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Parenting, Home Environment, and Child Obesity: A Survey of Parents and Children Attending  
a Pediatric Clinic

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A thesis  
presented to  
the faculty of the Department of Public Health  
East Tennessee State University

In partial fulfillment  
of the requirements for the degree  
Master of Public Health in Health Administration

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by  
Amit R. Bodhani  
August 2006

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Dr. James Anderson  
Dr. Michael Dunn  
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Keywords: Childhood Obesity, Parenting, Body Mass Index Percentile

## ABSTRACT

Parenting, Home Environment, and Child Obesity: A Survey of Parents and Children Attending  
a Pediatric Clinic

by

Amit R. Bodhani

Data were collected from 60 parents of children 5-11 years of age to describe the parental and family factors and explore the associations of these factors with children's Body Mass Index (BMI) percentiles. Mothers made up 81.7% of the sample. Whites/Caucasians comprised 88.3% of the sample. Males comprised 51.6% of the child participants while females comprised 48.3%. Among the child participants, 38.3% had BMI equal to or greater than the 95<sup>th</sup> percentile, and 6.7% had BMI 85<sup>th</sup> to less than 95<sup>th</sup> percentile. Concerns about child weight ( $r_s = 0.582$ ), pressure to eat ( $r_s = -0.433$ ), and monitoring ( $r_s = 0.348$ ) were found to be significantly associated with children's BMI percentile. There are variations in influence of parenting and home environments on children's eating and physical activity, and in the eating and physical activity habits amongst families. Consideration of parental and family factors is needed in developing child obesity prevention programs.

## DEDICATION

This thesis is dedicated to my parents Mrs. Smita Bodhani and Mr. Ravindra Bodhani, for their everlasting love.

I would also like to dedicate my work to my sister Amruta, sweetest person on the earth, for her love and care.

This thesis is also dedicated to my entire family, the most wonderful people in the world for their support, encouraging words and constant motivation.

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## CHAPTER 1

### INTRODUCTION

Childhood obesity is a significant and growing health problem in the US and other parts of the world. Secular trend data in the US suggest that children have become substantially heavier over the last several decades and that their risk for a number of health problems is increasing as a result (Kaur, Hyder, & Poston, 2003).

The prevalence of obese and at-risk status among children and adolescents has rapidly increased over the past 40 years (Fowler-Brown & Kahwati, 2004). According to the current prevalence estimates of obesity using data from most recent National Health and Nutrition Examination Survey (NHANES), 26.2 % of children ages 2 to 5, 37.2 % of children ages 6 to 11, and 34.3 % of adolescents and young adults ages 12 to 19 years are obese or were at a risk of becoming obese. Overall, among children aged 2 to 19 years, 17.1 % were obese in 2003-2004 (Ogden et al., 2006).

#### Background of the Problem

Childhood obesity is associated with both physical and emotional morbidity (Jain et al., 2001). Discrimination against obese children begins early in childhood and becomes progressively institutionalized. Because obese children tend to be taller than their non-obese peers, they are apt to be viewed as more mature. The inappropriate expectations that result may have an adverse effect on their socialization (Dietz, 1998). Childhood obesity affects self-esteem and has negative consequences on cognitive and social development (Veugelers & Fitzgerald, 2005).

Many of the cardiovascular consequences that characterize adult-onset obesity are preceded by abnormalities that begin in childhood. Hyperlipidemia, hypertension, and abnormal glucose tolerance occur with increased frequency in obese children and adolescents (Dietz, 1998).

Furthermore, obese children are more likely to become obese adults. Also, the morbidity, economic costs, and mortality from adult obesity are enormous. Therefore, obesity prevention that begins early in life is an important approach to reducing the dramatic upward trends in obesity prevalence (Jain et al., 2001).

Parental behaviors are thought to influence children's weight (Robinson, Kiernan, Matheson, & Haydel, 2001). Parents are key agents to develop a home environment that fosters healthful eating and physical activity among children and adolescents. Parents shape their children's dietary practices, physical activity, sedentary behaviors, and ultimately their weight status in many ways. Parents' knowledge of nutrition, their influence over food selection, meal structure, and home eating patterns, their modeling of healthful eating practices, their levels of physical activity, and their modeling of sedentary habits including television viewing are all influential in their children's development of lifelong habits that contribute to normal weight or to obesity (Lindsay, Sussner, Kim, & Gortmaker, 2006). Lack of parental care for the offspring's well-being has a highly significant association with obesity in young adulthood: parental neglect during childhood predicts a greatly increased risk of obesity in young adulthood (Lissau & Sorensen, 1994).

Rural southern Appalachia is characterized by the geography of mountains, rural cultural traditions, and significant economic disparity. People living in this area have faced a heavier burden from chronic diseases including obesity, heart disease, and cancer (Morbidity and

Mortality Weekly Report, 1998; Morbidity and Mortality Weekly Report, 2002). Health risk behaviors, including unhealthy diet and physical inactivity among children and adolescents, were more prevalent in the area than the national average (Ramsey & Glenn, 1998; Wu et al., 2004). Because of more limited resources in the region for nutrition and physical activity, parents and families might assume a more active role in addressing child obesity. However, studies on parental and family factors in relation with child obesity in the area are sparse.

### Study Purposes and Research Hypotheses

The purpose of this cross-sectional study was to describe the various parental and family factors and explore the relationship of these factors with children's BMI percentiles among a group of children attending a pediatric clinic in the Tri-cities area of southern Appalachia. Parental factors of interest included parents' eating habits, parenting related to child's eating, perceived feeding responsibility, concern about child weight, restriction on child's eating, parental pressure on the child to eat, monitoring child's eating, sedentary behaviors, amount of physical activity, and parental beliefs about weight control. Indicators of home environment included family meals, the time at which meal is served, the frequency at which family members enjoy physical activities together, family discussions about the importance of healthy diet, and physical activity.

The research hypotheses regarding the associations of parental and family factors with child's body mass status include:

1. Parental eating habits are associated with child's BMI percentile.

2. Parents perceived feeding responsibility, parenting related to child's eating, concerns about child weight, restriction/pressure on child's eating, and monitoring of child's eating are associated with child's BMI percentile.
3. Sedentary and physical activity behaviors of parents, their spouses, and the children are associated with child's BMI percentile.
4. Parental attitude toward weight control is associated with child's BMI percentile.
5. Indicators of home environment such as family meals, meal time, etc. are associated with child's BMI percentile.

#### Significance of the Study

This survey of parents provides preliminary data on parental and family factors in relation to the child's BMI percentile. These data are helpful in identifying the specific parental and family related factors that may have a significant impact on the child's BMI percentile. The identified target behaviors could be further intervened. The information and understanding of these factors gained from the study can be helpful in designing effective treatment and prevention strategies.

The study population in the proposed study is of a lower socioeconomic status than those in previous comparable studies. The study participants reside within the Appalachian region of the Southeastern United States, an area with high rates of obesity and in which few studies on childhood obesity have been conducted.

## CHAPTER 2

### REVIEW OF THE RELEVANT LITERATURE

Defining obesity in children has been difficult as assessing body fat is expensive and impractical. Body mass index (BMI), derived from weight and height is used as a surrogate indicator in adults. In children, the consensus is to use BMI percentiles statistically derived from a reference population (Kaur et al., 2003). BMI is defined as weight in kilograms divided by the square of height in meters (Ogden, Flegal, Carroll, & Johnson, 2002). The CDC uses the term “overweight” rather than “obesity” in the child and adolescent populations (Fowler-Brown & Kahwati, 2004). Based on the Centers for Disease Control and Prevention (CDC), overweight is defined if the BMI percentile derived from the CDC’s sex and age specific growth chart is at or above the 95<sup>th</sup> percentile. At risk for overweight is defined if the BMI percentile is at or above the 85<sup>th</sup> percentile, but less than the 95<sup>th</sup> percentile of BMI (Ogden et al.). The American Obesity Association uses the 85<sup>th</sup> percentile of BMI as a reference point for overweight and the 95<sup>th</sup> percentile for obesity (American Obesity Association, 2005). Over the past three decades, the rate of childhood obesity has more than doubled for pre-school children aged 2 to 5 years and adolescents aged 12 to 19 years, and it has more than tripled for children aged 6 to 11 years. At present approximately nine million children over 6 years of age are considered obese (Koplan, Liverman, & Kraak, 2005). Because an increasing number of children in the United States are obese, childhood and adolescent obesity is one of today’s most important health challenges and public health concerns. Further exacerbating this challenge are many immediate and long-term adverse outcomes associated with obesity (Fowler-Brown & Kahwati).

### Contributing Factors

The problem of obesity is multi-factorial and thought to be a convergence of factors favoring an imbalance between energy consumption and expenditure. Complex social and environmental factors contribute to this imbalance, including changing food habits, declining physical activity, and increasingly sedentary lifestyles. Children and adolescents spend more free time in sedentary activities while the number of schools requiring daily physical education has declined (Borra, Kelly, Shirreffs, Neville, & Geiger, 2003). Although the causes of the increasing prevalence of child obesity are multiple, including changing trends in energy expenditure, recent data confirm a link between adiposity among children and their food preferences and food selection (Birch, 1999). Poor eating habits are often established during childhood (Ogden et al., 2002).

### Parental Influence

Parents and adult caregivers, besides serving as role models, exert a powerful influence on young children's eating habits and activities. The powerful influence is because parents usually control the children's exposure to food stimuli and to food selection and they establish the emotional and physical environment in which obesity may or may not be discouraged (Golan, Fainaru, & Weizman, 1998).

The development of child risk factors is shaped by parenting styles and family characteristics such as parents' dietary intake and activity patterns, nutritional knowledge, child feeding practices, and peer and sibling interactions (Davison & Birch, 2001). Eating behaviors of children and adolescents are shaped by parental feeding behaviors (Golan & Crow, 2004a). Parents can influence their children's dietary practices, physical activity, sedentary habits, and

body satisfaction by controlling availability and accessibility to foods, meal structure, food socialization practices, food related parenting style, and by the extent of media exposure in the home. Knowledge of nutrition and modeling of behaviors and attitudes are also influential (Birch & Fisher, 1998; Golan & Crow, 2004a).

### Parental Eating Habits

Parent's eating style may influence their approach to feed their children. This approach can, in turn, alter children's food selection, their ability to regulate energy intake, and their body fatness (Whitaker, Deeks, Baughcum, & Specker, 2000).

Parental dietary restraint and disinhibition are two factors that may strongly influence the child's eating experiences. The term 'dietary restraint' is generally used to refer to the tendency to consciously restrict one's diet to control weight, while disinhibition refers to the degree to which an individual abandons control of dietary intake in the presence of certain external food cues or 'disinhibitors' (Hood et al., 2000). Maternal dietary disinhibition may mediate the relationship between maternal BMI and the relative weight of 3- to 5-year-old girls, with mothers and daughters sharing a disinhibited eating pattern (Whitaker et al., 2000). Adults who exhibit high levels of dietary restraint but who also report high levels of disinhibition are not generally successful at losing weight. Parents who exhibit both of these behaviors may unconsciously undermine their child's autonomy in food choices by imposing excessive control over the child's diet while at the same time modeling inappropriate eating behaviors (Hood et al).

One study reported that children whose parents ate diets high in saturated fat also ate diets high in saturated fats themselves. Parents tend to have foods in the home they like and eat, and with repeated opportunities to eat these foods; young children include many of them in their



diets (Golan & Crow, 2004a). Children's food related knowledge, preferences, and consumption are related to parents' preferences, beliefs, and attitudes towards food (Patrick & Nicklas, 2005). Thus, parent eating behavior may be a useful indicator of obesity risk in young children (Whitaker et al., 2000).

### Parental Child-Feeding Practices

Parent-child interactions in the feeding context are important in shaping children's preferences and intake patterns. In particular, the child-feeding strategies parents use can influence children's food preferences (Birch, 1999). Parental styles have been implicated in the development of children's eating patterns, with both over-controlling and under-controlling parental attitudes associated with unfavorable child outcomes (Jackson, Mannix, Faga, & McDonald, 2005).

Birch and Fisher identified three child-feeding patterns that map on to Baumrind's taxonomy of parenting styles: authoritarian, permissive, and authoritative. Authoritarian feeding includes behaviors such as restricting the child from eating certain foods (e.g. desserts) and forcing the child to eat other foods (e.g. vegetables). The authoritarian feeding is characterized by attempts to control the child's choices and preferences. Permissive feeding is characterized by what might be termed "nutritional neglect," whereby the child is allowed to eat whatever he or she wants in whatever quantities he or she wants. Authoritative feeding represents a balance between authoritarian and permissive feeding such that the child is encouraged to eat healthy foods but is given some choices about eating options. With authoritative feeding, adults determine which foods are offered, and children determine which foods are eaten. Authoritative

feeding has been associated with greater fruit and vegetable availability, higher intake of fruit and vegetables, and lower intake of junk food (Patrick & Nicklas, 2005).

Wardle and co-workers suggested four feeding patterns that have been in suspicion as contributing to the development of obesity. Feeding in response to emotional distress (emotional feeding), and using food as reward (instrumental feeding) are both assumed to encourage the child to associate eating with cues other than hunger and thereby increase the risk of eating in excess of physiological need. A third feeding practice that has been implicated is excessive prompting or encouragement to eat, deriving either from the parents' enthusiasm to see the child eating food that has been carefully prepared or the belief that a heavier child is a healthier one. Finally, there have been suggestions that parental restriction of high-fat foods might be related to improved quality of children's diets and thereby, perhaps, reduce the likelihood of obesity (Wardle, Sanderson, Guthrie, Rapoport, and Plomin, 2002).

