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An Educational Intervention to Increase Fruit and Vegetable Consumption in Parents of Obese and Overweight Children

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AN EDUCATIONAL INTERVENTION TO INCREASE FRUIT AND VEGETABLE CONSUMPTION IN PARENTS OF OBESE AND OVERWEIGHT CHILDREN

by

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Abstract

The incidence and prevalence of overweight and obese children in the United States is a serious health concern since the complications of childhood obesity can have serious and long-term effects: cardiovascular disease, sleep apnea, type 2 diabetes, neurological disease, and pulmonary disease. Parental modeling and nutritional education focusing on the obese/overweight child's parents has been shown as an effective strategy for improving nutritional outcomes of the recommended servings of fruits and vegetables in children from five to ten years of age. Outcomes of this study and targeted nutritional modeling included increasing vegetable and fruit consumption of the parent by at least one fruit and vegetable serving per day post-intervention through nutritional education.

The project purpose was to measure the impact of a parent-focused nutritional educational intervention that increases fruit and vegetable consumption in the parents of obese and overweight children. While the study indirectly measured a nutrition education intervention aimed at children via their parents, no children were included in this project.

Parents (N = 93) of obese/overweight children were provided nutritional and modeling education over three months. A participation rate of 14% (N = 13) was achieved. The majority of the parents were single African American mothers between 18 and 25 years old with one or two children living in the household, an average income less than $10,000 per year, and some college or technical education.

This project used a pre-and post-test design to measure the effectiveness of a nutritional educational intervention. A descriptive analysis of the participants was

computed. Differences in the pre-and post-test scores on the parental dietary modeling questionnaire and the food frequency questionnaire were analyzed. Results showed a significant increase in fruit and vegetable consumption ($p < .05$). The majority of the increase was due to improved fruit consumption. There was also an increase in parental modeling awareness. Parents' understanding of the importance of parental modeling had an impact on nutritional selection of their own fruit and vegetable intake.

For my children and mother

William W. Thomas IV, Calista Roshawn Renal Barkley, and Dorothy Williams

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Chapter One: Introduction

The prevalence of childhood obesity is escalating, particularly in certain populations such as African Americans, Latino, and Native Americans, and is identified as an urgent health concern in the United States. The national incidence of childhood obesity has increased by 12% in the past 30 years in children aged six to eleven years (Bibeau, Moore, Caudill, & Topp, 2008; Centers for Disease Control and Prevention [CDC], 2010). As the incidence and prevalence of childhood obesity increases, so does the incidence of obesity-related diseases. Currently the incidence and prevalence of childhood obesity has been leveling off in adolescent girls aged 12-19, especially among Mexican Americans and non-Hispanic Blacks (CDC 2009; CDC 2010). Even still, some researchers predict that the current generation of children and adolescents may die of heart disease and complications of type 2 diabetes before their parents do (Bibeau et al., 2008; CDC, 2009; CDC, 2010; Lakkakula, Zanovec, Silverman, Murphy, & Tuuri, 2008; Ogden, Carroll, & Flegal, 2008). During the past 30 years adult obesity in the United States has increased by 19%; this is a dramatic increase, considering the Healthy People 2010 goal, whose objective was to reduce the prevalence of adult obesity to less than 15% (CDC, 2010; Ogden & Carroll, 2010).

The Problem

The prevalence of childhood obesity is reported to be higher among Latino, Native-American, and African-Americans (Bibeau et al., 2008; CDC, 2010; Nicholas & Livingston, 2002). According to Bibeau, Moore, Caudill, and Topp (2008), as well as the CDC (2010), African-American and Hispanic children are two to four percent more likely to be obese than Caucasian children. Childhood obesity is also more prevelant in

younger children. According to the Center for Disease Control and Prevention (2010), the prevalence of obesity has increased from 5.0% to 12.4% in children aged 2-5, 6.5% to 17.0% in those aged 6-11, and 5.0% to 17.6% in those aged 12-19 (Ogden et al., 2008; Ogden & Carroll, 2010; CDC, 2010).

A review of Florida's statistics reveals that 11.2% of Florida children are obese, compared to 13.0% of U.S. children nationwide (CDC, 2007). Obesity is the result of too few calories expended for the number of calories consumed and is mediated by environmental, genetic, and behavioral factors (CDC, 2010). Also the CDC (2010), defines overweight as a BMI at or above the 85th percentile and lower than the 95th percentile and defines obesity as a BMI at or above the 95th percentile for children of the same age and sex. According to the Centers for Disease Control and Prevention (2007), 77.9% of Florida's children eat fewer than five fruits and vegetables per day, comparable to the national percentage of 78.6%. Children who do not eat the necessary requirements of fruits and vegetables are more likely to replace those fruit and vegetables with less healthy substitutes, such as potato chips, candy, and soda (CDC, 2007; CDC, 2009; CDC, 2010; Drohan, 2002). These substitutes, alongside a sedentary life style, can be a causative factor of childhood obesity (CDC, 2010; U.S. Department of Health and Human Services [USDHHS], 2005; Golan, 2006; Hudson, 2008).

As reported in Florida Charts (2010), about a quarter of adult Floridians are overweight with an obesity rate for adults rising 7% in the past decade. As of 2010, there was a marked similarity in the percentage of adults who are overweight or obese in the United States, Florida and Volusia County. About 64% of adults in the United States are

overweight or obese, compared to 65% of adults in Florida and 66% of adults in Volusia County (CDC, 2010; Florida Charts, 2010; Ogden & Carroll, 2010).

There is little statistical information currently available in Volusia County regarding obese/overweight children within the age group selected for this project. In 2007, Volusia County's population was approximately 510,504 (Florida Charts, 2009). Approximately 20% of that population was under 18 years of age. More than one-third (36.5%) of Volusia County families are led by single parents with minor children (Florida Charts, 2009). In addition, Volusia County ranks third in the state for children living in poverty. Single-parent homes and poverty can be major contributors to the increased number of children who are obese; poverty is associated with poor dietary intake and a sedentary lifestyle (Berry, Savoye, Melkus, & Grey, 2007; Golan, 2006; Haire-Joshu, et.al., 2003; Haire-Joshu et al., 2008; Hudson, 2008; Oude Luttikhuis et al., 2009). Moreover, parents who are living below the poverty line are focused mainly on immediate financial and safety issues rather than on long-term priorities such as increasing their children's fruit and vegetable intake (Golan, 2006; Haire-Joshu et al., 2003; Haire-Joshu et al., 2008; Hudson, 2008; Lakkakula et al., 2008; Oude Luttikhuis et al., 2009).

According to Golan, Weizman, Apter, and Fainaru (1998), parents who have unhealthy nutritional behavioral habits may instill them in their children. In order to prevent this, it is important to understand how different cultures perceive the cause, course, treatment, intervention, and perception of specific health behaviors (Baskin, Harsohena, Ahluwalia, & Resnicow, 2001).

Non-Caucasian cultures, such as that of African Americans, possess a different standard of physical beauty and ideal body image than do Caucasians. African Americans prefer fuller body types and are more likely to be satisfied with their weight, even when they are clinically overweight (Baskin et al., 2001). With this in mind, it is important to design culturally sensitive nutritional modeling interventions that accentuate a healthy lifestyle rather than weight reduction. Nutritional education and modeling for parents has been shown to be effective in people of all races and backgrounds (Golan et al., 1998; Gruber & Haldeman, 2009; Haire-Joshu et al., 2008; Lakkakula et al., 2008; Tibbs et al., 2001).

According to Berry, et al. (2007), 6- to 11-year-old children whose parents are the sole mediators of change, have demonstrated increased weight loss and positive nutritional behavior change. Golan (2006) emphasizes that the use of a parent-only intervention for a healthy lifestyle results in a significantly reduced percentage of overweight children and an increase in nutritional improvements.

