Don't know
Servings of milk	0	1	2	3	4	5+	Don't know
Servings of cheese	0	1	2	3	4	5+	Don't know
Servings of sugary snacks (cake, muffin, pudding, candy)	0	1	2	3	4	5+	Don't know

How often do you buy fast food meals for your child(ren)? (such as McDonald's, Wendy's, Taco Bell, Dairy Queen, Sonic, Chick-Fil-A, etc.)

- Almost every day
- At least once a week
- 1-3 times per month
- Less than once a month
- Never

If you buy fast food meals for your child, what is the main reason for doing so? (Select only one)

- Quick and convenient
- Cheap
- Child asks for it
- You (parent) want it
- Child meal comes with a toy
- There is a healthy option
- Other (please indicate): \_\_\_\_\_

Do you think fast food children's meal portions are:

- Too small
- Just right
- Too large

How often do you and your family (including your children) eat at a sit-down restaurant (not including fast food restaurants)?

- Almost every day
- At least once a week
- 1-3 times per month
- Less than once a month
- Never

Please answer the following questions about the sit-down restaurant(s) (not including fast food restaurants) you visit most often:

Please rate the children's menus on their nutritious value:

- Most options are healthy and nutritious
- Some options are healthy and nutritious
- Most options are not healthy or nutritious

Please rate the children's menu options on the portion sizes:

- Too small
- Just right
- Too large

Please rate the adult menus on their nutritious value:

- Most options are healthy and nutritious
- Some options are healthy and nutritious
- Most options are not healthy or nutritious

Please rate the adult menus options on the portion sizes:

- Too small
- Just right
- Too large

When choosing a restaurant, how important is each of the following? (On a scale of 1-5 with 1 being “Not Important At All” and 5 being “Very Important”)

	Not Important At All			Very Important	
Amount of food you get for your money	1	2	3	4	5
Convenience of location	1	2	3	4	5
Ability to order healthy meals	1	2	3	4	5

When buying food for your household, how important is each of the following? (On a scale of 1-5 with 1 being “Not Important At All” and 5 being “Very Important”)

	Not Important At All			Very Important	
Price	1	2	3	4	5
Convenient preparation	1	2	3	4	5
Nutritional value	1	2	3	4	5
Taste	1	2	3	4	5
Whether your children will like it	1	2	3	4	5

Which of the above is the most important?

- Price
- Convenient preparation
- Nutritional value
- Taste

During an average day, how much time does your child spend with each of the following activities (indicate in hours or minutes)

- Watching TV or DVDs \_\_\_\_\_
- Using a computer \_\_\_\_\_
- Playing video games \_\_\_\_\_
- Doing homework \_\_\_\_\_
- Reading books (not for school) \_\_\_\_\_
- Playing with non-electronic toys \_\_\_\_\_
- Playing outside \_\_\_\_\_
- Sleeping \_\_\_\_\_

The following questions concern your attitudes, perceptions, and knowledge of topics related to childhood obesity.

Which two factors do you think are the major contributors to childhood obesity in the U.S.? (Please be specific)

---



---

What do you believe are the major barriers when it comes to preventing childhood obesity in the U.S.? (Please be specific)

---



---



---



---

On a scale of 1-5 (with 1 being "Very Little" and 5 being "A Lot"), how much responsibility do you believe each of the following have in addressing the problem of childhood obesity in the U.S.? (Please circle your response to each)

		Very little.....				A lot
Government		1	2	3	4	5
Food Industry		1	2	3	4	5
Doctors/Health Care Providers	1	2	3	4	5	
Media		1	2	3	4	5
Schools	1	2	3	4	5	
Parents/Caregivers		1	2	3	4	5
Children themselves (self-control/behavior)	1	2	3	4	5	
Genetics	1	2	3	4	5	

In your opinion, what can parents/caregivers do to reduce and prevent childhood obesity? (Please be specific)

---



---



---



---

In your opinion, what can others (schools, healthcare providers, food industry, government, media) do to help prevent childhood obesity?