### Food Availability

Children choose to eat the foods that they are served the most often, and they tend to prefer to eat foods that are readily available in the home. Because parents are responsible for making foods available to children and adolescents, they can have a profound impact on preferences and, hence, consumption (Patrick & Nicklas, 2005). The types of foods that are stored at home by parents and siblings influence the younger child's food consumption. Despite increased autonomy as the child ages, the family environment remains a major influence on diet and activity. It is the parents' responsibility to offer a variety of healthy foods to children and minimize the availability of foods that may promote the over-consumption of energy. Meeting

these responsibilities is especially important if there is susceptibility of being obese (Evers, 1997).

### Food Accessibility

Parents and older siblings control young children's access to food (Golan, 2001). When foods are easily accessible and ready to be eaten, children are more likely to eat them. For example, Baranowski and colleagues found that among school children fruit and vegetable intake is higher when these foods are not only available but also provided in accessible locations and accessible sizes (e.g., apple wedges, carrot sticks). Thus, although children are not especially likely to get a carrot from a bag of full-sized carrots, they are more likely to eat carrots that have been cleaned and cut to age-appropriate sizes (Patrick & Nicklas, 2005).

Restricting children's access to foods high in fat and sugar may appeal to parents as one straightforward method of promoting eating patterns consistent with current dietary recommendations. Access to foods may be restricted by limiting portion sizes and limiting how frequently foods are offered. A central feature of child feeding strategies that restrict access to palatable foods is that specific foods but not total energy in the diet are restricted. Several studies indicated that restricting access to foods may increase children's preferences for and intake of restricted foods while diminishing self-control in eating. A central feature of child feeding strategies that restrict access to palatable foods is that specific foods but not total energy in the diet are restricted (Fisher & Birch, 1999).

A study conducted by Spruijt-Metz, Lindquist, Birch, Fisher, and Goran, (2002) showed that a mother's concern about her child's weight and her pressure in child feeding were directly related to the child's total fat mass. Parents who are concerned about their children's risk for obesity may adopt controlling child-feeding practices in an attempt to prevent obesity in their

children. Unfortunately, research suggests that these parental control attempts may interact with genetic predispositions to promote the development of problematic eating styles and childhood obesity (Golan & Crow, 2004a). Previous studies have found relations between BMI and monitoring as well as between BMI, weight concern and pressure to eat (Spruijt-Metz et al., 2002).

### Child's Physical Activity and Sedentary Behavior

It has been difficult to demonstrate a relationship between physical activity and obesity (Agras & Mascola, 2005), but studies have shown that obese children are physically less active, perceive physical activity more negatively, and find sedentary activities more reinforcing than physical activities relative to normal weight children (Epstein, Saelens, Myers, & Vito, 1997). High levels of physical activity could compensate for excessive caloric or fat intake, thereby allowing the maintenance of a healthy weight status (Davison & Birch, 2001). Sedentary behaviors such as computer use and television viewing may place children at the risk of being obese. Among children, a greater number of hours spent in sedentary pursuits have been associated with a higher prevalence of obesity (Golan & Crow, 2004a). American children spend more time watching television and videotapes and playing video games than with any other activity except sleeping (Robinson, 1999). By the time children and adolescents reach school-age, about half of the children in the United States watch television more than 2 hours a day. Many studies link TV viewing with obesity. Randomized controlled trials indicate that watching fewer hours of TV can reduce children's BMI and the risk of being obese. TV viewing, therefore, may be one important cause of childhood obesity that parents can modify at home (Lindsay et al., 2006). Television viewing is thought to promote weight gain not only by

displacing physical activity but also by increasing energy intake. Children seem to passively consume excessive amounts of energy dense foods while watching television. Furthermore, television advertising could adversely affect dietary patterns at other times throughout the day. Moreover, television viewing during mealtime is inversely associated with consumption of products not typically advertised such as fruits and vegetables (Ebbeling, Pawlak, & Ludwig, 2002). According to a recent nationally representative survey, children from 3<sup>rd</sup> through 12<sup>th</sup> grade spend an estimated 8 hours a day of media time- using computers, listening to music, watching movies, playing computer and video games, and watching TV. About 26 % of children are “media multitaskers” who go online while they watch TV, resulting in more exposure to the media environment simultaneously (Lindsay et al).

#### Parents’ Physical Activity and Sedentary Behavior

Children’s activity patterns and activity preferences are shaped within the context of the family. Parent participation in physical activity is positively related to activity among children and adolescents. Parents who are active are more likely to enjoy activity and believe in the positive health and emotional benefits of activity. Parents with such beliefs may be more likely to create an environment that promotes activity by encouraging their children to be active and by enrolling their children in sporting events and driving them to and from such activities, both of which have been linked to increased levels of activity among children (Davison & Birch, 2001). In a comprehensive review of physical activity correlates, one of the strongest and most consistent correlates of physical activity in children was the time spent outdoors, a factor largely determined by parents. Parental encouragement, parental support, and parental involvement in

and modeling of activity have been shown to positively predict activity in children (Ritchie, Welk, Styne, Gerstein, & Crawford, 2005).

Parents can also help by limiting their own TV watching and sedentary behavior. Studies show that when parents are sedentary, their children are more likely to be sedentary as well. Adolescents whose parents watch TV more than 2 hours a day are more than twice as likely to be physically inactive as those children whose parents watch less (Lindsay et al., 2006).

### Parental Nutrition Knowledge

Parents' nutritional knowledge and health concerns may influence children's eating patterns in a number of ways. Lack of knowledge of appropriate serving sizes may lead parents to overfeed children; research shows that serving children larger sized portion is associated with greater food intake. A focus on health may lead parents to purchase more healthful foods (i.e. fruits and vegetables) and make them more readily accessible in the home, which are both important determinants of children's preference for and intake of such foods. It is also likely that the reverse pattern is also true such that low nutritional knowledge is associated with greater accessibility to energy dense foods, thereby increasing the risk of obesity (Davison & Birch, 2001). Greater parental nutrition knowledge is associated with lower prevalence of obesity in children (Variyam, 2001).

### Family Meals

One trend that has paralleled the rise in obesity in the last 2 decades has been the decline in frequency of children eating family dinner (Taveras et al., 2005). Research suggests that when parents provide companionship at mealtime, establish a positive atmosphere, and model

appropriate food-related behaviors, their children tend to have improved dietary quality (Golan & Crow, 2004a). A group of researchers found a positive association between frequency of family meals and intake of fruits, vegetables, grains, and calcium-rich foods and a negative association with soft drink consumption (Taveras et al., 2005). According to another study conducted by Gillman et al. (2001), family dinner is associated with some healthful dietary patterns. Increasing frequency of family dinner was associated with higher consumption of fruits and vegetables and several beneficial nutrients including fiber, folate, calcium, iron, and vitamins B<sub>6</sub>, B<sub>12</sub>, C, and E. They also observed lower consumption of saturated and trans fat, soda, and fried foods as well as decreased glycemic load, a measure of the diet's propensity to raise blood glucose. One way that family dinner could improve diet quality is that family dinners contain foods that are more healthful than children or adolescents would otherwise eat.

## CHAPTER 3

### DESIGN AND METHODS

#### Study Site

The pediatric clinic of Department of Pediatrics at East Tennessee State University (ETSU), Johnson City, TN was selected as study site to reach parents of children between 5-11 years of age. The pediatric clinic employs, 9 attending physicians, 14 nurses, and 11 residents.

Based on the number of patients and visits for children 5-11 years of age during the period from July 1, 2004, to June 30, 2005, the ETSU pediatric clinic had 2741 children patients. Leading reasons for child visits included well child check, acute pharyngitis, upper respiratory infection, otitis media, and strep throat.

#### Target Population and Inclusion/Exclusion Criteria

The target population for the study was parents of children 5-11 years of age seeking care in the pediatric clinic. Parents of children who were visiting a general practitioner were eligible to participate in the study. Parents of children visiting a specialist on the day of data collection were ineligible to participate in the study. Also, parents of children visiting both a general practitioner as well as a specialist on the day of data collection were ineligible to participate in the study.

#### Questionnaire and Data Collection

The study was conducted by interviewing 60 parents in person, and their thoughts, and perceptions were gathered by administering the *Healthy Eating and Physical Activity Survey*:



*Parent's Questionnaire* (Appendix). A list of appointments was obtained on each data collection day from the clinic staff before collecting the data. Information about the ages of the children visiting the clinic on the day of data collection was also obtained from the clinic staff. In some instances, where the parents were accompanied by more than one child (each child belonging to the target age range and having an appointment with a general practitioner) the parents were requested to fill out the questionnaire with information pertaining only to one child, so that only one child per family is included in the study. In such cases the parents were allowed to select the child to be included in the study. In an effort to increase the participation rate, each study participant was provided with an incentive of five dollars upon completion of the questionnaire. An approval to conduct the study was obtained from the Institutional Review Board of ETSU before the study began. Participation in the study was completely voluntary and the participants were assured of confidentiality. The participants were also assured that there won't be any negative consequences irrespective of their decision to either participate or not participate in the study.

The *Healthy Eating and Physical Activity Survey: Parent's Questionnaire* consisted of 114 questions. Questions pertaining to the parental and family factors were developed mainly by using the Child Feeding Questionnaire (CFQ), The Family Eating and Activity Habit Questionnaire- Revised (FEAQ- R), and The Dieting Belief Scale (DBS).

## Parental Factors of Interest

### Child Feeding Information

The CFQ is a self-report measure to assess the parental beliefs, attitudes, and practices regarding child feeding, with a focus on obesity proneness in children. It is appropriate for use in research settings with parents of normally developing children ranging in age from the preschool period through middle childhood (Birch et al., 2001). Original CFQ- Adapted from Costanzo and Woody was developed as an assessment of parents' child feeding practices, including parental control of child food intake; qualitative aspects of child eating, child eating habits/behaviors such as timing of meals, parental perceptions of child eating problems, and child pickiness; and parental concern and ranking of child weight status. Twenty-four forced-choice items and 10 open-ended items assessed parental control of child feeding. Ten open-ended questions assessed qualitative aspects of child eating and a parental rating of child weight status (Faith, Scanlon, Birch, Francis, & Sherry, 2004).

The revised CFQ contains 31 items, loading on seven factors. All items were measured using 5-point Likert-type scale. Four hypothesized factors pertain to parental perception of child and parent weight and concern about weight, which may elicit parental control in feeding: perceived responsibility, parent perceived weight, perceived child weight, and parents concern about child weight. Three additional hypothesized factors assess parents' attitudes and practices regarding their use of controlling child feeding strategies. These include monitoring, restriction, and pressure to eat (Birch et al., 2001).

From amongst the above mentioned factors, perceived responsibility, parents' concern about child weight, monitoring, restriction, and pressure to eat were used in the questionnaire for this study.

Previous studies indicate that the internal consistency (Cronbach's  $\alpha$ ) for the different dimensions ranged from 0.70 to 0.92 (Spruijt-Metz, Lindquist, Birch, Fisher, & Goran, 2002).

### Parental and Family Eating and Activity Habits

The Family Eating and Activity Habit Questionnaire – Revised (FEAQ-R) was used to collect parental and family eating and activity habits data. Golan and Weizman identified the factors that affect obesity and weight loss in children and divided these factors in to four scales and developed a questionnaire using these scales which is the FEAQ.

The following are the four scales-

- i) Activity level - frequency in which the parent, spouse, and child engage in physical activity.
- ii) Stimulus exposure - stimulus exposure to snacks, sweets, cakes, and ice-cream in the home, eating related to hunger, and eating style. They designed a questionnaire using these scales.
- iii) Eating related to hunger - parent's action to the child's eating when he/she eats when not hungry.
- iv) Eating style - such as while watching television or when bored.

Utility and internal consistency of the questionnaire has been demonstrated (Golan & Weizman, 1998).

### Parental Attitudes/Beliefs about Weight Control

The Dieting Belief Scale (DBS) was used to determine the parental attitudes and beliefs about weight control. DBS is an instrument to measure parental beliefs that one's own behaviors or attributes determine one's own weight. The original scale includes 16 Likert-type. Respondents are asked to indicate how well each statement describes their own beliefs, using a 6-point scale ranging from (1) *not at all descriptive of my beliefs* to (6) *very descriptive of my beliefs*. The DBS demonstrates promise as an internally consistent and reliable research tool with a Cronbach's alpha of 0.68 and a test-retest score of 0.81 (Stotland & Zuroff, 1990).

### Other Variables of Interest

Child's Weight and BMI - Child's weight and height were measured by nurses in the clinic at the medical visit and weight status was determined using BMI (weight [in kg]/height<sup>2</sup> [in m]) percentiles. BMI percentile was derived for each child according to CDC's sex and age specific growth chart.

Questionnaires were created to collect information regarding the following additional variables of interest:

- 1) Demographic variables of the child and parent such as age, sex, and ethnicity;
- 2) The socioeconomic status of the parents' including, family size, health insurance coverage, parental employment status and occupation, and parental education.