Evidence-based interventions for childhood obesity prevention and treatment include improved nutrition and increased exercise in both children and parents. Changing the lifestyle patterns in parents of obese children has been shown to be beneficial. Intervention and prevention of childhood obesity is essential and educating parents is the key to treatment (Berry et al., 2007; Golan, 2006; Haire-Joshu et al., 2008; Larsen, Madleco, Williams, & Tiedeman, 2006; Oude Luttikhuis et al., 2009).

Parental obesity is a predictor of childhood obesity (Aubrey, 2005; Berry et al., 2007; Golan, 2006; Gruber & Haldeman, 2009; Haire-Joshu et al., 2003; Haire-Joshu et al., 2008; Myers & Vargas, 2000). Parents are a major mechanism of influence in

affecting behavioral changes in their children. Efforts to achieve and maintain nutritional behaviorial changes in children are more successful with parental involvement. It is therefore important for parents to take primary responsibility for what their children eat. A registered nurse and registered dietitian can help parents to gain the skills they need to model healthy eating habits and behaviors for their children (Aubrey, 2005; Bibeau et al., 2008; CDC, 2010; Golan 2006; Gruber & Haldeman, 2009; Haire-Joshu et al., 2003).

Tibbs et al. (2001) researched the relationship between eating patterns, dietary intake, and modeling among African-American parents. They concluded that a parental modeling nutritional education intervention was associated with lower dietary fat intake, low-fat eating patterns, and daily consumption of five fruits and vegetables .

According to the United States Department of Agriculture (USDA) (USDA, 2010), recommended consumption of fruits and vegetables for children includes 2 cups of fruit and 2 ½ cups of vegetables per day as part of their total 2,000 calorie intake; this averages 5 to 13 servings of fruits and vegetables each day (USDA, 2010). Fruits may be dried, fresh, frozen, or canned, and may be whole, pureed, or cut-up. There are various rules to remember how much fruit constitutes a cup; for example, 32 grapes count as one cup, one banana is equivalent to one cup, and eight large strawberries is equal to one cup.

The USDA organizes vegetables into five subgroups based on their nutrient content: dark green vegetables (broccoli, collard greens, romaine lettuce, spinach); starchy vegetables (corn, green peas, lima beans, potatoes); orange vegetables (acorn squash, carrots, sweet potatoes, butternut squash); dry beans and peas (black beans, black-eyed peas, kidney beans, pinto beans, split peas); and vegetables (asparagus, cabbage, tomato juice, vegetables juice, okra, green beans, cauliflower) (USDA, 2010).

Twelve baby carrots, one large sweet potato, and three spears of broccoli are each equivalent to one cup.

Children's consumption of fruits and vegetables is associated with a lower risk of overweight or obesity (CDC, 2010; Lakkakula et al., 2008). The intake of fruits and vegetables by both parents and children is below the recommended levels (CDC, 2010; Lakkakula et al., 2008; USDA, 2010; USDHHS, 2005). Differences between the actual and the recommended levels are evident in children from minority groups, underscoring a need for dietary interventions to increase their intake of fruits and vegetables. The assessment of choice for consumption of fruits and vegetables is the food frequency questionnaire (FFQ).

The Project

The purpose of this project was to measure the impact of a parent-focused nutritional educational intervention that increases fruit and vegetable consumption in the parents of obese and overweight children. While the study indirectly measured a nutrition education intervention aimed at children, no children were included in this project.

This project determined if a parent-focused nutritional educational intervention for parents of overweight or obese child between the ages of 5 and 10 resulted in an increase of at least one additional fruit and vegetable serving post-intervention in parents. Pre- and post-intervention assessments of nutritional behaviors was administered to study participants. Anticipated outcomes of this study were to increase vegetable and fruit consumption by at least one serving per day while developing an awareness in the parents of the nutritional value of these habits.

Prior to choosing an intervention, it was important to understand how parents perceive the cause, course, intervention of childhood obesity. Parents influence the nutritional development of their children. They influence what their children eat and have power over shaping their children's food preferences. According to Haire-Joshu et al. (2008) and the CDC (2010), the foods that children consume at home are crucial in the fruits and vegetables that they prefer. Parents who do not promote good nutritional habits contribute to their children's weight, which can lead to serious childhood health disorders and diseases as they grow. It is important for parents to understand that modeling the consumption of fruits and vegetables can instill positive intake patterns in their children.

Description of the Project

This project determined if a parent-focused nutritional educational intervention for parents whose child is between the ages of five and ten and is identified as overweight/obese by his or her pediatrician resulted in an increase of at least one fruit and vegetable serving post-intervention in parents. A pediatric practice located in rural Northeast Florida's "Front Porch" community, is devising a strategy to ameliorate the problem. The most extreme social and health disparities are condensed into a single square mile within this primarily minority and underserved community. Due to the strategic location of the practice, many of the patients can walk, or simply cross the street, to their appointments. The pediatrician in the practice has identified overweight/obesity in children as a health issue in the minority population that they serve. According to the pediatrician, many of these children who are identified as being overweight or obese are living in single-parent homes. The pediatricians' goal is to

implement a nutritional educational intervention that emphasizes a healthy lifestyle to improve nutritional behaviors in parents.

Pre- and post-intervention assessments of nutritional behaviors were administered to study participants. The pre-intervention parental dietary modeling questionnaire (PDMQ) and food frequency questionnaire (FFQ) (Ministry of Health, 2003) were completed by parents before the nutritional education began and three months after the three educational sessions were completed. The nutritional education consisted of three sessions, each a month apart, and included interactive activities that focused on nutritional education and parental modeling.

Anticipated outcomes of this study and targeted nutritional education included increasing fruit and vegetable consumption by at least one serving post-intervention in parents by promoting parental modeling of nutritional behaviors and providing parents with nutrition related skills. According to Drohan (2002), the advantage of implementing a parent-focused intervention for children between the ages of five and ten is that it is easier to change their behavior through modeling. Negative behavior patterns can be changed and environmental cues controlled if the child is introduced to positive modeling behaviors that support healthy eating.

Research Question

In parents whose child is between five and ten years of age and has a body mass index at or above the 85th percentile, as identified by the pediatrician at a pediatric practice in Northeast Florida, does a three-month parent-focused nutritional educational intervention increase an overweight or obese child's parent's consumption of fruits and vegetables by at least one serving a day?

Definition of Terms

For the purpose of their use in this evidence-based practice project, the following definitions are provided.

Children – Individuals between the ages of five and ten years old.

Body Mass Index (BMI) – A measure of weight in relation to height that is used to determine weight status; it can also be used to determine obesity in children (CDC, 2009).

Modeling – The process in which an action of an individual is imitated by another individual through observational learning (Rosenthal & Bandura, 1979).

Overweight/obese – These terms are used interchangeably in this study. A BMI at or above the 85th percentile and lower than the 95th percentile is defined as overweight; obesity is defined as a BMI at or above the 95th percentile for children of the same age and sex (CDC, 2009).

Parents – The parental models who were used as agents of change and were responsible for attending intervention sessions and modeling lifestyle changes in their children; this included parents, grandparents, caregivers, or legal guardians.

Summary

This chapter discussed the prevalence and incidence of childhood obesity and the need for a parent-focused intervention emphasizing a healthy lifestyle to improve nutritional behaviors through parental modeling. Several studies have identified parents as the major mechanism of behavioral changes in their children. The formulation of a practice model for a parent-focused intervention can be accomplished through a nutritional educational program that targets changes in nutritional behavior, such as

increasing fruit and vegetable consumption by at least one serving post-intervention. This can be accomplished through the promotion of nutrition-related skills and parental modeling.

Chapter Two: Literature Review

This chapter contains an overview of strategies used to identify and retrieve evidence-based research on parent-focused nutritional educational intervention. This will be followed by a description of parental intervention strategies and a review of the effects of those strategies on nutritional behavior.