---



---



---

Please rate on a scale of 1-5 (with 1 being “Very Little” and 5 being “A Lot”) how much you think each of the following contribute to childhood obesity:

	Very little..... A lot					
	1	2	3	4	5	
Genetic predisposition						
Lack of parent concern about children’s weight	1	2	3	4	5	
Lack of parent concern about their own weight	1	2	3	4	5	
Parents’ lack of knowledge about healthy eating	1	2	3	4	5	
Parents’ lack of knowledge about the risk factors associated with childhood obesity	1	2	3	4	5	
Lack of physical activity outside of school	1	2	3	4	5	
Lack of physical activity during the school day	1	2	3	4	5	
Children’s lack of interest in physical activity	1	2	3	4	5	
Children’s lack of interest in eating healthy	1	2	3	4	5	
Overconsumption of fast foods	1	2	3	4	5	
Overconsumption of high-calorie foods at home	1	2	3	4	5	
Overconsumption of high-calorie foods at school	1	2	3	4	5	
Portion sizes at home		1	2	3	4	5
Portion sizes at restaurants	1	2	3	4	5	
Media promotion of unhealthy foods		1	2	3	4	5
Children spending too much time with media	1	2	3	4	5	
Eating in front of the TV	1	2	3	4	5	
Lack of safe places for children to be physically active	1	2	3	4	5	
Lack of safe cycling and walking paths	1	2	3	4	5	
Healthy foods being expensive	1	2	3	4	5	
Healthy foods being unavailable	1	2	3	4	5	
Lack of prevention programs in the health care	1	2	3	4	5	

industry

Lack of prevention policy (national level)	1	2	3	4	5
Lack of prevention policy (state level)	1	2	3	4	5

Please rate on a scale of 1-5 (with 1 being “Very Little” and 5 being “A Lot”) how significant you think each of the following would be in reducing childhood obesity:

	Very little.....				A lot
Additional 5% tax on high-fat/high-sugar foods	1	2	3	4	5
Giving 5% tax incentives to manufacturers of healthy foods	1	2	3	4	5
Banning advertising of high-fat/high-sugar foods during children’s viewing hours	1	2	3	4	5
Restaurants reducing portion sizes	1	2	3	4	5
Schools serving more healthy foods	1	2	3	4	5
Increasing physical education requirements in schools	1	2	3	4	5
Providing healthy eating and exercise programs in schools	1	2	3	4	5
Providing community education programs about nutrition and healthy eating	1	2	3	4	5
Government building more recreational facilities, such as parks, trails, and sports courts	1	2	3	4	5
Children’s TV programs promoting healthy eating	1	2	3	4	5
Government running healthy eating and physical activity campaigns in the media on a regular basis	1	2	3	4	5
Directing obesity prevention actions at <u>all</u> children (not just those who are overweight)	1	2	3	4	5
Decreasing children’s daily media time	1	2	3	4	5
Restaurant menus indicating nutrition information and calories for each meal	1	2	3	4	5
More time allotted for well child visits (regularly scheduled check-ups with the child’s pediatrician)	1	2	3	4	5

On a scale of 1-5 (with 1 being “Would Definitely Not Support” and 5 being “Definitely Would Support”), please indicate the extent to which you would support any of the measures listed below:

	Definitely Would Not Support			Definitely Would Support	
	1	2	3	4	5
Additional 5% tax on high-fat/high-sugar foods (which would increase the cost of fast food meals and some groceries)	1	2	3	4	5
Allowing only healthy foods in school vending machines	1	2	3	4	5
Removing all vending machines from schools	1	2	3	4	5
Higher-cost school lunches in exchange for healthier meals	1	2	3	4	5
More physical education courses in the school curriculum (by replacing other courses currently on the curriculum)	1	2	3	4	5
More physical education courses in the school curriculum (by extending the school day)	1	2	3	4	5
Requiring schools to teach students healthy eating and exercise habits	1	2	3	4	5
Requiring schools to weigh students regularly and sending parents a health report card	1	2	3	4	5
Restricting TV advertisements of unhealthy foods	1	2	3	4	5
Removing toys from fast food children’s meals	1	2	3	4	5
More time set aside for well child visits (without additional cost for the patient)	1	2	3	4	5
More time set aside for well child visits (with slight additional cost for the patient)	1	2	3	4	5
Increased access to recreational facilities in the community (parks, trails, sports courts, etc.), paid for with tax payer money	1	2	3	4	5
Increased access to fee-for-service recreational facilities in the community	1	2	3	4	5
Increased access to community education programs about nutrition and healthy eating, paid for with tax payer money	1	2	3	4	5