### Scale Measures for Parental and Family Factors

Index scores were calculated to sum up the individual items for parental eating habits (parental eating habits index), parenting related to child's eating (parenting related to child's

eating index), indicators of home environment (home environment index), parents perceived feeding responsibility (perceived feeding responsibility index), parents concerns about child weight (concerns about child weight index), parents restriction on child's eating (restriction index), parental pressure on the child to eat (pressure to eat index), parents monitoring of child's eating (monitoring index), parents, spouses and child's sedentary activity (sedentary activity index), physical activity (physical activity index), and the parental weight control beliefs (parental weight control beliefs index), after coding the responses to the individual items. A number from 1 to 5 was used to code the response to each item except for the parental weight control beliefs where a number from 1 to 6 was used to code the response with a larger number corresponding to a stronger or more responsible behavior. For example, "unconcerned" was coded with 1 and "very concerned" was coded with 5, for the responses to "How concerned are you about your child becoming obese." In contrast, for the responses to "Do you use food to reward your child," "Always" was coded with 5 and "Never" was coded with 1.

The scales are as following:

1) *Parental Eating Habits* ( Q. 27 & 28 – Appendix)

This scale consists 2 items assessing the level of unnoticeable binge eating habits followed by the parents. Response choices were labeled (1) Never – (5) Always. Both the items on this scale were scored in a reverse direction.

2) *Parenting Related to Child's Eating* (Q. 29, 30, 31, 34, 36, and 37 – Appendix)

This scale consists 6 items assessing parents' habits related to their child's eating. Response choices were labeled (1) Never – (5) Always. Questions 31, 36, and 37 were scored in a reverse direction.

3) *Home Environment* (Q. 32, 33, 35, 38-42 – Appendix)

This scale consists 8 items assessing the home environment, whether it fosters good eating habits, physical activity habits, etc. Response choices were labeled (1) Never – (5) Always. Questions 32 and 35 were scored in a reverse direction.

4) *Perceived Responsibility* (Q. 43, 44, and 45 – Appendix)

This scale consists 3 items assessing parents' perceptions of their responsibility for child feeding. Response choices were labeled (1) Never – (5) Always.

5) *Parents' Concerns about Child Weight* (Q. 46, 47, and 48 – Appendix)

This scale consists 3 items, assessing parents' concerns about the child's risk of being obese. Response choices were labeled (1) Unconcerned – (5) Very concerned.

6) *Restriction* (Q. 49-56 – Appendix)

This scale consists 8 items, assessing the extent to which parents restrict their child's access to foods. Response choices were labeled (1) Disagree – (5) Agree.

7) *Pressure to Eat* (Q. 57, 58, 59, and 60 – Appendix)

This scale consists 4 items, assessing parents' tendency to pressure their children to eat more food, typically at mealtimes. Response choices were labeled (1) Disagree – (5) Agree.

8) *Monitoring* (Q. 61, 62, and 63 – Appendix)

This scale consists 3 items, assessing the extent to which parents oversee their child's eating. Response choices were labeled (1) Never – (5) Always.

9) *Activity Level* (Q. 64-85 – Appendix)

This scale consists 22 items divided in to two parts, one part assessing the frequency with which the parent, spouse, and child engage in sedentary activity (3 items) and the other

one assessing the frequency in which the parent, spouse, and child engage in physical activity (19 items).

10) *Parental Beliefs about Weight Control* (Q. 105-114 – Appendix)

This scale consists of 10 items assessing parental attitudes and beliefs about weight control. Response choices were labeled (1) Not at all descriptive – (6) Very descriptive. Questions 106, 107, 108, 109, 111, 113, and 114 were scored in a reverse direction.

### Data Analysis

The questionnaires were numbered and the data collected in the form of questionnaires was manually entered into a computer file using the Statistical Package for Social Sciences (SPSS<sup>®</sup>) software to create a database. Values were assigned to the response categories for the questions which had more than one response choices.

Descriptive measures like mean, standard deviation, and percentage were calculated to describe the demographic, socioeconomic, and parental and family factors. These descriptive statistics described the characteristics of the parents and children who participated in the study. Physical measures of children were also described by calculating the descriptive measures like mean and standard deviation for height, weight, and BMI percentile for the child participants. Descriptive statistics also describe the following parental and family environment factors - parents' eating habits, parenting related to child's eating, perceived feeding responsibility, concerns about child's weight, restrictions on the access to foods, putting pressure on the child to eat, monitoring child's eating, beliefs about weight control, and measures related to the home environment such as family dinner, the time at which meal is served, the frequency at which

family members enjoy physical activities together, family discussions about the importance of healthy diet, and physical activity.

Spearman's correlation coefficient was conducted to determine the association between individual subscales (parental and family factors of interest) and the BMI percentile. Spearman's correlation coefficient was also conducted for every single item representing the various subscales to determine the association of that item with children's BMI percentile.



## CHAPTER 4

### RESULTS

#### Descriptive Statistics- Demographic and Socioeconomic Factors

##### Characteristics of Parent Participants

The characteristics of the parent participants are presented in Table 1. The majority of the participants were mothers comprising 81.7% of the total study sample. Age was divided into 3 groups. The age group 31-40 years accounted for the most number of participants (41.7%) followed by those who were 21-30 years of age (35%) and those who were 41 years and above (18.3%). The data pertaining to the education level of the parent participants show that almost 42% of the parents attended some college, while 35% attended high school. Slightly more than 13% of the parents had a bachelor's degree, whereas only 1.7% i.e. one participant had a masters/doctoral degree. Seven percent of the participants had education less than the high school level. The ethnicity data reveals that the study participants were mostly from the group which included Whites, Caucasians, non-Hispanics or non African-Americans constituting 88.3% of the total study sample, followed by Black or African Americans (6.7%), American Indians/Alaskan Natives (3.3%), and other (1.7%). Occupation data distribution tells that 45% of the participants selected the response choice "Other", 21.7% were unemployed, 13.3% worked in the healthcare field, and 11.7% were students. Please refer to the Appendix for the response choices. The sample had almost equal number of smokers (48.3%), and non-smokers (51.7%). According to the health insurance coverage data, 70% of the participants were covered by TennCare. The mean for family size was found to be 3.85 indicating that each family was

composed of around 4 members, with the minimum number of members in a family being 2 and maximum being 8.

Table 1

*Characteristics of Parent Participants*

Characteristics	Response	n	%	
Age	21-30	21	35.0	
	31-40	25	41.7	
	41 and above	11	18.3	
Relationship with child	Father	6	10.0	
	Mother	49	81.7	
	Grandparent	4	6.7	
	Other	1	1.7	
Education Level	Less Than High School	4	6.7	
	High School	21	35.0	
	Some College	25	41.7	
	Bachelor's Degree	8	13.3	
	Master's or Doctoral Degree	1	1.7	
Ethnicity	American Indian/Alaskan Native	2	3.3	
	Black or African American	4	6.7	
	White, Caucasian, Non-Hispanic or Non African-American	53	88.3	
	Other	1	1.7	
Occupation	Health Care	8	13.3	
	Wholesale or Retail Trade Business	4	6.7	
	Construction	1	1.7	
	Student	7	11.7	
	Unemployed	13	21.7	
	Other	27	45.0	
Smoking Status	Yes	29	48.3	
	No	31	51.7	
Health insurance coverage	TennCare			
	Yes	42	70.0	
	No	17	28.3	
	Other health insurance			
	Yes	22	36.7	
	No	38	63.3	
Family size	Minimum	Maximum	Mean	SD
	2	8	3.85	1.087

n- Sample size  
 %- Percentage  
 SD- Standard Deviation

### Characteristics of Child Participants

Table 2 presents the characteristics of the child participants. Among the children participated in the study, 51.6% were males and 48.3% were females. As with the parent participants, the ages of child participants were also categorized in three groups. Children of the age group 8-10 years comprised 53.3% of the total sample, 5-7 years age group made up 38.3%, and children 11 years of age constituted the remaining 8.3%. White, Caucasians, Non-Hispanics or non African-American children accounting for 88.3% of the total study sample. Figure 1 is a pie chart that represents the distribution of child participants based on their BMI percentile. Forty-three percent of the study population is between the 5th and 85th percentile which, according to the CDC growth charts, comes under the healthy weight category. The study population with BMI percentile equal to or greater than the 95th percentile (which indicates that they are obese) constituted 38.3%. The “less than the 5<sup>th</sup> percentile” (underweight) category constitutes approximately 6.7%, and those who are between 85th and 95th percentile (At risk of being obese) also comprised approximately 6.7%.

Table 2

*Characteristics of Child Participants*

Characteristics	Participants	n	%
Gender	Male	31	51.6
	Female	29	48.3
Age	5-7 years	23	38.3
	8-10years	32	53.3
	11 years	5	8.3
Ethnicity	American Indian/Alaskan Native	2	3.3
	Black or African-American	4	6.7
	White, Caucasian, Non-Hispanic or Non African-American	53	88.3
	Other	1	1.7
BMI Percentile	Less than the 5 <sup>th</sup> percentile	4	6.6
	5 <sup>th</sup> percentile up to the 85 <sup>th</sup> percentile	26	43.3
	85 <sup>th</sup> to less than the 95 <sup>th</sup> percentile	4	6.6
	Equal to or greater than the 95 <sup>th</sup> percentile	23	38.3
	Missing	3	5.0

n- Sample size  
%- Percentage

**Distribution of the Child Participants by BMI Percentile**

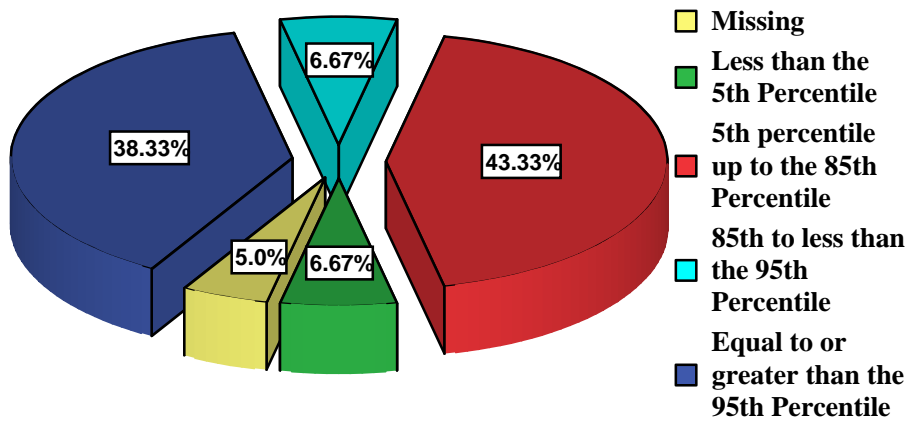


Figure 1. Distribution of the Child Participants by BMI Percentile

Table 3 summarizes the descriptive statistics for physical measures of the child participants. Children had a mean height of 51.6 inches with a minimum of 36 inches and maximum of 68 inches. The mean weight for children was 76.2 pounds. Body weight for children ranged between 37 pounds and 148 pounds. Children had a mean BMI percentile of 70.7 and a mean BMI of 20.2.

Table 3

*Descriptive Statistics for the Physical Measures of Children*

	Sample Size	Minimum	Maximum	Mean	Standard Deviation
Height (Inches)	57	36	68	51.6	6.4
Weight (pounds)	60	37	148	76.2	28.2
BMI	57	8.7	62.5	20.2	7.6
BMI percentile	57	0.0	99.9	70.7	33.1

Descriptive Statistics- Parental and Family Factors

The distribution of parental and family factors of interest is represented in Tables 4 through 15. Table 4 summarizes the frequency distributions of parental eating habits. For specific/detailed wordings of the items related to the parental eating habits please refer to the Appendix. Forty-three percent of the parents reported that occasionally they eat when they are lonely, bored, nervous, or upset, whereas 31.7% of the parents never eat when they are lonely, bored, nervous, or upset followed by 13.3% of the parents who frequently eat in such situations. Minor percentages of parents either always or usually eat when they are lonely, bored, nervous, or upset. Most of the parents (78.3%) never get out of bed at night and finish the remains of food in their kitchen. Parents who occasionally did get out of the bed at night and finished the remains of food in their kitchen made up 18.3%.

Table 4

*Distribution of Parental Eating Habits*

Habit	Response									
	Never		Occasionally		Frequently		Usually		Always	
	n	%	n	%	n	%	n	%	n	%
Eating when lonely, bored, nervous, or upset	19	31.7	26	43.3	8	13.3	5	8.3	2	3.3
Eating at night	47	78.3	11	18.3	1	1.7	1	1.7	0	0.0

n- Sample size

% - Percentage

Frequencies of parenting habits in relation to child's eating have been shown in Table 5. Please refer the Appendix for the specific items related to the parenting habits associated with child's eating. Nearly 50% of the never parents limited the amount of food their child would eat at mealtime. Out of the remaining, 20% of the parents occasionally limited their child's eating at mealtime, followed by 13.3% of parents who frequently did so. Only 5% of the parents always limited the amount of food their child would eat at mealtime. In response to the question- Do you allow your child to snack between meals? 51.7% of the parents said that they occasionally allowed their child to do so. Only 1.7% i.e., 1 parent participant never allowed the child to snack between meals. Surprisingly, it was discovered that 23.3% of the parents occasionally included vegetables and fruits in meals. Parents who always included vegetables and fruits in meals comprised 20%, followed by 21.7% who frequently did so, and 30% who did it usually. Regarding the use of food to reward their child, 58.3% parents said that they never practiced such a habit. Occasionally 35% of the parents used food to reward their child.