Search Strategies

Multiple databases were used to obtain evidence-based research on parent-focused intervention for childhood obesity: CINAHL, Pro-Quest, Pub Med, Medline, ADA Evidence Analysis Library, Cochrane Library, EBSChost, -+Psycho Info, and ProQuest Education. A PICO (Patient, Intervention of interest, Comparison or Control Intervention, and Outcome) question was formulated to identify key words that would drive the literature search (Small, Anderson, & Melnyk, 2007). The PICO question was: Among parents whose child is between 5 and 10 years of age and with a body mass index at or above the 85th percentile, as identified by the pediatrician at a pediatric practice in Northeast Florida, does a three-month parent-focused nutritional educational intervention improve nutritional behaviors in parents of obese children? The search was conducted using the key words *intervention*, *school-aged*, *treatment*, *parents*, *nutritional behaviors*, *caregivers*, *nutrition*, *change agents*, *overweight*, *lifestyle*, *minority children*, *childhood obesity*, *family-based*, *nutritional education*, *modeling*, *social cognitive theory*, *Albert Bandura*, and *health promotion*.

The manual and website searches yielded 7,747 studies and abstracts. The search was limited to studies that identified parents as the sole mediator of change in relation to childhood obesity, nutritional education interventions, parental modeling, and social

cognitive theory (modeling theory). Forty studies were found to be relevant to childhood obesity, nutritional behavior modification, and/or parent/caregiver-focused intervention for this study. The abstracts of the articles were reviewed using the following inclusion criteria:

- Written in English.
- Peer-reviewed journal.
- Parent-focused behavior modification intervention.
- Intervention for parents of obese/overweight children.
- Nutritional behavior programs.
- Parental modeling.
- Parent-focused treatment of childhood obesity.
- Interventions for childhood overweight and obesity.
- Family-based behavior modification.

Information about parents as agents of change in childhood obesity was found in ten studies. These articles dealt with targeting parents as the exclusive mediators and the resultant reduction in their child's weight, improvement in nutritional behavior changes, modeling, and interventions that improved nutritional behaviors. A meta-analysis and synthesis of the literature conducted by Small et al. (2007) indicated a weight reduction at 6 and 12 months following lifestyle interventions involving children. A summary list of relevant literature (many retrieved through the ADA Evidence Analysis Library) with comments on outcomes relative to childhood obesity intervention and parents as the exclusive agent of change is contained in the Critical Analysis Table in Appendix A.

Childhood Obesity

Parents' recognition of obesity in their child is a necessary factor in changing that child's dietary and lifestyle habits. Parents may not have the same perception as others regarding their child's weight. Parents play an essential role in encouraging their children's nutritional behaviors, physical activity, food preferences, and quantities of food (Golan et al., 1998).

The overweight/obese child is at risk of cardiovascular disease, sleep apnea, type 2 diabetes, neurological disease, and pulmonary disease. Children who remain overweight into adulthood are at a greater risk for of heart disease, type 2 diabetes, hypertension, high cholesterol, gallbladder disease, arthritis, certain cancers, and even a shortened life span (American Academy of Pediatrics, 1998; CDC, 2010; Hurd, 2005). Children who are overweight/obese have much co-morbidity earlier in life. Other diseases and complications associated with childhood obesity are sleep apnea, joint problems, congestive heart failure, and elevated liver enzymes. Six percent of obese children have nonalcoholic steatohepatitis (Bibeau et al., 2008; CDC, 2010). Childhood obesity has also been associated with low self-esteem, depression, eating disorders, and problems in school. Children who are not overweight/obese have a decreased risk of hypertension, high blood cholesterol, type 2 diabetes, and other diseases attached to being overweight or obese (Bibeau et al., 2008; CDC, 2010). Educating parents is the key to the treatment and prevention of childhood obesity.

Childhood obesity in minority children is now considered to be an epidemic. Of minority children between the ages of 5 and 10 years old, 60% have a least one risk factor for cardiovascular disease and 25% have more than two (Hurd, 2005; CDC, 2010). Type

2 diabetes in children is also becoming an epidemic. It is projected that children who develop type 2 diabetes prior to the age of 15 will lose between 17 to 24 years of their life span (Hurd, 2005; CDC, 2010).

Childhood obesity is also a concern for local health care providers. The rapidly increasing prevalence of childhood obesity is a dilemma facing all healthcare professionals who work with children. Health care providers are struggling to develop strategies for the treatment of childhood obesity.

In the management of childhood obesity, the primary step is the timely identification of obesity in children by the health care team. According to O'Brien, Holubkov, and Reis (2004), of the health care providers for whom childhood obesity was identified in a timely manner, 81% of charts contained an adequate dietary history and 27% of pediatric charts contained an account of the child's television viewing or activity. Children whose pediatricians identified them as overweight/obese received screening, nutritional education, and specialist referral.

Parental Modeling

According to Tibbs et al. (2001), modeling and parental support among minority groups is positively related to each parent's intake of fruits and vegetables. The authors conducted a cross-sectional study of 456 African-American parents using the High 5, Low Fat Program, which is a dietary and nutritional change program in which parents complete a parental dietary modeling questionnaire, food frequency questionnaire, and eating patterns questionnaire. The program consists of parents who participate in a dietary change study. The High Five, Low Fat Program was a community-based study to

increase fruit and vegetable consumption to five servings per day and lower dietary fat intake in African-American parents of obese children.

Tibbs et al. (2001) examined the relationship between parental dietary intake and the frequency with which parents report modeling healthy dietary behaviors for their children. The authors concluded that parental modeling of improved dietary behavior was associated with a higher consumption of fruits and vegetables. The authors further proposed that for parents who understand that children mirror their behaviors, modeling can be a powerful motivator and increase their ability to stimulate their children's social, cognitive, and physical development (Tibbs et al., 2001).

Parental modeling is a process of observational learning in which the behavior of parents can stimulate the same or similar behavior in the child (Rosenthal & Bandura, 1979). According to Rosenthal and Bandura, observational learning is thought to occur through four functions:

1) Observational learning effects.
2) Disinhibiting or inhibiting behavior.
3) Facilitating similar response.
4) Cognitive standards for self-regulation.

Table 2.1 outlines this theory of observational learning.

Table 2.1

Modeling Theory of Observational Learning

Observational Learning Functions	Description	Example
Observational Learning	Occurs when parents model or display a response, and the child (the observer) learns that behavior.	When a child sees the parents eating a certain fruit or vegetable the child will try the fruit or vegetable.
Disinhibiting or Inhibiting Behavior	Occurs when the child sees positive or negative consequences of a parent's actions that serve to weaken or strengthen responses by the child.	When a child is watching his or her parents enjoying eating fruits and vegetables, the child may be more likely to eat fruits and vegetables.
Facilitating Similar Response	Occurs when the behavior of the parents serves as a cue for the child's actions.	A child who sees parent consume fruits and vegetables throughout the day may eat fruits and vegetables more frequently as a result.
Cognitive standards for self-regulation	Provides standards for the child to judge adequacy of performance.	Parents can decide their standard will be eating 7 servings of fruits and vegetables per day, leading the child to evaluate and adapt his or her routine against the same standard his or her parents set.

Information from "A Psychological Modeling: Theory and Practice," by T. Rosenthal & A. Bandura, 1979, in S. Garfield & A. Bergen's (Eds.) *Handbook of Psychotherapy and Behavior* Change, 2nd ed., pp. 621-658.

Research findings indicate that many factors contribute to obesity in children. Altered nutrition and a sedentary lifestyle are the primary factors associated with an increased incidence of overweight and obese children. Other factors include overweight or obese parents, ethnic or racial background, socioeconomic status, gender, low metabolic rate, increased numbers of fat cells, and increased health and psychosocial disorder (Buiten & Metzer, 2000; CDC, 2010). Baskin et al. (2001) believe that interventions should emphasize a healthy lifestyle, as recommended in articles on family-based management of childhood obesity.