Increased access to fee-for-service community education programs about nutrition and healthy eating      1      2      3      4      5

How willing would you be to take an active role in working to affect state and federal policies to improve prevention or management of overweight patients?

- Very anxious to get involved
- Willing to have a significant role
- Willing to have a small role
- Not willing to get involved

Please explain your response: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

How do you define a healthy diet? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

How do you determine portion sizes for your child? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

What do you believe is an adequate amount of exercise and physical activity for children? (e.g., “30 min. per day” or “1 hour per week”)

\_\_\_\_\_

What do you believe is an adequate amount of exercise and physical activity for adults? (e.g., “30 min. per day” or “1 hour per week”)

\_\_\_\_\_

Compared to what is healthy, do you think your child’s diet is too low, too high, or about right in the following nutritional components?

	Too Low	About Right	Too High	Don’t Know
Total Calories	X	X	X	X
Protein	X	X	X	X
Fat	X	X	X	X
Carbohydrates	X	X	X	X
Sodium	X	X	X	X
Sugar	X	X	X	X
Fiber	X	X	X	X
Calcium	X	X	X	X

Compared to what is healthy, do you think your own diet is too low, too high, or about right in the following nutritional components?

	Too Low	About Right	Too High	Don't Know
Total Calories	X	X	X	X
Protein	X	X	X	X
Fat	X	X	X	X
Carbohydrates	X	X	X	X
Sodium	X	X	X	X
Sugar	X	X	X	X
Fiber	X	X	X	X
Calcium	X	X	X	X

How many servings from the following food groups would you say a child should eat each day for good health?

Bread, cereal, rice, and pasta:	1	2	3	4	5+	Don't know
Vegetables:	1	2	3	4	5+	Don't know
Fresh fruit:	1	2	3	4	5+	Don't know
Milk, yogurt, and cheese:	1	2	3	4	5+	Don't know
Meat, poultry, fish, beans, eggs, nuts:	1	2	3	4	5+	Don't know

Based on your knowledge, what is the difference between "overweight" and "obese"?

---



---



---

What proportion of U.S. children are overweight? (Give your best estimate) \_\_\_\_\_

What proportion of U.S. children are obese? (Give your best estimate) \_\_\_\_\_

What proportion of U.S. adults are overweight? (Give your best estimate) \_\_\_\_\_

What proportion of U.S. adults are obese? (Give your best estimate) \_\_\_\_\_

What are some of the health risks associated with childhood obesity?

---



---



---

What burden does childhood obesity cause for society in general? (Be specific)

---



---



---

How concerned are you with your child's weight?

\_\_\_ Not at all concerned

- A little concerned
- Somewhat concerned
- Very concerned

Has your child's doctor every told you that he/she is/was overweight?

- Yes
- No
- Don't remember

Do you think your child is overweight?  Yes  No

How much does your child weigh? \_\_\_\_\_

How tall is your child? \_\_\_\_\_

Is your child:  Male  Female

Have you ever tried to control your child's weight?  Yes  No

If yes, what have you tried to do to control your child's weight?

---

---

---

How concerned are you with your own weight?

- Not at all concerned
- A little concerned
- Somewhat concerned
- Very concerned

Has your doctor every told you that you are/were overweight?

- Yes
- No
- Don't remember

Do you think you are overweight?  Yes  No

Have you ever tried to control your weight?  Yes  No

If yes, what have you tried to do to control your weight?

---

---

---

How much do you weigh? \_\_\_\_\_

How tall are you? \_\_\_\_\_