Table 5

*Frequencies of Parenting Related to Child's Eating*

Habit	Response									
	Never		Occasionally		Frequently		Usually		Always	
	N	%	n	%	n	%	n	%	n	%
Limit the amount of food	29	48.3	12	20.0	8	13.3	7	11.7	3	5.0
Allow child to snack	1	1.7	31	51.7	9	15.0	11	18.3	8	13.3
Serving vegetables and fruits in meals	3	5.0	14	23.3	13	21.7	18	30.0	12	20.0
Using food to reward	35	58.3	21	35.0	3	5.0	0	0.0	1	1.7
Ask what child eats at school	0	0.0	9	15.0	21	35.0	9	15.0	21	35.0
Allow child to decide how much candy he/she wants to eat	44	73.3	11	18.3	0	0.0	1	1.7	3	5.0

n- Sample size

%- Percentage

Table 6 summarizes the responses related to home environment. Please refer to the Appendix for the specific items included under the home environment measures. When asked whether the meals are served at a regular time, 35% of the parents said that usually the meals are served at a regular time, followed by 28.3% who frequently maintained the regular mealtime, 16.7% who always served the meal at a regular time, and 11.7% who occasionally followed the same. Five percent of the parents said that the meals at their house are never served at a regular time. It was surprising to know that only 11.7% families always enjoyed physical activities together. There were 43.3% parents who said that their family occasionally enjoys physical activities together. Almost equal distribution of responses was seen across all response categories except one for the question where the parents were asked whether they discuss the importance of healthy diet with their children. None of the parents said that they never discussed the importance of a healthy diet. Approximately 32% of the parents always discussed the importance

of a healthy diet with their children. It was observed that 45% of the parents have meals with their children and 36.7% usually have meals with their children.

Table 6

*Distribution of Responses Related to Home Environment*

Habit	Response									
	Never		Occasionally		Frequently		Usually		Always	
	n	%	n	%	n	%	n	%	n	%
Meals served at regular time	3	5.0	7	11.7	17	28.3	21	35.0	10	16.7
Family enjoying physical activities together	0	0.0	26	43.3	17	28.3	10	16.7	7	11.7
Discussing importance of a healthy diet	0	0.0	15	25.0	14	23.3	11	18.3	19	31.7
Discussing importance of physical activity	0	0.0	17	28.3	13	21.7	12	20.0	18	30.0
Family having meals together	0	0.0	4	6.7	7	11.7	22	36.7	27	45.0
Allow child to decide how much TV he/she wants to watch	22	36.7	20	33.3	7	11.7	8	13.3	3	5.0
Allow child to watch TV during meals	9	15.0	29	48.3	6	10.0	13	21.7	2	3.3
Child lets you know when he/she is emotionally low	4	6.7	12	20.0	6	10.0	23	38.3	14	23.3

n- Sample size  
%- Percentage

Parent’s habits associated with their responsibility towards child’s eating are displayed in Table 7. Specific items representing parent’s responsibility for child’s eating can be found in the Appendix. The majority of the parents (70%) said that when they are at home they are always responsible for feeding their child and 18.3% of the parents said that when they are at home most of the time they carry the responsibility of feeding their child. Minor percentages represented the response categories “never”, “seldom”, and “half of the time”. Slightly more than 50% of the



parents were always responsible for deciding their child’s portion sizes. Thirty percent of the parents most of the time decided their child’s portion sizes. Around 7% of the parents are responsible half of the time for deciding the child’s portion sizes. The response categories “never”, and “seldom” each represented 5% of the respondents. Sixty percent of the parents are always responsible for deciding whether their child has eaten the right kind of foods, followed by 25% who are responsible most of the time.

Table 7

*Distribution of Responsibility for Child’s Eating*

Habit	Response									
	Never		Seldom		Half of the time		Most of the time		Always	
	N	%	N	%	n	%	n	%	n	%
Responsible for feeding the child	2	3.3	2	3.3	3	5.0	11	18.3	42	70.0
Responsible for deciding child’s portion sizes	3	5.0	3	5.0	4	6.7	18	30.0	32	53.3
Responsible for deciding if the child has eaten the right kind of foods	0	0.0	1	1.7	8	13.3	15	25.0	36	60.0

n- Sample size  
%- Percentage

The proportion of parents concerns about their child’s weight is summarized in Table 8. Specific items related to parents concern about their child’s weight can be found in the Appendix. It was found that 41.7% parents were unconcerned whereas 15% were very concerned about their child eating too much when they are not around. Fifteen parents (25%) had little concern and nine parents (15%) were concerned about their child eating too much when they are not around. Parents who were unconcerned about their child having to diet to maintain a desirable weight made up 50% of the total respondents, followed by 16.7% who were a little

concerned. Parents who were very concerned about their child having to diet to maintain a desirable weight comprised 15%. Twenty-six parents (43.3%) were unconcerned about their child becoming obese whereas 17 parents (28.3%) were very concerned about their child becoming obese.

Table 8

*Proportion of Concerns of Parent's about Child's Weight*

Habit	Response									
	Unconcerned		A little concerned		Concerned		Fairly concerned		Very Concerned	
	n	%	N	%	n	%	n	%	n	%
Concern about child eating too much	25	41.7	15	25.0	9	15.0	2	3.3	9	15.0
Concern about child having to diet to maintain a desirable weight	30	50.0	10	16.7	7	11.7	3	5.0	9	15.0
Concern about child becoming obese	26	43.3	7	11.7	4	6.7	5	8.3	17	28.3

n- Sample size  
%- Percentage

Table 9 represents the frequencies of restrictions parents put on child's eating. The appendix gives the details about questions pertaining to the restrictions parents put on child's eating. Close to 60% of the parents tend to agree that they have to be sure about their child not eating too many sweets. Parents who disagreed that they have to be sure that their child does not eat too many sweets comprised 11.7%, followed by those who slightly disagreed (6.7%), and those who slightly agreed (5%). Twenty-five parents (41.7%) agreed and 10 parents (16.7%) slightly agreed about being sure that their child does not eat too many high-fat foods. A very smaller percentage of parents (11.7%) disagreed that they have to be sure that their child does not eat too many high-fat foods. Out of 60 parents, 15 (25%) tended to agree and 12 (20%)

tended to slightly agree about ensuring that their child does not eat too many of his/her favorite foods. An equal percentage of parents (11.7%) selected the response choices “disagree” and “slightly disagree” in response to the question where they were asked whether they have to be sure that their child does not eat too many of his/her favorite foods. Approximately 42% of the parents said that they intentionally keep some foods out of the reach of their children while 28.3% said that they never do so. Offering sweets as a reward for good behavior was practiced only by 5% of the parents, whereas 53.3% of the parents never practiced the same. Offering favorite foods in exchange of good behavior was never practiced by 60% of the parents. Thirty-five percent of the parents said that if they did not guide or regulate their child’s eating, he/she would eat too many junk foods whereas 23.3% of the parents said that they did not believe in such a regulation. Twenty parents (33.3%) said that if they did not guide or regulate their child’s eating, he/she would eat too many of his/her favorite foods.

Table 9

*Frequencies of Restrictions Parents put on Child's Eating*

Habit	Response									
	Disagree		Slightly Disagree		Neutral		Slightly agree		Agree	
	n	%	N	%	n	%	n	%	n	%
Ensure that child does not eat too many sweets	7	11.7	4	6.7	11	18.3	3	5.0	35	58.3
Ensure that child does not eat too many high- fat foods	7	11.7	5	8.3	13	21.7	10	16.7	25	41.7
Ensure that child does not eat too many favorite foods	7	11.7	7	11.7	19	31.7	12	20.0	15	25.0
Intentionally keeping some foods out of the child's reach	17	28.3	5	8.3	5	8.3	8	13.3	25	41.7
Offering sweets as a reward for good behavior	32	53.3	9	15.0	5	8.3	10	16.7	3	5.0
Offering favorite foods in exchange of good behavior	36	60.0	10	16.7	3	5.0	5	8.3	6	10.0
Regulating child's consumption of junk foods	14	23.3	9	15.0	4	6.7	12	20.0	21	35.0
Regulating child's consumption of favorite foods	10	16.7	9	15.0	9	15.0	11	18.3	20	33.3

n- Sample size

% - Percentage

The summary of distribution of the pressure parents put on their child's eating is shown in table 10. The Appendix could be referred for details of the specific items related to parental pressure on child's eating. Only five parents (8.3%) said that their child should always eat all the food on his/her plate. Out of the 60 parents, 22 parents (36.7%) disagreed and 14 parents (23.3%) slightly disagreed that their child should finish all the food on his/her plate. Parents who

disagreed that they should be especially careful to make sure that their child should eat enough comprised 33.3%. The remaining response categories had an almost similar distribution across themselves. Mixed responses were obtained across all response categories (25% disagree, 13.3% slightly disagree, 23.3% neutral, 21.7% slightly agree, and 15% agree) when the parents were asked if they make their child eat even when he/she is not hungry. Forty percent parents disagreed whereas 18.3% of the parents agreed that if they did not guide or regulate their child's eating, he/she would eat much less than what he/she should.

Table 10

*Distribution of Pressure Parents put on Child's Eating*

Habit	Response									
	Disagree		Slightly Disagree		Neutral		Slightly agree		Agree	
	N	%	n	%	n	%	n	%	n	%
Eat all food on the plate	22	36.7	14	23.3	12	20.0	6	10.0	5	8.3
Be especially careful to make sure that child should eats enough	20	33.3	11	18.3	7	11.7	10	16.7	10	16.7
Feeding forcefully	15	25.0	8	13.3	14	23.3	13	21.7	9	15.0
If not regulated, child would eat much less than he/she should	24	40.0	8	13.3	11	18.3	5	8.3	11	18.3

n- Sample size  
%- Percentage

Table 11 displays the distribution of parents monitoring of child's eating. Please refer to the Appendix for the items pertaining to parents monitoring of child's eating. Parents who always keep track of the sweets that their child eats constituted 35% whereas those who mostly do so constituted 40%. Slightly more than 70% of the parents also keep track of the snack foods

that their child eats. Approximately 60% of the parents keep track of the high-fat foods consumed by their children.

Table 11

*Distribution of Parents Monitoring of Child's Eating*

Habit	Response									
	Never		Rarely		Sometimes		Mostly		Always	
	N	%	n	%	n	%	n	%	n	%
Keep track of sweets	3	5.0	3	5.0	8	13.3	24	40.0	21	35.0
Keep track of snack food	3	5.0	3	5.0	9	15.0	21	35.0	23	38.3
Keep track of high-fat foods	4	6.7	5	8.3	14	23.3	20	33.3	16	26.7

n- Sample size

%- Percentage

Descriptive statistics associated with parents, spouses, and children's involvement in sedentary activities have been summarized in Table 12. Parents spend an average of about 12 hours watching TV, approximately 3 hours on the internet, and 1 hour playing computer and video games during an average week. The mean for number of hours spent by spouses during an average week on watching TV was found to be 9. On an average, spouses spend around 1.5 hours online, and approximately 3 hours playing computer and video games during an average week. According to the data, during an average week children spend an average of about 11 hours on watching TV, followed by an average of 4.3 hours spent online and approximately 1 hour on playing computer and video games.

Table 12

*Descriptive Statistics of the Number of Hour's Parents, Spouses, and Children Spend on Sedentary Activities During an Average Week*

Sedentary Activity	n	Minimum	Maximum	Mean	SD
Parent					
Watching TV	60	.0	60.0	12.4	13.4
Online	60	.0	25.0	2.7	5.1
Computer and video games	60	.0	20.0	1.0	3.7
Spouse					
Watching TV	60	.0	60.0	8.7	11.1
Online	60	.0	30.0	1.4	5.0
Computer and video games	60	.0	35.0	2.7	6.4
Children					
Watching TV	60	.0	60.0	11.0	10.9
Online	60	.0	12.0	1.1	2.6
Computer and video games	60	.0	48.0	4.3	7.5

n- Sample size

SD- Standard Deviation

Parents' physical activity related descriptive statistics have been presented below in Table 13. Most of the parents reported regular walking sessions in a week (mean=5.7). Some less frequent physical activities in which parents engaged themselves included running/jogging (mean= 0.4) playing tag (mean= 0.3), dancing (mean= 0.6), playing baseball/softball (mean= 0.3), playing basketball (mean= 0.4), swimming (mean= 0.3). Some physical activities in which parents engaged themselves rarely included hiking/biking, playing frisbee/kickball, playing jumping rope, playing soccer, bicycling, playing tennis/badminton, and aerobics. The mean for all activities combined was found to be 9.4.

Table 13

*Descriptive Statistics for the Number of Times Parents do a Physical Activity During an Average Week*

Activity	n	Minimum	Maximum	Mean	SD
Walking	60	0.0	100.0	5.7	13.6
Running/Jogging	60	0.0	10.0	0.5	1.6
Playing tag	60	0.0	3.0	0.3	0.7
Dancing	60	0.0	5.0	0.6	1.3
Hiking/Biking	60	0.0	2.0	0.1	0.4
Playing baseball/softball	60	0.0	4.0	0.3	0.9
Playing basketball	60	0.0	6.0	0.4	1.1
Playing Frisbee/kickball	60	0.0	5.0	0.2	0.7
Playing jumping rope	60	0.0	7.0	0.1	0.9
Playing soccer	60	0.0	4.0	0.1	0.5
Swimming	60	0.0	7.0	0.3	1.0
Bicycling	60	0.0	5.0	0.2	0.8
Playing tennis/badminton	60	0.0	2.0	0.1	0.3
Aerobics	60	0.0	4.0	0.2	0.8
Other physical activities	60	0.0	6.0	0.4	1.3

n- Sample size

SD- Standard Deviation

Physical activity patterns for spouses as summarized in Table 14 show that spouses most frequently engaged themselves in walking (mean= 1.9). Other less frequent physical activities include running/jogging, playing tag, dancing, hiking/biking, playing baseball/softball, basketball, football, tennis/badminton, and swimming.