The literature supports nutritional interventions with a focus on parental education and modeling. According to Berry et al. (2007), parents as the sole mediators of change are able to effect increased weight loss and nutritional improvements in their child or children. Golan (2006) conducted a randomized clinical trial (duration follow-up of 6

months, 1 year, 2 years, and 7 years) using 30 parents and 30 children divided into two groups that consisted of a children-only group (30), who were overweight or obese, and a parent-only group (30). The children-only group received a conventional dietary intervention and the parent-only group change was delivered through the parents via the children. Each group attended 14 one-hour sessions that began with four weekly sessions and then four bi-weekly sessions. The last six sessions were held once every six weeks. The children-only group had a drop-out rate 10 times greater than the parent-only group (30% and 3%, respectively). The outcome of the study was that the children in both groups showed a significant decrease in weight after 12 months. However, based on the findings, superiority was observed in the parent-only intervention (15% weight reduction as compared to 8% in the children-only group; ($p<0.03$) focusing on a healthy lifestyle in that the children reached a non-obese status (35% of the children in the parent-only group as compared to 14% in the children-only group ($p<0.01$) at the end of the intervention. Even at the 7-year follow up, the results were consistent, with marked superiority in the parent-only group 29.2% compared with 20.3% in the children-only group in reduction overweight from baseline, respectively, $p<0.05$. The author highly recommends a parent-only intervention focused on healthy lifestyle over weight reduction because parents play a pivotal role in modeling healthy lifestyle norms.

Golan and Weizman (2001) developed a conceptual model for the management of childhood obesity that uses a family-based approach. In this model, positive changes occur within the family unit when implementing a nutritional modeling intervention that is parent-focused, emphasizing a healthy lifestyle rather than weight reduction.

Berry et al. (2007) conducted a pilot study to determine the effects of adding coping-skills training to a behavior modification program for obese multi-ethnic parents whose child was diagnosed as overweight/obese. The study revealed that when parents are taught role modeling, problem solving, self-monitoring, and praise, their children's nutritional behaviors and weight loss outcomes improved. Haire-Joshu et al. (2003) researched one strategy for addressing obesity issues in children, which was to develop dietary interventions that embrace the strengths and build upon the values of culture and are institutionalized within organizations respected by the ethnic group. The authors conducted a randomized, nested cohort design using 738 parents; the primary outcome was an increase in fruit and vegetable consumption. The nutrition education intervention aimed at improving nutrition-related skills and parental modeling of dietary behaviors (Haire-Joshu et al., 2003).

Haire-Joshu et al. (2008) examined the effectiveness of a parent-focused home-based role modeling intervention. The objective was to examine if a parent-focused nutritional modeling intervention had any association with the child's nutritional behavior change. The authors concluded, similar to Golan and Weizman (2001), that parents' improved nutritional behavior was a significant predictor of the child's improved nutritional behavior change.

Six treatment intervention studies had young overweight/obese children and parents as the exclusive focus of the nutritional behavior change (see Appendix A). The studies identified a nutrition education intervention that used parental modeling to increase the consumption of fruit and vegetables in parents of overweight/obese children; the indirect outcome was improved intake. The methodological differences in the

research designs made it difficult to compare the results across studies. Three of the six studies were conducted in Israel and Australia, not in the United States. The studies reviewed and critically analyzed included parents in the intervention sessions, a component believed to be essential in the treatment of overweight/obese children between the ages of five and ten, especially when implementing an intervention that affects behavior change in both parents and their young children.

Parent-Focused Nutritional Education Interventions

Upon searching for parent-focused nutritional education interventions, three studies were found that used the same or similar intervention. The nutritional education intervention in each study was shown to be effective when the parents of overweight/obese children were the focus. One of the studies was cross-sectional and the other two studies were randomized nested cohort design. Each study had 456 to 1306 parents. The parent-focused nutritional behavioral interventions used the High 5, Low Fat program (Haire-Joshu et al, 2008; Haire-Joshu et al., 2003; Tibbs et al., 2001).

In the first study, Tibbs et al. (2001) researched the relationship between eating patterns, dietary intake, and parental modeling among African-American parents whose children were under the age of three, using the High 5, Low Fat Program. The results showed that parental modeling of improved nutritional behaviors related to an increase in the consumption of vegetables and fruits, lower fat intake, and low fat nutritional patterns in the parents, and thus indirectly in their children.

In the second study, Haire-Joshu et al. (2003) addressed one strategy for resolving obesity in children, which was to develop dietary interventions that embrace the strengths and values of the African-American culture, and are institutionalized within organizations

respected by African Americans. The authors conducted a randomized nested cohort study of 738 African American parents with children between the ages of three and ten (Haire-Joshu et al., 2003). The final sample consisted of 98% African-American single mothers. The purpose of the study was to test a dietary intervention (High 5, Low Fat Program) appropriate for national adoption. The goal was to improve dietary behaviors and nutritional skills in African-American parents. Results of the study revealed that the mothers consumed 30% fewer calories from fat and vegetable consumption increased by 0.53%.

The third study by Haire-Joshu et al. (2008) examined the effectiveness of a parent-focused home-based nutritional behavioral role modeling intervention using the High 5, Low Fat Program. The aim was to examine if a parent-focused nutritional behavioral intervention had any association with the child's nutritional behavior change. The authors concluded that the parents' increased vegetables and fruit consumption was a significant predictor of improvement in their child's nutritional behavior. This study aligned with other studies addressing nutritional interventions designed to improve parents' ability to modify their overweight/obese child's nutritional behavior.

Expanding the search to include other parent-focused interventions, three studies suggested the effectiveness of parent-focused nutritional education intervention. Each study added the problem-solving intervention to the experimental group alongside a nutrition education intervention (Epstein, Paluch, Gordy, Saelens, & Ernst, 2000; Golan et al., 1998; Graves, Meyers, & Clark, 1988). Epstein et al. (2000) conducted a randomized control trial of 67 obese 6- to 12-year-old children and their parents to determine the effects of implementing problem-solving training alongside a nutritional

education intervention, one for children and parents, and another for children alone, as a comprehensive family-based intervention. Problem solving was taught to the parents and children of Group 1, and taught to the child only in Group 2. Group 3 did not incorporate problem solving (control) and received nutritional education only.

The comprehensive family-based intervention targeted a change in eating and exercise behaviors for both the parents and the child and provided group instruction and individual family counseling to reinforce the behavior change, in addition to ideas and feedback to cope with any problems or difficulties. The study showed no advantages for child weight control when the parent and/or the child were provided with problem-solving training. It further revealed that the addition of problem solving to a nutrition education treatment was not superior to nutritional education treatment alone (Epstein et al., 2000).

Graves et al. (1988) added parental problem solving to the nutritional education intervention. The authors conducted a three-group randomized control trial of 40 obese 6- to12-year-old children and their parents. The purpose of the study was to determine the effectiveness of adding parental problem-solving training to a weight-reduction program. Parents and children participated in groups together in a clinic-based setting and received the same diet and exercise information. Group 1 received nutrition education and weight-reduction methods only, Group 2 received the same nutrition education instruction in addition to problem-solving skills, and Group 3 received nutrition education only with 15 minutes of exercise. The authors concluded that parents in the nutrition education and problem-solving groups increased their consumption of

vegetables and fruits and decreased their consumption of foods high in fat, as did the third group that had nutritional education only.

Golan et al. (1998) compared the effectiveness of a family-based nutritional treatment for childhood obesity. In the study the parents were the sole agents of change, which was comparable to the conventional approach in which the children were the sole agents of change. In this study the authors conducted a two-group randomized longitudinal prospective study of 60 obese 6- to 11-year-old children and their parents. Support and educational sessions were conducted for both groups focusing on nutritional behaviors, exercise, and behavior modification. The groups consisted of an experimental group (14 sessions, parents only) with nutritional education focused on family and parenting skills, as well as a conventional (30 sessions, children only) group. Results of the study found a decrease in weight and unhealthy eating patterns in children whose parents were involved. The authors found that utilizing parents as the sole agents of nutritional behavior change in the treatment of childhood obesity was the most effective, as indicated by the percentage of weight loss in these children as compared to the conventional approach.