Table 14

*Descriptive Statistics for the Number of Times Spouses of Parent Participants do a Physical Activity During an Average Week*

Activity	n	Minimum	Maximum	Mean	SD
Walking	60	0.0	40.0	1.9	5.4
Running/Jogging	60	0.0	5.0	0.1	0.7
Playing tag	60	0.0	6.0	0.2	1.0
Dancing	60	0.0	3.0	0.1	0.5
Hiking/Biking	60	0.0	4.0	0.2	0.7
Playing baseball/softball	60	0.0	3.0	0.1	0.5
Playing basketball	60	0.0	3.0	0.2	0.6
Playing football	60	0.0	5.0	0.3	0.9
Swimming	60	0.0	7.0	0.2	1.0
Playing tennis/badminton	60	0.0	5.0	0.2	0.9
Other physical activities	60	0.0	7.0	0.2	1.1

n- Sample size  
SD- Standard Deviation

Table 15 displays the descriptive statistics for physical activity patterns followed by the child participants. The most frequent physical activities found among children included walking, running/jogging, playing tag, bicycling, and dancing with a mean on 4.7, 3.7, 2.4, 2.3, and 2.1 respectively. Hiking/biking, playing baseball/softball, basketball, football, volleyball, Frisbee/kickball, jumping rope, skateboarding/skating, swimming, and aerobics were amongst the less frequent activities found in children.

Table 15

*Descriptive Statistics for the Number of Times Children do a Physical Activity During an Average Week*

Activity	n	Minimum	Maximum	Mean	SD
Walking	60	0.0	100.0	4.7	12.9
Running/Jogging	60	0.0	25.0	3.7	5.6
Playing tag	60	0.0	20.0	2.4	3.6
Dancing	60	0.0	20.0	2.1	4.2
Hiking/Biking	60	0.0	7.0	0.5	1.5
Playing baseball/softball	60	0.0	10.0	0.6	1.6
Playing basketball	60	0.0	20.0	1.9	3.4
Playing volleyball	60	0.0	2.0	0.1	0.3
Playing football	60	0.0	15.0	0.6	2.0
Playing Frisbee/kickball	60	0.0	35.0	1.1	4.5
Playing jumping rope	60	0.0	20.0	0.9	2.8
Playing soccer	60	0.0	10.0	0.5	1.5
Skateboarding/skating	60	0.0	3.0	0.3	0.8
Swimming	60	0.0	7.0	0.4	1.2
Bicycling	60	0.0	12.0	2.3	2.7
Aerobics	60	0.0	5.0	0.1	0.6
Other physical activities	60	0.0	7.0	0.6	1.6

n- Sample size

SD- Standard Deviation

The proportions of the items that parents stock in their kitchen is represented in Table 16. Twenty parents (33.3%) said that pretzels are stocked rarely in their kitchen, whereas the same number of parents said that they sometimes stock pretzels in their kitchen. Thirteen parents (21.7%) said that they never stock pretzels. Most of the parents (three response categories combined) said that they stock popcorn in their kitchen. Only 8.3% of the parents said that they always stock nuts in their kitchen whereas 16.7% said that they frequently stock nuts in kitchen. There were 11.7% of the parents who said that nuts are never stocked in their kitchen. Twenty-

two parents said that they sometimes stock cakes in their kitchen, followed by those who rarely stock cakes in their kitchen (26.7%). Ten parents said that cakes are frequently stocked in their kitchen. Fifty percent of the parents' said that they rarely stock candy bars in their kitchen. Fourteen parents (23.3%) said that they stock candy bars sometimes whereas 10% of the parents said that they never stock candy bars in their kitchen. Parents who said that they rarely stock candies in their kitchen made up 46.7%, whereas 23.3% said that sometimes they stock candies in their kitchen. Approximately 50% of the parents said that they stock chips in their kitchen. Not a single parent said that ice-cream/popsicles are never stocked in their kitchen. Twenty-five parents (41.7%) said that cookies are sometimes stocked in their kitchen whereas 30% said that cookies are frequently stocked in their kitchen. Fruits were stocked always by 45% of the parents and frequently by 38.3% of the parents. Thirty-eight parents (63.3%) always stocked vegetables in their kitchen. Parents who frequently stocked vegetables in their kitchen made up 21.7%.

Table 16

*Proportions of Items Stocked in Kitchen*

Food Item	Response									
	Never		Rarely		Sometimes		Frequently		Always	
	n	%	n	%	n	%	n	%	N	%
Pretzels	13	21.7	20	33.3	20	33.3	2	3.3	2	3.3
Popcorn	2	3.3	6	10.0	13	21.7	18	30.0	18	30.0
Nuts	7	11.7	12	20.0	23	38.3	10	16.7	5	8.3
Cakes	7	11.7	16	26.7	22	36.7	10	16.7	2	3.3
Candy bars	10	16.7	30	50.0	14	23.3	2	3.3	1	1.7
Candy	7	11.7	28	46.7	14	23.3	5	8.3	3	5.0
Chips	1	1.7	10	16.7	17	28.3	20	33.3	9	15.0
Ice-cream/ Popsicles	0	0.0	10	16.7	25	41.7	18	30.0	4	6.7
Cookies	1	1.7	14	23.3	25	41.7	11	18.3	5	8.3
Fruits	0	0.0	1	1.7	6	10.0	23	38.3	27	45.0
Vegetables	0	0.0	0	0.0	6	10.0	13	21.7	38	63.3

n- Sample size  
%- Percentage

Table 17 summarizes the proportion of items that children eat daily. As reported by the parents, starchy foods/grains are eaten by 58.3% of the children at least 1-2 times daily whereas 28.3% parents said that their children consume starchy foods/grains 3-5 times daily. Thirty-three parents (55%) said that their children eat fruits 1-2 times in a day followed by those who said that their children eat fruits 3-5 times daily (33.3%). Approximately 80% of the parents said that their children eat vegetables 1-5 times daily. Dairy products are consumed by 53.3% of the children 3-5 times daily while 21.7% of the parents said that their children eat dairy products 1-2 times in a day. Twenty-nine (48.3%) parents reported that their children eat meat products like fish, poultry products, and eggs, 3-5 times every day. Those who said that their children eat meats 1-2 times daily made up 33.3%. Children of 60% of the parents eat processed meat products like bologna, hot dogs, and sausage 1-2 times in a day. About 60% of the parents said that their child eats fat containing foods 1-2 times daily, followed by those (15%) who said that their children eat fat containing foods 3-5 times everyday. Children of most of the parents (70%) eat sweets 1-2 times everyday, and children of 15% of the parents eat sweets 3-5 times everyday.

Table 17

*Proportion of Items Children Eat in a Day*

Food Item	Response									
	Never		1-2 times		3-5 times		6-8 times		More than 8 times	
	N	%	N	%	n	%	n	%	N	%
Starchy foods/grains	2	3.3	35	58.3	17	28.3	2	3.3	1	1.7
Fruits	1	1.7	33	55.0	20	33.3	2	3.3	1	1.7
Vegetables	3	5.0	25	41.7	23	38.3	3	5.0	3	5.0
Dairy	1	1.7	13	21.7	32	53.3	5	8.3	6	10.0
Meats	1	1.7	20	33.3	29	48.3	2	3.3	4	6.7
Processed meats	13	21.7	36	60.0	3	5.0	1	1.7	2	3.3
Fat	8	13.3	35	58.3	9	15.0	3	5.0	2	3.3
Sweets	4	6.7	42	70.0	9	15.0	0	0.0	2	3.3

n- Sample size  
%- Percentage

Frequencies for the parental beliefs about weight control have been summarized in Table 18. Results indicate that 35% of the parents said they strongly believe that by limiting eating one can lose weight whereas 5% said that limiting eating has no effect on one's weight. Only 7 parents out of 60 said that shape of one's body is largely what he/she gets from his/her parents. Half of the study participants (50%) said that they did not believe that fate controls one's weight. Twenty-three parents said that they do not believe that even though there is so much fattening food around it is impossible to lose weight. Only 5% parents said that for a person to diet successfully, he/she has to be pushed by other to do so. As is evident from the results, mixed responses were observed when the parents were asked whether obese people lack the willpower to control their weight. According to the data, 50% of the parents said they don't believe that people who are couple of pounds obese need professional help. Parents who said that one can lose weight by increasing the amount of exercise comprised 36.7%. Most of the parents tend to

agree that a person is at his/her present weight because that is the weight level that is natural for him/her.

Table 18

*Frequencies of Responses by Parents about their Beliefs Regarding Weight Control*

Parental Belief	Response											
	1		2		3		4		5		6	
	Not at all Descriptive				Somewhat descriptive				Very Descriptive			
	N	%	n	%	n	%	n	%	n	%	n	%
Limiting eating can result in weight loss	3	5.0	5	8.3	11	18.3	10	16.7	7	11.7	21	35.0
Shape of body depends on parents weight	7	11.7	9	15.0	16	26.7	14	23.3	5	8.3	7	11.7
Weight is controlled by fate	30	50.0	14	23.3	6	10.0	4	6.7	3	5.0	0	0.0
Too much fattening food around so loosing weight impossible	23	38.3	7	11.7	11	18.3	8	13.3	6	10.0	2	3.3
People diet successfully when other push to do so	24	40.0	13	21.7	9	15.0	7	11.7	2	3.3	3	5.0
Obese people lack willpower to control weight	15	25.0	10	16.7	13	21.7	10	16.7	3	5.0	7	11.7
People more than a couple of pounds obese need professional help	30	50.0	6	10.0	8	13.3	5	8.3	2	3.3	7	11.7
Weight can be lost by increasing exercise	1	1.7	4	6.7	11	18.3	8	13.3	11	18.3	22	36.7
Present weight is natural weight level	16	26.7	15	25.0	15	25.0	6	10.0	5	8.3	1	1.7
For loosing weight encouragement from others is needed	10	16.7	13	21.7	13	21.7	9	15.0	4	6.7	9	15.0

n- Sample size  
%- Percentage

Table 19 includes the summary of descriptive statistics of the scale measures for parental and family factors. The mean of responses was calculated for each individual item and each parental and family factor included in the questionnaire. The mean of responses for all parental eating habits combined was found to be 4.3. Parenting related to child eating had a mean of 3.1, whereas family related parameter had a mean of 3.5. The mean of responses for perceived feeding responsibility was the lowest among all the factors and was found to be 2.3. Responses for parents concern about child obesity had a mean of 4.3. Parental restrictions on child's eating had a mean of 3.0. The mean of responses for the pressure that parents put on their child to eat was found to be 2.5. Parental monitoring of child's eating had a mean of 3.8. The mean of total hours spent by parents on all sedentary activities combined was found to be 16 hours per week. The mean of total hours spent by parents, spouses, and children on all sedentary activities combined was calculated and was found to be 16.2, 12.8 and 16.5 hours respectively. Parents', spouses, and children's physical activity patterns were observed and their means were found to be 9.4 for parents, 4.3 for spouses, and 23.2 for children. These figures about physical activity reveal the number of times parents, their spouses, and the children engage in a physical activity for 15 minutes or more during an average week. The data pertaining to parental weight control beliefs shows us a mean of 4.2.

Table 19

*Descriptive Statistics for all Subscales Representing Various Parental and Family Factors*

All Subscales	n	Mean	SD
Parental eating habits	60	4.3	0.6
Parenting related to child eating	60	3.1	0.5
Indicators of home environment	60	3.5	0.7
Perceived feeding responsibility	60	2.3	1.3
Concerns about child weight	60	4.3	0.8
Restriction	60	3.0	1.0
Pressure to eat	59	2.5	1.1
Monitoring	59	3.8	1.0
Total for all sedentary activities			
Parent	60	16.2	16.2
Spouse	60	12.8	18.1
Children	60	16.5	14.6
Total for all physical activities			
Parent	60	9.4	14.1
Spouse	60	4.3	7.5
Children	60	23.4	27.9
Parental weight control beliefs	58	4.2	0.5

n- Sample size

SD- Standard Deviation



### Spearman's Correlation

The association between parental eating habits and children's BMI percentile has been represented in Table 20. It can be seen from the results that there was no statistically significant relationship between any of the items related to parental eating habits and children's BMI percentile.

Table 20

#### *Association between Parental Eating Habits and Children's BMI Percentile*

Habit	n	$r_s$	p
Eating when lonely, bored, nervous, or upset	57	0.017	0.900
Eating at night	57	0.189	0.160
Parental eating habits index	57	0.053	0.694

n- Sample size

$r_s$ - Spearman's correlation coefficient

p- Significance

Table 21 shows the association between parenting related to child's eating and children's BMI percentile. Limiting the amount of food child eats at mealtime ( $r_s = 0.401^{**}$ ) had a positive correlation and statistically significant ( $p = 0.002$ ) relationship with BMI percentile. Parents use of food to reward their child ( $r_s = 0.255$ ) had a moderate correlation and marginal statistical significance ( $p = 0.055$ ).

Table 21

*Association between Parenting Related to Child's Eating and Children's BMI Percentile*

Habit	n	r <sub>s</sub>	p
Limiting the amount of food child eats at mealtime	56	0.401**	0.002
Allowing child to snack between meals	57	0.051	0.706
Vegetables and fruits in meals	57	-0.076	0.572
Using food to reward	57	0.255	0.055
Ask what child eats at school	57	0.058	0.667
Allow child to decide how much candy he/she wants to eat	56	-0.034	0.803
Parental habits related to child's eating index	55	0.155	0.259

n- Sample size

r<sub>s</sub>- Spearman's correlation coefficient

p- Significance

\*\* Correlation is significant at the 0.01 level (2-tailed).

No statistically significant relationship was observed between indicators related to home environment and children's BMI percentile as shown in Table 22.

Table 22

*Association between Indicators Related to Home Environment and Children's BMI Percentile*

Factor	n	r <sub>s</sub>	p
Meals served at regular time	55	-0.061	0.659
Family enjoying physical activities together	57	0.092	0.496
Discussing importance of a healthy diet	56	-0.042	0.760
Discussing importance of physical activity	57	0.089	0.509
Family enjoying meals together	57	0.128	0.341
Allow child to decide how much TV he/she wants to watch	57	0.027	0.840
Allow child to watch TV during meals	57	0.027	0.846
Child lets you know when he/she is emotionally low	56	0.166	0.222
Home environment index	52	0.180	0.201

n- Sample size

r<sub>s</sub>- Spearman's correlation coefficient

p- Significance

Table 23 represents the association between parent's perceived feeding responsibility and children's BMI percentile. It is evident from the results that none of the items representing

parent's perceived feeding responsibility hold a statistically significant association with children's BMI percentile.

Table 23

*Association between Parents Perceived Feeding Responsibility and Children's BMI Percentile*

Item	n	r <sub>s</sub>	p
Responsible for feeding the child	57	0.022	0.872
Responsible for deciding child's portion sizes	57	0.034	0.805
Responsible for deciding if the child has eaten the right kind of foods	57	-0.050	0.709
Perceived feeding responsibility index	57	0.007	0.956

n- Sample size  
r<sub>s</sub>- Spearman's correlation coefficient  
p- Significance

As shown in Table 24, concerns about child's weight ( $r_s = 0.582^{**}$ ) had a positive correlation and a statistically significant association ( $p = <0.01$ ) with children's BMI percentile. A positive and statistically significant association was found for all the individual items representing parents' concerns for child's weight - concern about child eating too much when the parent is not around ( $r_s = 0.455^{**}$ ,  $p = <0.0001$ ), concern about child having to diet to maintain a desirable weight ( $r_s = 0.589^{**}$ ,  $p = <0.0001$ ), concern about child becoming obese ( $r_s = 0.544^{**}$ ,  $p = <0.0001$ ).

Table 24

*Association between Parents Concern about Child's Weight and Children's BMI Percentile*

Item	n	r <sub>s</sub>	p
Concern about child eating too much when	57	0.455**	<0.0001
Concern about child having to diet to maintain a desirable weight	56	0.589**	<0.0001
Concern about child becoming obese	56	0.544**	<0.0001
Concerns about child weight index	56	0.582**	<0.0001

n- Sample size

r<sub>s</sub>- Spearman's correlation coefficient

p- Significance

\*\* Correlation is significant at the 0.01 level (2-tailed).

There is evidence for a mild association between parent's restrictions on child's eating and children's BMI percentile ( $p = 0.083$ ) as is represented in Table 25. Ensuring that the child does not eat too many of his/her favorite foods ( $r_s = 0.309^*$ ,  $p = 0.019$ ) and the perception that if not guided or regulated the child would eat too many of his/her favorite foods ( $r_s = 0.367^{**}$ ,  $p = 0.005$ ) were the two items that had a positive and statistically significant relationship with children's BMI percentile.

Table 25

*Association between Restriction Parents put on Child's Eating and Children's BMI Percentile*

Item	n	r <sub>s</sub>	p
Ensure that child does not eat too many sweets	57	0.121	0.368
Ensure that child does not eat too many high- fat foods	57	0.152	0.258
Ensure that child does not eat too many of his/her favorite foods	57	0.309*	0.019
Intentionally keeping some foods out of the child's reach	57	0.228	0.088
Offering sweets as a reward of good behavior	56	-0.017	0.900
Offering favorite foods in exchange of good behavior	57	-0.069	0.611
Parents regulating child's consumption of junk foods	57	0.168	0.211
Parents regulating child's consumption of his/her favorite foods	56	0.367**	0.005
Restriction on child's eating index	55	0.236	0.083

n- Sample size

r<sub>s</sub>- Spearman's correlation coefficient

p- Significance

\* Correlation is significant at the 0.05 level (2-tailed)

\*\* Correlation is significant at the 0.01 level (2-tailed).

A negative correlation ( $r_s = -0.433^{**}$ ) and statistically significant association ( $p=0.006$ ) was found between the pressure parents put on their child's eating and children's BMI percentile as shown in Table 26. Three out of the four items (parents being especially careful to make sure that their child eats enough,  $r_s = -0.331^{**}$ ,  $p= 0.014$ ; try to make the child eat even when he/she is not hungry,  $r_s = -0.444$ ,  $p= 0.001$ ; and the perception that if not guided or regulated the child would eat too little,  $r_s = -0.362$ ,  $p= 0.006$ ) representing the pressure to eat factor had a negative and statistically significant association with children's BMI percentile.

Table 26

*Association between Pressure Parents put on Child's Eating and Children's BMI Percentile*

Item	n	$r_s$	P
Child should always eat all of the food on his/her plate	56	-0.159	0.240
Be especially careful to make sure that child should eats enough	55	-0.331*	0.014
Forcefully feeding the child	56	-0.444**	0.001
If not regulated, child would eat much less than he/she should	56	-0.362**	0.006
Pressure to eat index	55	-0.433**	0.001

n- Sample size

$r_s$ - Spearman's correlation coefficient

p- Significance

\* Correlation is significant at the 0.05 level (2-tailed)

\*\* Correlation is significant at the 0.01 level (2-tailed).

As shown in Table 27, parents monitoring of child's eating was found to have a statistically significant ( $p= 0.009$ ) and positive correlation ( $r_s = 0.348^{**}$ ) with children's BMI percentile. Parents monitoring of the amount of snack food child eats ( $r_s = 0.371^{**}$ ,  $p= 0.005$ ), and the amount of high-fat foods child eats ( $r_s = 0.307^*$ ,  $p= 0.009$ ) were positively correlated and had a statistically significant association with children's BMI percentile. Keeping track of the amount of sweets eaten by the child was not associated with the children's BMI percentile.

Table 27

*Association between Parents Monitoring of Child's Eating and Children's BMI Percentile*

Item	n	r <sub>s</sub>	P
Keep track of sweets	56	0.233	0.084
Keep track of snack food	56	0.371**	0.005
Keep track of high-fat foods	56	0.307*	0.021
Parent's monitoring of child's eating index	56	0.348**	0.009

n- Sample size

r<sub>s</sub>- Spearman's correlation coefficient

p- Significance

\* Correlation is significant at the 0.05 level (2-tailed)

\*\* Correlation is significant at the 0.01 level (2-tailed).

Table 28 represents the association between the food items parents stock in their kitchen and children's BMI percentile. As the table shows, none of the items except popcorn (r<sub>s</sub> = -0.283\*, p= 0.038) had a statistically significant association with children's BMI percentile.

Table 28

*Association between the Food Items Parents Stock in their Kitchen and Children's BMI Percentile*

Item	n	r <sub>s</sub>	P
Pretzels	54	0.019	0.892
Popcorn	54	-0.283*	0.038
Nuts	54	-0.230	0.094
Cakes	54	0.193	0.162
Candy bars	54	0.137	0.322
Candy	54	0.183	0.185
Chips	54	0.225	0.102
Ice-cream/popsicles	54	0.210	0.128
Cookies	53	0.209	0.133
Fruits	54	-0.018	0.900
Vegetables	54	0.020	0.884
Food items index	53	0.119	0.393

n- Sample size

r<sub>s</sub>- Spearman's correlation coefficient

p- Significance

\* Correlation is significant at the 0.05 level (2-tailed).

Association between the foods eaten by the children and their BMI percentile is represented in Table 29. As is evident from the results, no association was found between the foods eaten by children and their BMI percentile.

Table 29

*Association between the Food Items Children Eat and their BMI Percentile*

Item	n	r <sub>s</sub>	P
Starchy foods/grains	57	-0.035	0.804
Fruits	57	-0.170	0.218
Vegetables	57	0.032	0.820
Dairy	57	0.072	0.603
Meats	57	-0.180	0.198
Processed meats	57	0.068	0.634
Fat	57	0.185	0.181
Sweets	57	-0.006	0.965

n- Sample size  
r<sub>s</sub>- Spearman's correlation coefficient  
p- Significance.

Time spent by the parent participants, their spouses, and their children on sedentary behaviors (watching TV, online, and playing computer and video games) was compared with children's BMI percentile to check if an association exists. It was discovered that no significant association exists between the measures of parental and child's sedentary behavior and children's BMI percentile (Table 30).

Table 30

*Association between Measures of Parental and Child’s Sedentary Behavior and Child’s BMI Percentile*

Activity	n	r <sub>s</sub>	p
Watching TV			
Parent	57	-0.203	0.130
Spouse	57	0.129	0.339
Child	57	0.060	0.660
Online			
Parent	57	0.163	0.224
Spouse	57	0.003	0.981
Child	57	0.065	0.631
Playing computer or video games			
Parent	57	0.073	0.591
Spouse	57	0.039	0.775
Child	57	0.125	0.353
Sedentary Activities index			
Parent	57	-0.119	0.376
Spouse	57	-0.104	0.441
Child	57	0.100	0.458

n- Sample size  
r<sub>s</sub>- Spearman’s correlation coefficient  
p- Significance.

As presented in Table 31, no significant association was found between parents’, spouses, and children’s physical activity patterns and children’s BMI. The correlation coefficients between parents’ physical activity patterns and children’s BMI was found to be -0.046, for spouses it was found to be -0.062, and for children’s it was found to be -0.111.

Table 31

*Association between Parents, Spouses, and Children’s Physical Activity and Children’s BMI Percentile*

Physical Activities index	n	r <sub>s</sub>	p
Parents	57	-0.046	0.735
Spouses	57	-0.062	0.645
Children	57	-0.111	0.409

n- Sample size  
r<sub>s</sub>- Spearman’s correlation coefficient  
p- Significance.



Parental weight control beliefs and their association with children’s BMI percentile were tested and the results have been presented in Table 32. Non significant  $r_s$  values were obtained for the following statements- “By limiting what you eat, you can lose weight” (0.131), “The shape of your body is largely what you got from your parents” (-0.205), “Your weight is, to a great extent, controlled by fate” (-0.115), “There is so much fattening food around that losing weight is almost impossible” (-0.128), “Most people can only diet successfully when other people push them to do it” (-0.119), “People who are overweight lack the willpower to control their weight” (0.066), “People who are more than a couple of pounds overweight need professional help” (-0.157), “By increasing the amount you exercise, you can lose weight” (0.180), “Most people are at their present weight because that is the weight level that is natural for them” (-0.187), “In order to lose weight people must get a lot of encouragement from others” (-0.127). Therefore, no significant results exist to indicate that parental weight control beliefs are associated with children’s BMI percentile.

Table 32

*Association between Parental Weight Control Beliefs and Children’s BMI Percentile*

Weight control beliefs	n	$r_s$	p
Limiting eating can result in weight loss	54	0.131	0.343
Shape of body depends on parents weight	55	-0.205	0.133
Weight is controlled by fate	54	-0.115	0.406
Too much fattening food around so losing weight impossible	54	-0.128	0.356
People diet successfully when other push to do so	55	-0.119	0.385
Obese people lack willpower to control weight	55	0.066	0.634
People more than a couple of pounds obese need professional help	55	-0.157	0.252
Weight can be lost by increasing exercise	54	0.180	0.193
Present weight is natural weight level	55	-0.187	0.171
For losing weight encouragement from others is needed	55	-0.127	0.354
Parental weight control beliefs index	51	-0.150	0.292

n- Sample size  
 $r_s$ - Spearman’s correlation coefficient  
p- Significance

## CHAPTER 5

### DISCUSSION

This study was conducted with the main objective to describe the parental and family factors and explore the association between these factors and children's BMI percentile. The study used data collected from 60 parents of children ages 5-11 in the form of a self-administered questionnaire. The major findings of the study indicate a significant relationship between children's BMI and three factors from the CFQ viz., parents' concerns about child weight, parental pressure on the child to eat, and parental monitoring of child's eating.