Outcomes of a Parent-Focused Nutritional Education Intervention

The nine studies with successful outcomes were obtained when parents were the sole focus of the nutritional education intervention (Berry et al., 2007; Epstein et al., 2000; Golan, 2006; Golan & Weizman, 2001; Golan et al., 1998; Graves et al., 1988; Haire-Joshu et al., 2008; Haire-Joshu et al., 2003; Tibbs et al., 2001). The premise of these studies is that a parent-focused nutritional education has a positive effect both the parent and the child. The studies showed that when parents learn new parenting skills,

such as role modeling, problem solving, self-monitoring, and praise, their child's nutritional behaviors and weight-loss outcomes improved. The authors concluded that the addition of coping-skills training to the nutritional program demonstrated enhanced outcomes in an established weight-management program for overweight youth. The major difference between Berry et al.'s (2007) study and the other behavioral intervention studies is that coping-skills training was added to the parent-focused nutritional education intervention taught to multi-ethnic parents, which improved health-promoting behaviors such as knowledge in nutrition, exercise, stress management, and interpersonal relationships between parents and their children.

Concerns for a Parent-Focused Nutritional Education Intervention

The meta-analysis (Small et al., 2007), integrative review (Hudson, 2008), and Cochrane review (Oude Luttikhuis et al., 2009) revealed barriers and identified some recommendations on how to overcome these barriers in order to facilitate family-based behavioral changes among parents of overweight/obese children. Hudson (2008) conducted an integrative review of 28 pilot studies on the prevention of obesity in African-American children. Many of the studies described short-term interventions with insufficient power needed for a level of confidence related to small sample size and no follow up. However, the studies reviewed culturally specific nutritional behavioral interventions that were intended to reduce obesity among African-American children.

Hudson (2008) recommends future research to understand motivators for, and influences on, dietary behavior and physical activity. This could be helpful for designing interventions that would instill long-term changes in African-American children. Hudson (2008) argues that more studies that examine interventions that encourage family-based

behavioral changes among African-Americans would be beneficial; the studies should examine BMI changes and lifestyle behaviors within families; and provide opportunities to reinforce or establish the concept of lifelong healthy behaviors within the context of their socioeconomic and/or cultural status.

The meta-analysis, Cochrane review, and systematic review of studies for this evidence-based project revealed positive effects of lifestyle interventions in children younger than 12 years. Published results of a Cochrane review acknowledged that there was a reduction in overweight children 12 years and younger following a 6- and 12 month followup on their lifestyles (Oude Luttikhuis et al., 2009). This review evaluated the outcomes of 5,230 children and parents. Lifestyle interventions focused on sedentary behaviors and physical activity in 12 studies; six of the studies focused on diet and 36 of the studies concentrated on behaviorally oriented treatment programs. The authors concluded that while there was limited quality data to recommend one treatment program over another, the review shows that combined behavioral lifestyle interventions, compared to standard care or self-help interventions, can produce a significant and clinically meaningful reduction in the size of overweight children (Oude Luttikhuis et al., 2009).

Golan and Weizman (2001) developed a conceptual model for the management of childhood obesity that adopts a family-based approach. The authors stressed that positive changes occur within the family unit when change is delivered solely by parents with an emphasis on healthy lifestyle. Golan and Weizman stressed that parents are role models and authority figures for their obese child, thus providing a family environment conducive to a healthy nutritional behavioral lifestyle. Their conceptual model for a

familial approach to the treatment of young overweight/obese children revolves around a parental emphasis on a healthy lifestyle in which the parents are the sole agents of change. These authors concluded that the conceptual model applies ideas to the management of childhood obesity in a unique way: the complete exclusion of the child from the primary intervention. This model stresses the importance of an intervention program in which the parent as the exclusive agent of change. The model enables parents to provide healthy food choices and to instill nutritional behaviors practices in their children. Golan and Weizman (2001) recommended that future interventions to treat childhood obesity may benefit from directly comparing no-child inclusion with collaborative child inclusion.

Benefits of a Parent-Focused Nutritional Education Intervention

The literature review revealed six studies that support the benefits of a parentally-focused nutritional education as a desirable intervention in the behavioral treatment of childhood obesity (Epstein et al., 2000; Golan et al., 1998; Graves et al., 1988; Haire-Joshu et al., 2008; Haire-Joshu et al., 2003; Tibbs et al., 2001). These studies showed that a parent-focused nutritional education intervention and/or parental problem solving intervention improved the weight of the children in the studies beyond those children who received the basic behavioral treatment. While this information pertained to the study, it was not an outcome of the study. The studies followed the USDA guidelines for daily fruit and vegetable consumption and parents were instructed on the guidelines as part of their nutritional education. Parents in each study increased their consumption of vegetables and fruits and decreased their consumption of foods high in fat.

The studies compared the effectiveness of a family-based nutritional approach for the treatment of childhood obesity. In each study the parents served as the sole agents of nutritional behavior change as opposed to the conventional approach, in which the children served as the sole agents of change.

Summary

The literature review concludes that there is limited evidence to support the use of a nutritional education intervention with the focus on parents of overweight/obese children. Studies of childhood obesity interventions were identified and compared in relation to intervention strategies, outcomes, concerns, and benefits that affect nutritional change. Specific studies on parents using a variety of intervention strategies were found and reviewed. The studies placed emphasis on improving nutritional behaviors, lifestyle changes, and weight loss in both the parent and the child. Several studies emphasized parental education, role modeling, and parental support as related to parents and children's vegetable and fruit intake.

The review of evidence and the critical analysis of interventions review (see Appendix A) found that the parent as the exclusive agent of change was an essential element in reducing a family's exposure to food stimuli and creating opportunities for physical activity and nutritional behavior changes. The best evidence on childhood obesity interventions reveals that treatment of childhood obesity with parents as the exclusive agents of change was superior to the conventional approach.

Chapter Three: Methodology

This chapter describes the nutritional education intervention plan for parents of children who have been diagnosed as overweight/obese by their pediatrician. The purpose of the study was to improve the nutritional patterns of parents. The goal of the nutritional education intervention was to provide parents with modeling skills and nutritional education in order to increase their child's consumption of fruits and vegetables per pyramid food guidelines/myplate established by the USDA (2010). MyPlate was used because the project started while the pyramid was in place and MyPlate replaced it during the course of the project, so it was incorporated in the nutritional education interventions. The study design, sample, methods, feasibility, and project evaluation plan are discussed in the following sections.

Study Design

This project used a pre- and post-test design to measure the effectiveness of a nutritional education intervention plan for parents of children who have been diagnosed as overweight/obese by their pediatrician. A descriptive analysis of the participants was computed. Differences in the pre- and post-scores on the parental dietary modeling questionnaire (PDMQ) and the food frequency questionnaire (FFQ) were analyzed.

Sample and Setting

The setting for this project was a pediatrician's office in Northeast Florida. The pediatrician referred a voluntary sample of parents whose children had been diagnosed as overweight/obese. The projected sample size was 30 parents.

The population for this project was a sample of parents whose children were between the ages of 5 and 10 with a body mass index at or above the 85th percentile, as

identified by the pediatrician at a practice in Northeast Florida. The criteria used by the pediatrician to diagnose children as being overweight/obese were a history, a physical, and the Body Mass Index (BMI) chart (BMI graph by age and gender; 85% overweight, and 95% or over obese). The pediatric practice is a part of the Medical Center in Northeast Florida. The pediatricians there serve approximately 3,000 patients (providing about 12,000 services per year), 95% of whom are on Medicaid and the other 5% are either uninsured or covered under other insurances. There is a growing uninsured Hispanic population. The patient population is 50% African American, 40% Caucasian, 8% Hispanic, and 2% Asian European/other. There are two pediatricians, one physician assistant, four clinic nurses, and three clerical staff. The setting has seven pediatric exam rooms, a weight room, a physical work-up room, one office for the physicians, one office for the nurse care coordinators and social workers, one office for the clinical nurses, a 20-seat conference room, two waiting rooms with more than 20 seats, one receptionist area, medical records room, and a dining area.

Protection of Human Subjects

This project was presented to the University of North Florida's (UNF) IRB for approval. Approval was granted by the UNF Institutional Review Board and the project was declared exempt from further IRB oversight (Appendix B). The pediatrician's office has an Oversight Committee that functions as an IRB. Approval from the pediatrician's office was obtained and was also exempt from further oversight (see Appendix H). Letters explaining the study (see Appendix J) were issued to participants prior to obtaining consent. Written informed consent was obtained from each of the participants (see Appendix G).

There were no unforeseen and/or potential risks related to this project or participants. Potential benefits to participants included nutritional education, better understanding of parental modeling, nutritional change, and acknowledgement of improved nutritional patterns. No monetary compensation was provided to participants. Fruits and vegetables per USDA pyramid guidelines/MyPlate were provided during the sessions along with a session literature packet and a fruit and vegetable receipt booklet. No other compensation was made in this study.

Procedures to protect participants against potential risks such as confidentiality were in place. Pre- and post-questionnaires did not identify participants by name to guarantee anonymity. All data collected during this study were stored on a secure electronic server at the University of North Florida. Access to the data is password protected and available to the PI only. The statistician only had access for data analysis, and only under direct supervision of the PI. No data will be downloaded from the UNF electronic server. All data will be destroyed after three years.

All data collected by the PI were transferred to the SPSS software spreadsheet (version 16.0, 2007) by the PI and statistician. Each participant was given a unique study code number, which was recorded on each questionnaire in order to link documents from one data collection point to another. The PI was the only person with access to the list of participants' names and code numbers. Pre-questionnaires were paired up with post-questionnaires three months later, and then de-identified.

In order to maintain HIPPA standards, the pediatrician and her staff identified children that fit the criteria of being between the ages of five and ten and diagnosed as overweight or obese by conducting a chart review using the electronic medical record.

The pediatrician then drafted a letter to parents informing them of the nutritional education study. Once the pediatrician received consent from the parents, the pediatrician provided the PI with a list of names. A letter of recruitment was given to parents along with contacting the parent to explain the project thoroughly by the PI. The parents were advised that the project was voluntary and they may terminate their participation at any time if they desired. Refusal to participate or withdrawal from participation did not affect the patient's care at the pediatrician's office.

After the parents received explanation, they were able to ask questions and then signed a written informed consent. The parents were given the PI's name and phone number as referral.

No children were included in this project as study participants. The project was parent-focused. The project was a voluntary, autonomous, convenience project. The project allowed participants to participate and withdraw at will.

Methods

The pre-intervention parental dietary modeling questionnaire (PDMQ) and the food frequency questionnaire (FFQ) were completed by parents during the group session before the nutrition education began; the PDMQ and FFQ were completed again by the same group of parents three months after the final educational session. Refer to appendix C and appendix D for complete questionnaires. The sessions were conducted on the first Saturday of the month. The parents participated in three 90-minute nutritional education group intervention sessions. In the case that a parent missed a session, three additional sessions offered the second Saturday of each month in order for parents to make up the session missed. The sessions promoted parental modeling. All sessions included

nutritional education and parental modeling (i.e. activities included interactive activities such as show and tell, videos, role play for adult learners, and question and answer sessions).

The first session consisted of an introduction to the intervention, completion of questionnaires, nutritional education (increase fruits and vegetables) and parental modeling, and a literature packet was provided for the parents to take home. Eighteen parents participated in the first session and 20 parents participated in the first make-up session. Goals for nutrition education and parental modeling were set and general dietary guidelines were discussed during the session.

The second session was offered one month later. There were a total of 22 parents who participated in the second session and a total of 5 who participated in the second make-up session. This session consisted of feedback from parents prior to the intervention information. During the session there was reinforcement of nutritional education, and parental modeling. Parents, RD, and PI brought a fruit or vegetable dish to share with the group. There was also a discussion of factors that allowed the parent to incorporate or hinder their consumption of fruits and vegetables, along with responsibilities regarding food and eating. Additional information was provided for the parents to take home.

The final session was a month after the second session. There were a total of 13 parents who participated in the final session and none who participated in the final make-up session. This session consisted of feedback from parents from prior months related to the intervention information, progress review, and future planning. There was also a reinforcement of nutritional education and parental modeling. Post-intervention

questionnaires were given for completion prior to the session ending to use for comparative data. Ongoing support was provided to all parents since ending the project by the pediatric office, the PI, and the registered dietitian. Table 3.1 outlines the intervention plan.

Table 3.1

Nutritional Intervention Plan

Sessions	Parent Session Outline
Session 1 (90 minutes)	Completion of questionnaires (20 minutes) • Demographic • Parental Modeling • Food Frequency Introduction to intervention (10 minutes) • Intervention overview • Factor influencing nutritional selection Parental modeling (30 minutes) 1. Observational Learning 2. Disinhibiting or inhibiting behavior 3. Facilitating similar response 4. Cognitive standards for self-regulation Nutritional education (30 minutes) • Review of food pyramid/myplate guidelines 1. Nutritional recommendations related to fruit and vegetable groups and serving sizes 2. Food selection and Preparation 3. Taste testing Take home literature packet
Session 2 (90 minutes)	Parental feedback (15 minutes) Review and Reinforcement of nutritional education and parental modeling from previous session (25minutes) Responsibilities around food and eating (25 minutes) • Encourage healthy eating habits • Healthy eating out choices • Healthy eating while busy • Healthy eating during special occasions Taste testing (25 minutes) • Parent/caregivers prepare one dish (fruit or vegetables) for sharing with the group. • Discussion
Session 3 (90 minutes)	Completion of questionnaires (15 minutes) • Parental Modeling • Food Frequency Parental feedback (15 minutes) Review and Reinforcement of nutritional education and parental modeling (20 minutes) Progress review (20 minutes) Future planning (20 minutes)

The PI offered bi-weekly telephone support to all parents throughout the intervention. Unfortunately, some phones were disconnected, some of the PI's calls went

straight to voicemail, or the cell phones had no minutes. A parent who missed session one or three and the respective make-up session were dropped from the study. A total of 28 parents who missed either the first session or the last session were dropped from the study.

Evidence-based Intervention Plan

This study followed the effects of a nutrition educational intervention on parents of children who had been diagnosed as being overweight/obese. The intervention was led by a registered dietitian (RD) (see Appendix I for agreement) who is a licensed nutritionist in the state of Florida, and the PI. The RD conducted the nutritional education with the PI's assistance and the PI conducted the parental modeling. The intervention consisted of five group sessions for parents; two of the five were make-up sessions. The nutritional sessions were held at one, two, and three months. For parents who missed a session, three additional sessions were offered on the second Saturday of every month. A parent-focused approach was used to promote modeling. The parents were required to fill out two questionnaires to assess their modeling and nutritional behaviors. The pre- and post-assessments were the parental dietary modeling questionnaire (see Appendix C) and the food frequency questionnaire (see Appendix D). Discussion of the validity and reliability of the tools is included later in the chapter.

Prior to starting the group intervention, all parents completed a demographic questionnaire (see Appendix F) covering the parents' income, education, employment status, age range, and number of children.

The six-question PDMQ assessed the regularity with which parents model eating fruits and vegetables to their children. The PDMQ used a Likert Scale. The PDMQ was

scored by adding the individual items and dividing that number by the number of items to provide the frequency. For example, if there were 20 responses, that number would be divided by 6 (total number of items) and that would equal 3.33.

The FFQ assessed the foods eaten by the parents and children by type of food, food group, and frequency of consumption. In addition, food samples were provided to facilitate the accurate estimation of portion sizes for adults and children.

Outcomes of Interest

The goal of the nutrition education intervention was to provide parents with modeling skills and a nutritional education in order to improve their consumption of fruits and vegetables per the pyramid food guidelines and MyPlate established by the USDA. The goal of the teaching plan was that there would be a change in the parents' behavior and that the parents would be able to: (a) describe and identify the pyramid food guidelines related to fruits and vegetables and portion sizes for adults and children; (b) identify the skills needed to plan, implement, and maintain behavior change; and (c) discuss how modeling serves as a cue for the child's behavior.