Approximately 82% of the parent participants were mothers mostly (88.3%) white, Caucasian, Non-Hispanic or Non African-American. The sample had almost an equal mix of male and female child participants. Among the parental factors, parents concern for child's weight ( $4.3 \pm 0.8$ ), parental eating habits ( $4.3 \pm 0.6$ ), and parental monitoring of child's eating ( $3.8 \pm 1.0$ ), had comparatively higher means on a scale of 1-5. Higher scores indicate higher levels parental concern about child weight, and responsible eating habits and higher levels of parental monitoring of child's eating. Comparatively lower means were obtained on following parental factors- parents' perceived feeding responsibility ( $2.3 \pm 1.3$ ), pressure to eat ( $2.5 \pm 1.1$ ), parenting related to child's eating ( $3.1 \pm 0.5$ ), and restriction ( $3.0 \pm 1.0$ ). Lower means indicate lower levels of perceived feeding responsibility, lower levels of parental pressure on the child to eat, less responsible parenting related to child's eating, and lower levels of parental restriction. High scorers on this scale appear to be more concerned about their weight and more active in attempting to control it (Stotland & Zuroff, 1990).

Findings of this study revealed a significant positive correlation between children's BMI percentile and parents concern about child weight. This finding is consistent with the findings from a study conducted by Spruijt-Metz et al. (2002) where they explored the relationship

between mother's child feeding practices and children's adiposity in a sample of 74 white and 46 African American children ages 7-14 years and their mothers. They found positive relationship between parents' concern for child's weight and child's total fat mass. Another study conducted by Perryman (2005) showed identical results when parents concern about child's weight was compared to child's BMI. Perryman's study employed 75 children ages 96 to 152 months (8-approximately 12 years) and their parents. The current study confirms the same finding in a study population of children ages 5-11 years and by considering BMI percentile as the outcome variable. This positive correlation between children's BMI percentile and concern about child's weight could be a result of the child's current weight status (the child might be obese) or because of parents perception about their child being/becoming obese.

Another variable from the CFQ, parental pressure on the child to eat, was found to have a significant negative correlation with children's BMI percentile. This finding was in congruence with four other independent studies. The above mentioned study conducted by Spruijt-Metz et al. (2002) revealed a negative correlation between children's total fat mass and maternal pressure to eat. Researchers Lee, Mitchell, Smiciklas-Wright, & Birch (2001) reported that BMI of 5 year old girls' was negatively correlated with maternal pressure to eat ( $r = -0.20$ ;  $p < 0.005$ ). Another independent study conducted by Faith et al. (2004) also reported a negative correlation between child BMI z scores and pressure to eat while studying the association between parental feeding attitudes and styles and child BMI z scores in children ages 5 and 7 years. Similarly, another study conducted by Perryman (2005) found a negative correlation between parents' pressure to eat and children's BMI. Parental use of pressure to eat is in part a response to the child's weight (Lee et al., 2001). One possible interpretation of this finding is that mothers pressure thinner children to eat, whereas they are concerned about their heavier children (Spruijt-Metz et al.,

2002). The negative correlation between pressure to eat and children's BMI is somewhat expected. Parents of children with higher BMI's would likely not pressure them to eat more food (Perryman, 2005).

Analyses showed that parents monitoring of child's eating was positively correlated to children's BMI percentile. Birch and Fisher (2000) reported a similar finding while exploring the influence of maternal child-feeding practices on daughter's eating and weight. Keller, Pietrobelli, Johnson, and Faith (2006) reported that monitoring showed significant familial correlations while investigating whether maternal feeding attitudes and styles towards children are part of the 'shared' or 'non-shared' home environment. This again could be attributed to the current BMI status of the child or a perception of the parents that monitoring of child's sweets, snack foods and high-fat food consumption could help the child in maintaining or reducing his/her weight.

Parental restriction on child's eating was mildly associated with children's BMI percentile. One comparable study found restriction to be highly correlated with total fat mass. Parental use of restriction is in part a response to the child's weight status, with heavier children eliciting more restriction (Spruijt-Metz et al., 2002).

No significant associations were found between children's BMI percentile and the following factors- parental eating habits, parenting related to child's eating, parameters related to home environment, parents' perceived feeding responsibility, sedentary activity patterns, physical activity patterns, and parental beliefs.

To summarize the findings, parents displayed comparatively higher levels of concerns about the child's weight and monitoring of child's eating, more responsible eating habits. A significant association was found between parents concern about child's weight, parental pressure on child's eating, parental monitoring of child's eating when compared with children's

BMI percentile. A marginally significant association was found between parents restriction on child's eating and children's BMI percentile. The findings suggest that parents could have concern about the child's weight issues and might actively manage their children's eating.

#### Limitations of the Study and Recommendations for Future Research

The first limitation of this study was the comparatively small sample size predominantly composed of white, Caucasian, non-Hispanic or non African-American participants. This is especially problematic because the prevalence of obesity is even higher among Hispanic and black children than among non-Hispanic white children. At the same time, the reported dieting and weight concerns are lower in racial and ethnic groups other than non-Hispanic whites, which suggests that pathways of influence may differ between racial and ethnic groups (Birch & Fisher, 2000). Also, as food choices, culture, food availability, beliefs vary across different ethnicities this restricts the extrapolation of these findings to other ethnic and racial groups. The study should be conducted on a larger sample comprising more ethnically and socioeconomically diversified populations to better understand the influences of different ethnic and racial groups and socioeconomic status on child obesity. Because of the small sample size, the study may not have enough power to detect an association between a factor of interest and the child BMI percentile. This may explain why most of the associations analyzed were not statistically significant.

The second limitation of this study was that the data were obtained using a self-reported questionnaire. Parents might have tended to choose desirable answers. Also, it is questionable whether parents were accurate reporters of their habits (Wardle et al., 2002).

Finally this being a cross-sectional study, the direction of a relationship cannot be established between children's BMI percentile and a parental or family factor even if the relationship is significant. To better understand the association of the parental and family factor with child's BMI percentile, a longitudinal research design needs to be undertaken in future studies.

## REFERENCES

- Agras, W. S., Hammer, L. D., McNicholas, F., & Kraemer, H. C. (2004). Risk factors for childhood overweight: a prospective study from birth to 9.5 years. *J Pediatr, 145*(1), 20-25.
- Agras, W. S., & Mascola, A. J. (2005). Risk factors for childhood overweight. *Curr Opin Pediatr, 17*, 648-652.
- American Obesity Association Childhood Obesity: Prevalence and Identification (2005). Retrieved on 30<sup>th</sup> June 2006, from American Obesity Association website: <http://www.obesity.org/subs/childhood/prevalence.shtml>
- Birch, L. L. (1999). Development of food preferences. *Annu Rev Nutr, 19*, 41-62.
- Birch, L. L., & Fisher, J. O. (1998). Development of eating behaviors among children and adolescents. *Pediatrics, 101*, 539-549.
- Birch, L. L., & Fisher, J. O. (2000). Mothers' child-feeding practices influence daughters' eating and weight. *Am J Clin Nutr, 71*, 1054-1061.
- Birch, L. L., Fisher, J. O., Grimm-Thomas, K., Markey, C. N., Sawyer, R., & Johnson, S. L. (2001). Confirmatory factor analysis of the Child Feeding Questionnaire: A measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite, 36*, 201-210.
- Borra, S. T., Kelly, L., Shirreffs, M. B., Neville, K., & Geiger, C. J. (2003). Developing health messages: Qualitative studies with children, parents, and teachers help identify communications opportunities for healthful lifestyles and the prevention of obesity. *J Am Diet Assoc, 103*, 721-728.

- Cancer death rates – Appalachia, 1994-1998.* (No. 51)(2002). No. 51): Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention.
- Coronary heart disease mortality trends among whites and blacks Appalachia and United States, 1980-1993.* (No. 47)(1998). No. 47): Morbidity and Mortality Weekly Report, Centers for Disease Control and Prevention.
- Cutting, T. M., Fisher, J. O., Grimm-Thomas, K., & Birch, L. L. (1999). Like mother, like daughter: familial patterns of overweight are mediated by mothers' dietary disinhibition. *Am J Clin Nutr*, *69*, 608-613.
- Davison, K. K., & Birch, L. L. (2001). Childhood overweight: a contextual model and recommendations for future research. *Obes Rev*, *2*, 159-171.
- Dietz, W. H. (1998). Health consequences of obesity in youth: Childhood predictors of adult disease. *Pediatrics*, *101*, 518-525.
- Ebbeling, C. B., Pawlak, D. B., & Ludwig, D. S. (2002). Childhood obesity: Public-health crisis, common sense cure. *Lancet*, *360*, 473-482.
- Epstein, L. H., Saelens, B. E., Myers, M. D., & Vito, D. (1997). Effects of decreasing sedentary behaviors on activity choice in obese children. *Health Psychol*, *16*, 107-113.
- Evers, C. (1997). Empower children to develop healthful eating habits. *J Am Diet Assoc*, *97*(10 Suppl 2), S116.
- Faith, M. S., Scanlon, K. S., Birch, L. L., Francis, L. A., & Sherry, B. (2004). Parent-child feeding strategies and their relationships to child eating and weight status. *Obes Res*, *12*, 1711-1722.
- Fisher, J. O., & Birch, L. L. (1999). Restricting access to palatable foods affects children's behavioral response, food selection, and intake. *Am J Clin Nutr*, *69*, 1264-1272.



- Fowler-Brown, A., & Kahwati, L. C. (2004). Prevention and treatment of overweight in children and adolescents. *Am Fam Physician, 69*, 2591-2598.
- Gillman, M. W., Rifas-Shiman, S. L., Frazier, A. L., Rockett, H. R., Camargo, C. A., Jr., Field, A. E., et al. (2000). Family dinner and diet quality among older children and adolescents. *Arch Fam Med, 9*, 235-240.
- Golan, M., & Crow, S. (2004a). Parents are key players in the prevention and treatment of weight-related problems. *Nutr Rev, 62*(1), 39-50.
- Golan, M., & Crow, S. (2004b). Targeting parents exclusively in the treatment of childhood obesity: long-term results. *Obes Res, 12*, 357-361.
- Golan, M., Fainaru, M., & Weizman, A. (1998). Role of behaviour modification in the treatment of childhood obesity with the parents as the exclusive agents of change. *Int J Obes Relat Metab Disord, 22*, 1217-1224.
- Golan, M., & Weizman, A. (1998). Reliability and validity of the Family Eating and Activity Habits Questionnaire. *Eur J Clin Nutr, 52*, 771-777.
- Golan, M., Weizman, A., Apter, A., & Fainaru, M. (1998). Parents as the exclusive agents of change in the treatment of childhood obesity. *Am J Clin Nutr, 67*, 1130-1135.
- Golan, M., Weizman, A., & Fainaru, M. (1999). Impact of treatment for childhood obesity on parental risk factors for cardiovascular disease. *Prev Med, 29*(6 Pt 1), 519-526.
- Halverson, J. A., Lin M, Harner, E. J., Hanham, R. Q., and Braham, V. E. (2004). Adult obesity in Appalachia: An atlas of geographic disparities. Morgantown: West Virginia University, Prevention Research Center, Center for Healthy Communities.
- Hood, M. Y., Moore, L. L., Sundarajan-Ramamurti, A., Singer, M., Cupples, L. A., & Ellison, R. C. (2000). Parental eating attitudes and the development of obesity in children. The

- Framingham Children's Study. *Int J Obes Relat Metab Disord*, 24, 1319-1325.
- Jackson, D., Mannix, J., Faga, P., & McDonald, G. (2005). Overweight and obese children: mothers' strategies. *J Adv Nurs*, 52(1), 6-13.
- Jain, A., Sherman, S. N., Chamberlin, L. A., Carter, Y., Powers, S. W., & Whitaker, R. C. (2001). Why don't low-income mothers worry about their preschoolers being overweight? *Pediatrics*, 107, 1138-1146.
- Kagan, D. M., & Squires, R. L. (1984). Eating disorders among adolescents: Patterns and prevalence. *Adolescence*, 19(73), 15-29.
- Kaur, H., Hyder, M. L., & Poston, W. S. (2003). Childhood overweight: An expanding problem. *Treat Endocrinol*, 2, 375-388.
- Keller, K. L., Pietrobelli, A., Johnson, S. L., & Faith, M. S. (2006). Maternal restriction of children's eating and encouragements to eat as the 'non-shared environment': A pilot study using the child feeding questionnaire. *Int J Obes (Lond)*. Retrieved June 16, 2006 from <http://www.nature.com.ezproxy.etsu.edu:2048/ijo/journal/vaop/ncurrent/abs/0803318a.html;jsessionid=EA23CBA6B97D867F97BF4354F39ADBBB>
- Kimm, S. Y., & Obarzanek, E. (2002). Childhood obesity: A new pandemic of the new millennium. *Pediatrics*, 110, 1003-1007.
- Koplan, J. P., Liverman, C. T., & Kraak, V. I. (2005). Preventing childhood obesity: Health in the balance: Executive summary. *J Am Diet Assoc*, 105, 131-138.
- Lee, Y., Mitchell, D. C., Smiciklas-Wright, H., & Birch, L. L. (2001). Diet quality, nutrient intake, weight status, and feeding environments of girls meeting or exceeding recommendations for total dietary fat of the American Academy of Pediatrics. *Pediatrics*,

107(6), E95.