Instruments

The project used descriptive analysis of the demographic, the PDMQ, and the FFQ collected from the sample participants. A t-test for dependent samples was utilized to compare nutritional and modeling changes from the educational sessions using the pre- and post- questionnaires. To assess the effectiveness of the PDMQ, preliminary work was conducted to develop the instrument. The PDMQ was developed by the PI based on information used by Tibbs et al. (2001). From the preliminary work, a six-question scale was developed and reviewed by content experts: two registered nurses (PhD, ARNP; and

PhD, RN) and two registered dietitians (PhD, RD; and EdD, RD), who are faculty members at a university in North Florida and a university in Northeast Florida. The content experts specialize in family and community health, child health, primary care, health promotion/disease prevention, and nutritional education. Content validity was obtained from experts using content that represented Rosenthal and Bandura's observational learning theory (1979). Readability was measured with a Flesch-Kincaid (Microsoft Word Tool Used) at a grade level of 4th grade 9 months, no passive sentences used, and the Flesch reading ease at 83.6. Each item assessed the parents' dietary practices, such as eating fruits and vegetables.

The FFQ followed a review of previous work from the New Zealand Ministry of Health (2003). It consisted of 32 questions about fruits and vegetables, including a list of food groups and picture of foods and portion size and frequency consumption. Validity and reliability was conducted with 428 participants using the FFQ and proved adequate with a correlation coefficient of 0.92 (Ministry of Health, 2003). Although the FFQ is a public domain, permission was still obtained by the New Zealand Ministry of Health (see Appendix E).

Statistical Analysis

All raw data were checked for errors and analyzed using SPSS statistical software (version 16.0, 2007) with a statistical significance determined as $p<0.05$. Baseline data were analyzed to determine differences between the group demographics using independent *t*-test. The magnitude of the effects of the intervention through the use of the pre- and post-questionnaires determined changes in nutritional behaviors and patterns. Measurements of the changes were accomplished using paired sample *t*-tests assessing

for change in parental modeling and nutritional patterns before and after the education sessions.

Summary

The methodology for parental modeling and nutritional educational intervention has been described. Pre- and post-questionnaires were used to compare pre-nutritional modeling with post-nutritional modeling/behaviors. Intervention strategies recommended through evidence-based literature provided the supporting theory for parental modeling of nutritional patterns. Parental modeling using Rosenthal and Bandura's (1979) observational learning theory and the USDA food pyramid/MyPlate using strategies such as discussions, question and answer sections, role play, and videos supported the intervention in the project.

Chapter 4: Results

The purpose of this project was to measure the impact of a parent-focused nutritional educational intervention based on the modeling theory to increase fruit and vegetable consumption in parents of obese and overweight children. The project measured the impact of a parent-focused nutritional educational intervention. A descriptive analysis of the demographics, parental dietary modeling questionnaire, and food frequency questionnaire form collected from the sample participants was conducted. Data were analyzed using SPSS statistical software (version 16.0, 2007) with statistical significance determined as $p<0.05$.

Study Participants

Participants in this study were parents of obese and overweight children. Of the 93 parents who were referred by the pediatrician, 38 participated in the pre-intervention surveys and 13 participated in the post-intervention survey. A participation rate of 14% was achieved. The attrition rate for the participants in this study was 65% and it was associated with lack of child care (N = 5), sickness (N = 3), surgery/illness (N = 1), older child's sports season (N = 1), work related (N = 3), personal matters (N = 2), unknown (N = 6), and transportation issues (N = 6).

Demographic Data

Baseline data were analyzed to identify possible differences between pre- and post-test measurements using paired *t*-test. Thirteen parents completed the nutritional educational intervention. The majority of the parents were African American single mothers between the ages of 18 and 25 years old with one or two children, an average

income less than $10,000 per year, and some college or technical schooling. The demographic characteristics of the participants are displayed in Table 4.1.

Table 4.1

Sample Characteristics of Parents Enrolled in the Nutritional Education Intervention (N=13)

Demographic Variable	N	%
Relationship to child		
Mother	6	46
Father	2	15
Grandmother	1	7
Grandfather	0	0
Other	4	31
Age Range		
18-25	7	54
26-30	0	0
31-35	0	0
36-40	3	23
41 and over	3	23
Race/Ethnicity		
Caucasian	2	15
African American	11	85
Asian/Pacific Islander	0	0
Native American Hispanic	0	0
Mixed	0	0
Other	0	0
Education		
Less than High School	0	0
Some High School	1	7.7
High School Graduate	2	15
Some College or Technical Sch.	8	62
College Graduate	2	15
Master's Degree	0	0
Doctoral Degree	0	0
Household Income		
Less than $10,000	6	46
$10,000-$19,000	2	15
$20,000-$29,000	4	30
$30,000-$44,000	0	0
$45,000-$59,000	1	8
More than $60,000	0	0
Adults Living in Household		
1	7	54
2	5	38
3	0	0
More than 4	1	8
Children Living in Household		
1	6	46
2	5	38
3	0	0
More than 4	2	15

Parental Dietary Modeling and Food Frequency Pre- and Post-Questionnaire Data

The 6-question parental dietary modeling (PDM) and the 32-question food frequency (FF) pre- and post-intervention questionnaires were designed to obtain information about each parent's fruit and vegetable patterns and parental modeling. The questionnaires were analyzed to determine improvements between scores before and after the nutritional education intervention. A descriptive analysis of the data was performed to look at the means and standard deviation values. The paired sample *t*-test was performed for pre- and post-test scores.

The paired *t*-test was calculated to compare the mean PDMQ pre-intervention score to the PDMQ mean post-intervention score. The mean on the pre-test was 3.38 (sd= 1.14), and the mean on the post intervention was 3.97 (sd = 0.61). The mean difference for PDMQ pre-score and PDMQ post-score was -0.59, sd = 0.97. A significant increase from pre-intervention to post-intervention was found (t (12) = -2.20, $p < .05$). Therefore, parents frequency of modeling fruit and vegetable patterns to their children increased by .59% (see Table 4.2).

In looking at the Food Frequency in table 4.2; which consisted of fruits and vegetables, the mean difference for Food Frequency pre-and-post intervention was -0.82, sd = 0.63. A significant increase from pre-intervention to post-intervention was found (t (12) = -4.67, $p < .05$). The results conclude post intervention the parents increased their fruit and vegetable intake by .82 servings.

After reviewing the positive outcome of the fruit and vegetable intake, it is important to discuss each group separately. In looking at the fruit only mean pre-and-post intervention score, the mean difference from fruit only pre-and-post intervention

score was -0.98, sd = 1.04. A significant increase from pre-intervention to post-intervention was identified (t (12) = -3.36, $p < .05$). This result concludes that the parents post intervention increased their fruit intake by .98 servings (see Table 4.2).

Lastly, in reviewing the vegetable only mean pre-and-post intervention score, the mean difference from the vegetable only pre-intervention score to post-intervention score was -0.88, SD = 0.76. A significant increase pre-intervention to post-intervention was found (t (12) = -4.15, $p < .05$). This concludes that the parents increased their vegetable intake by .88 servings post intervention (see Table 4.2).

Table 4.2

PDM and FF Pre-and-Post Questionnaire Data Differences

Difference	Mean	Std. Dev.	*Df*	*t*	*p*	Minimum	Maximum
PDMQpreScore-PDMQpostScore	-0.58	0.97	12	-2.20	0.049	-2.67	0.67
FFpreScore-FFpostScore	-0.82	0.63	12	-4.67	0.0005	-1.90	0.26
FruitPreScore-FruitPostScore	-0.97	1.04	12	-3.36	0.005	-3.20	0.30
VegetablesPreScore-VegetablesPostScore	-0.88	0.76	12	-4.15	0.001	-2.80	0.20

$p < .05$

Pearson Correlation between Parental Dietary Modeling and Food Frequency

A Pearson correlation between the parental dietary modeling questionnaire and the food frequency questionnaire were also conducted. The Pearson correlation was calcutated for the relationship between parents' parental modeling and consumption of fruit and vegetables. Table 4.3 measures the paralyzed correlation using the Pearson Correlation Coeeficient and there are some items in the table that are correlated and some that are not. The post-intervention PDMQ scroes was not correlated with the post intervention Food Frequency, Fruit, or Vegetable scores. The Fruit post-intervention

score was moderately positively correlated with the vegetable post-intervention score, the correlation coefficient was 0.55 and the p-value was 0.04.