- Lindsay, A. C., Sussner, K. M., Kim, J., & Gortmaker, S. (2006). The role of parents in preventing childhood obesity. *Future Child, 16*, 169-186.
- Lissau, I., & Sorensen, T. I. (1994). Parental neglect during childhood and increased risk of obesity in young adulthood. *Lancet, 343*, 324-327.
- Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *Jama, 295*, 1549-1555.
- Ogden, C. L., Flegal, K. M., Carroll, M. D., & Johnson, C. L. (2002). Prevalence and trends in overweight among US children and adolescents, 1999-2000. *Jama, 288*, 1728-1732.
- Patrick, H., & Nicklas, T. A. (2005). A review of family and social determinants of children's eating patterns and diet quality. *J Am Coll Nutr, 24*, 83-92.
- Perryman, M. L. (2005). *The relationship between parents' weight related perceptions and behaviors and children's body composition, body image, and self-concept*. Unpublished Dissertation, The University of New Mexico.
- Ramsey, P. W., Glenn, L. L. (1998). Risk factors for heart disease in rural Appalachia. *Family and Community Health, 20*, 71-82.
- Ritchie, L. D., Welk, G., Styne, D., Gerstein, D. E., & Crawford, P. B. (2005). Family environment and pediatric overweight: what is a parent to do? *J Am Diet Assoc, 105*(5 Suppl 1), S70-79.
- Robinson, T. N. (1999). Reducing children's television viewing to prevent obesity: A randomized controlled trial. *Jama, 282*, 1561-1567.
- Robinson, T. N., Kiernan, M., Matheson, D. M., & Haydel, K. F. (2001). Is parental control over

- children's eating associated with childhood obesity? Results from a population-based sample of third graders. *Obes Res*, 9, 306-312.
- Spruijt-Metz, D., Lindquist, C. H., Birch, L. L., Fisher, J. O., & Goran, M. I. (2002). Relation between mothers' child-feeding practices and children's adiposity. *Am J Clin Nutr*, 75, 581-586.
- Stotland, S., & Zuroff, D. C. (1990). A new measure of weight locus of control: The Dieting Beliefs Scale. *J Pers Assess*, 54, 191-203.
- Taveras, E. M., Rifas-Shiman, S. L., Berkey, C. S., Rockett, H. R., Field, A. E., Frazier, A. L., et al. (2005). Family dinner and adolescent overweight. *Obes Res*, 13, 900-906.
- Veugelers, P. J., & Fitzgerald, A. L. (2005). Prevalence of and risk factors for childhood overweight and obesity. *Cmaj*, 173, 607-613.
- Wardle, J., Sanderson, S., Guthrie, C. A., Rapoport, L., & Plomin, R. (2002). Parental feeding style and the inter-generational transmission of obesity risk. *Obes Res*, 10, 453-462.
- Whitaker, R. C., Deeks, C. M., Baughcum, A. E., & Specker, B. L. (2000). The relationship of childhood adiposity to parent body mass index and eating behavior. *Obes Res*, 8, 234-240.
- Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *N Engl J Med*, 337, 869-873.
- Wu, T. J., Wilson, J. L., Flowers, J. W., Tudiver, F., Glen, L., Dunn, M. S., et al. (2004). Assessment of health risk behaviors among teens in an Appalachian community. *American Journal of Epidemiology*, 159:S019.

## APPENDIX

### Healthy Eating and Physical Activity Survey: Parent's Questionnaire



#### **Healthy Eating and Physical Activity Survey: Parent's Questionnaire**

Dear Parents,

This survey has been developed so you can tell us your health status and the health status of your child who is with you today at the clinic. The information you give us will help us better understand factors that may influence children's eating and physical activity so that appropriate health education programs can be developed in our area.

You do not need to write down your name on the questionnaire. This means that only you and the person giving this survey will know your answers. The information shared with us will not be given to other parents, your child's school, or anyone else, so do not worry about how you answer the questions. It is important that you answer the question truthfully. If you are uncomfortable answering a question, just leave it blank. Completing the questionnaire is voluntary. Whether or not you decide to complete the questionnaire will not affect you or your relationship with East Tennessee State University.

After you complete the questionnaire, please return it to the person who distributes it to you. Thank you very much for taking the time and completing the questionnaire.

Tiejian Wu, MD, PhD  
Assistant Professor  
Department of Public Health  
Department of Family Medicine  
East Tennessee State University



## Healthy Eating and Physical Activity Survey: Parent's Questionnaire

*Please fill in the blank or circle/ mark the answer you choose.*

1. What is today's date?  
\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_  
Month / Day /Year
2. What is your sex?
  - A. Male
  - B. Female
3. What is your age?  
\_\_\_\_\_ Years
4. What is your relation to the child who is with you at the clinic?
  - A. Father
  - B. Mother
  - C. Grandparent
  - D. Other \_\_\_\_\_
5. Have you ever been told by a doctor that you have:
  - Diabetes?
    - A. Yes
    - B. No
  - High blood pressure or hypertension?
    - A. Yes
    - B. No
  - Heart disease?
    - A. Yes
    - B. No
6. What is the highest degree or level of school you have completed?
  - A. Less than High School
  - B. High School
  - C. Some college
  - E. Bachelors Degree
  - F. Masters or Doctoral Degree
7. How many people are living in your household?  
\_\_\_\_\_
8. How do you describe yourself?  
(Select one or more responses.)
  - A. American Indian or Alaska Native
  - B. Asian
  - C. Black or African American
  - D. Hispanic or Latino
  - E. Native Hawaiian or Other Pacific Islander
  - F. White, Caucasian non-Hispanic or non-African American
  - G. Other
9. What is your occupation?
  - A. Manufacturing
  - B. Agriculture
  - C. Health Care
  - D. Wholesale or retail trade business
  - E. Military
  - F. Construction
  - G. Student
  - H. Unemployed
  - I. Other
10. Have you smoked cigarettes in the past month?
  - A. Yes
  - B. No
11. If smoked during past month, on average, how many cigarettes per day did you smoke?  
\_\_\_\_\_ Cigarettes per day.

12. Has your spouse smoked during the past month?

- A. Yes
- B. No
- C. Not applicable

13. How tall are you?

\_\_\_\_\_ feet \_\_\_\_\_ inches

14. How much do you weigh?

\_\_\_\_\_ pounds

15. Does your family have TennCare?

- A. Yes
- B. No

16. Does your family have other health insurance?

- A. Yes. \_\_\_\_\_
- B. No

17. How do you describe your body weight?

- A. Very underweight
- B. Slightly underweight
- C. About the right weight
- D. Slightly overweight
- E. Very overweight

**The following questions are about the child who is with you today.**

18. What is the child's age?

\_\_\_\_\_ Years

19. What is the child's sex?

- A. Female
- B. Male

20. Did the child come for a well-child check-up?

- A. Yes
- B. No

21. Does the child have any of the following symptoms?

- A. Fever
- B. Throat sore
- C. Cough
- D. Runny nose
- F. Headache
- G. Vomiting
- H. Other:

\_\_\_\_\_

22. How much do you think the child weighs?

\_\_\_\_\_ Pounds

23. How tall do you think the child is?

\_\_\_\_\_ feet \_\_\_\_\_ inches

24. How do you describe the child's body weight?

- A. Very underweight
- B. Slightly underweight
- C. About the right weight
- D. Slightly overweight
- E. Very overweight

25. Which of the following is the child trying to do about his/her weight?

- A. Lose weight
- B. Gain weight
- C. Stay the same weight
- D. Not trying to do anything about his/her weight

26. What are the child's weight and height measurements at this visit?

(Please ask the nurse who does the measurement to fill in the information below)

Child's Weight: \_\_\_\_\_ pounds

Child's Height: \_\_\_\_\_ feet \_\_\_\_\_ inches

**The following questions are about eating and physical activity. Please mark the box that corresponds to the frequency in which each situation takes place.**

	Never	Occasionally	Frequently	Usually	Always
27. How often do you eat because you are lonely, bored, nervous, or upset?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. How often do you get out of bed at night, go into the kitchen, and finish the remains of some food?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. How often do you ask about what your child eats at school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Do you limit the amount of food your child eats at mealtime?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31. Do you allow your child to snack between meals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Do you allow your child to watch TV during meals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Are the meals at your house served at a regular time?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. How often do the meals served at your house include both vegetables and fruits?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Do you let your child decide how much TV he/she wants to watch?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Do you let your child decide how much candy he/she wants to eat?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Do you use food to reward your child?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. How often does your family enjoy physical activities together?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Does your child let you know when he/she is emotionally low?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Do you discuss with your child the importance of a healthy diet?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Do you discuss with your child the importance of physical activity?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Do you and your child/children have meals together?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Questions pertaining to how responsible you are for your child's eating.**

	Never	Seldom	Half of the time	Most of the time	Always
43. When your child is at home, how often are you responsible for feeding him/her?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. How often are you responsible for deciding what your child's portion sizes are?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. How often are you responsible for deciding if your child has eaten the right kind of foods?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



**Questions pertaining to your concern about your child's weight.**

Unconcerned	A little concerned	Concerned	Fairly concerned	Very concerned	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	46. How concerned are you about your child eating too much when you are not around him/her?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	47. How concerned are you about your child having to diet to maintain a desirable weight?
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	48. How concerned are you about your child becoming over weight?

**Questions pertaining to restrictions you put on your child's eating.**

	Disagree	Slightly disagree	Neutral	Slightly agree	Agree
49. I have to be sure that my child does not eat too many sweets (candy, ice cream, cake or pastries)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. I have to be sure that my child does not eat too many high-fat foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. I have to be sure that my child does not eat too much of his/her favorite foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. I intentionally keep some foods out of my child's reach	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53. I offer sweets (candy, ice cream, cake, pastries) to my child as a reward for good behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. I offer my child his/her favorite foods in exchange for good behavior	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. If I did not guide or regulate my child's eating, he/she would eat too many junk foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. If I did not guide or regulate my child's eating, he/she would eat too much of her favorite foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Questions pertaining to pressure put on your child to eat.**

Disagree	Slightly disagree	Neutral	Slightly agree	Agree	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	57. My child should always eat all of the food on his/her plate
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	58. I have to be especially careful to make sure my child eats enough
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	59. If my child says "I'm not hungry", I try to get him/her to eat anyway
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60. If I did not guide or regulate my child's eating, he/she would eat much less than he/she should

**Questions concerning how you monitor what your child eats.**

	Never	Rarely	Sometimes	Mostly	Always
61. How much do you keep track of the sweets (candy, ice cream, cake, pies, pastries, etc.) that your child eats?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
62. How much do you keep track of the snack food (potato chips, Doritos, cheese puffs, etc.) that your child eats?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
63. How much do you keep track of the high-fat foods that your child eats?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**During an average week, how many hours do you, your spouse, and your child spend watching TV and video, online, and playing computer/video games?**

	You	Your Spouse	Your child
64. Watching TV or video			
65. Online			
66. Playing computer or video games			

**For each activity that you, your spouse, or your child do 15 minutes or more, write down the number of times each of you perform the activity during an average week.**

	You	Your spouse	Child
67. Walking			
68. Running/jogging			
69. Playing tag			
70. Dancing			
71. Hiking/climbing			
72. Baseball/softball			
73. Basketball			
74. Volleyball			
75. Football			
76. Frisbee/kickball			
77. Jumping rope			
78. Soccer			
79. Skateboarding/skating			
80. Swimming laps			
81. Bicycling			
82. Tennis/badminton			
83. Aerobic dance			
84. Water skiing			
85. Other:			

**How often are the following items stocked in your kitchen? (Mark appropriate column)**

	Never	Rarely	Sometimes	Frequently	Always
86. Pretzels	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
87. Popcorn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
88. Nuts (Almonds, cashews, walnuts, peanuts, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89. Cakes (Twinkies, Ho-ho's, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
90. Candy bars (Snickers, BabyRuth, Hershey's, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
91. Candy (Skittles, M & M's, Gummi Bears, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
92. Chips (Doritos, Ruffles, Cheetos, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93. Ice-cream/popsicles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
94. Cookies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
95. Fruits (Apples, oranges, grapes, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
96. Vegetables (Carrots, tomatoes, potatoes, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**How often, in a day, does your child eat the following items? (Mark appropriate column)**

	Never	1-2 times	3-5 times	6-8 times	More than 8 times
97. Starchy foods/grains (rice, pasta, breads, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
98. Fruits (apples, oranges, bananas, grapes, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
99. Vegetables (carrots, celery, lettuce, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
100. Dairy (milk, yogurt, cheese)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
101. Meats (fish, poultry, eggs, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
102. Processed meats (bologna, hot dogs, sausage, etc)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
103. Fat (butter, margarine, mayonnaise, oil, salad dressing, sour cream, cream cheese)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
104. Sweets (candy, cakes, regular soda, juices)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Please respond to the following statements by indicating how well each statement describes your beliefs. Circle a number from 1 (not at all descriptive of my beliefs) to 6 (very descriptive of my beliefs).**

	Not at all descriptive		Somewhat descriptive		Very descriptive	
	1	2	3	4	5	6
105. By limiting what you eat, you can lose weight.	1	2	3	4	5	6
106. The shape of your body is largely what you got from your parents.	1	2	3	4	5	6
107. Your weight is, to a great extent, controlled by fate.	1	2	3	4	5	6
108. There is so much fattening food around that losing weight is almost impossible.	1	2	3	4	5	6
109. Most people can only diet successfully when other people push them to do it.	1	2	3	4	5	6
110. People who are overweight lack the willpower to control their weight.	1	2	3	4	5	6
111. People who are more than a couple of pounds overweight need professional help.	1	2	3	4	5	6
112. By increasing the amount you exercise, you can lose weight.	1	2	3	4	5	6
113. Most people are at their present weight because that is the weight level that is natural for them.	1	2	3	4	5	6
114. In order to lose weight people must get a lot of encouragement from others.	1	2	3	4	5	6

## VITA

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