The Food Frequency post-intervention score was strongly positively correlated with the Fruit post-intervention score, the correlation coeficient was 0.80, the p-value was .001; and the Vegetable post-intervention correlation coefficient was 0.94, the p-value was .0001 (see Table 4.3). PDMQ is not correlated with FFQ or the Fruit or Vegetables post-intervention scores, but the FFQ post-intervention, and Fruit post-intervention was correlated with the Vegetables post-intervention.

Parents that had high scores post-intervention on Fruit also had high post-intervention scores on Vegetables. The low scores on Fruit post-intervention also correlated to low scores on Vegetables post-intervention. Table 4.3 describes that PDMQ post-intervention score does not seem to be correlated with the Fruit and Vegetables post-intervention scores.

Table 4.3

Pearson Correlations Coefficients Between PDMQ and FFQ

Variable	PDMQ Pre	PDMQ Post	FFQ Pre	FFQ Post	Fruits Pre	Fruits Post	Vegetables Pre	Vegetables Post
PDMQ Pre	1.00	0.53	0.67*	-0.10	0.68*	-0.02	0.54	-0.10
PDMQ Post	0.53	1.00	0.77*	-0.03	0.65*	-0.02	0.78*	-0.02
FFQ Pre	0.67*	0.77*	1.00	0.38	0.89*	0.43	0.94*	0.31
FFQ Post-	-0.10	-0.03	0.38	1.00	0.15	0.80*	0.45	0.94*
Fruits Pre	0.68*	0.65*	0.89*	0.15	1.00	0.20	0.71*	0.12
FruitsPost	-0.02	-0.02	0.43	0.80*	0.20	1.00	0.53	0.56*
Vegetables Pre	0.54	0.78*	0.94*	0.45	0.71	0.52	1.00	0.35
Vegetables Post	-0.10	-0.96	0.31	0.94*	0.12	0.55	0.35	1.00

* $p < .05$

Parental Dietary Modeling Questionnaire Data

As discussed earlier there was a statistically significant difference between the pre-intervention and post-intervention scores. Table 4.4 provides reported frequency of

parental modeling of dietary behaviors. The lowest score on the PDMQ was 0 to 7.7, which indicated a frequency between "never" and "sometimes". The highest score on the PDMQ was 46.15 to 61.53, which indicated a frequency between "sometimes" and "always". The parents reported greater frequency in eating fruits and vegetables they want their child to eat, and sitting with their child at mealtime. The dietary modeling of parents improved significantly (.59%, $p < .05$) after the parental dietary modeling education. Parents' understanding of the importance of parent modeling had an impact on nutritional selection of their own fruit and vegetable intake.

Table 4.4 *Pre-and Postt test Responses to Individual PDMQ Questions*

Questions	Modeling Construct	Responses (%)									
		Never		Rarely		Sometimes		Often		Almost always/ always	
		Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
When I eat fruits and vegetables in front of my child and show my child that I enjoy eating them, my child tries them.	Disinhibiting Behavior	15.4	7.7	7.7	0	23.07	30.76	38.46	46.15	15.4	15.4
My Child and I sit and eat meals together.	Response Facilitation	15.4	0	0	0	30.76	30.76	15.4	15.4	38.46	53.84
My child eats fruits and vegetables from the standards and rules I set.	Cognitive Standards	15.4	0	0	0	15.4	30.76	61.53	53.84	7.7	15.4
I limit my child's intake of non-fruits and vegetable snack foods.	Cognitive Standards	7.7	7.7	46.15	0	7.7	23.07	30.76	38.46	7.7	23.07
My child learns to drink 100% fruit juice and vegetable juice from me.	Observation al Learning	23.07	7.7	7.7	0	7.7	23.07	38.46	38.46	15.4	30.76
I eat fruit and vegetable I want my child to eat.	Observation al Learning	7.7	0	7.7	0	15.4	7.7	38.46	30.76	30.76	61.53

Summary

This chapter presented the pre- and post-nutritional educational and parental dietary modeling intervention results. The results were associated with the parental dietary modeling and food frequency questionnaires to measure the impact of a parent-focused nutrition education intervention based on the modeling theory to increase fruit and vegetable consumption in parents of obese and overweight children. Statistical analyses included descriptive, paired t-tests, and Pearson correlation coefficients.

The educational intervention improved fruit and vegetable intake and parental modeling. Parents' understanding of the importance of parent modeling had an impact on nutritional selection of their own fruit and vegetable intake. Parents significantly improved their fruit and vegetable intake by .82 servings after three months. The majority of this change was due to improved fruit intake (increase by .97 servings). Although the number of participants is small in relation to the number of items on the food frequency 32-scale, the Cronbach Alpha yielded reliability at .84, which is considered good.

Post-intervention, the parents reported greater frequency in eating fruits and vegetables they want their child to eat, and sitting with their child at mealtime. In contrast, post-intervention parents infrequently report modeling the intake of fruit and vegetables in front of their child, and setting the standards and rules set about how many fruit and vegetables their child should eat. The parental modeling of the parents post-intervention improved by .59%, thus concluding that modeling is a key tenet of nutritional education and it is important to educate parents on their role and their influence on their child's fruit and vegetable intake.

Chapter 5: Discussion

This chapter presents a discussion of findings, limitations, recommendations, and implications framed as an outcome of the project. The purpose of this project was to measure the impact of a parent-focused nutrition education intervention that was intended to increase fruit and vegetable consumption among the parents of obese and overweight children. The educational intervention had a goal of increasing the parent's vegetable and fruit consumption by at least one serving per day post-intervention. The parental modeling and nutritional educational intervention played a significant role in improving parents' nutritional patterns. The educational sessions promoted interaction, communication, and an opportunity for improving nutritional and parental modeling behaviors.

Findings

The educational intervention did, in fact, improve nutritional patterns and parental modeling awareness as captured in the questionnaires used in this study. Parents' understanding of the importance of modeling had an impact on nutritional selection of their own fruit and vegetable intake. Parents significantly improved their fruit and vegetable consumption by 0.82 servings after 3 months. The majority of this change was due to improved fruit consumption (increase by 0.97 servings). Although the number of participants is small in relation to the number of items on the food frequency 32 scale, the Cronbach Alpha yielded reliability. In looking at the internal consistency of the sets of questions making up the FF scale, for the FF pre-responses, alpha = 0.84.

The parental modeling of the parents improved by .59%, thus leading the conclusion that modeling is a principle of nutritional education and it is important to

educate parents on their role and their influence on their child's nutritional patterns. Parents encouraging the choice of fruit and vegetable consumption by role modeling are important in establishing healthful nutritional patterns.

Post-intervention, the parents reported greater frequency in eating fruits and vegetables they want their child to eat, and sitting with their child at mealtime. In contrast, post-intervention parents infrequently report modeling the intake of fruit and vegetables in front of their child, and setting the standard and rules set about how many fruit and vegetables their child should eat. Explanations for these differences are unclear.

Limitations

This study was a convenience sample, pre-post design with no control group and provides outcome data on a small group of parents with obese and overweight children. A limitation to this project was the inability to assess the direct impact of the intervention on the children's weight, eating patterns, and the direct effects of parental modeling. Further study relative to these findings and the inclusion of a control group is needed. This project required participants' self-reports rather than observational or direct measurement methods to assess parental modeling and intake of fruits and vegetables. It is possible that parents over- or under-reported the frequency in which they modeled their dietary behaviors.

Another limitation may have been the rather high attrition rate. When working with specific cultural groups, or low-income families, subjects whose phone number, living, or health status may change, or stressors are great, it is important to obtain additional information to remain in contact with them. It is important to try to measure how these variables may also impact the effectiveness of the intervention.

Recommendations for Practice

This study promoted parental modeling and nutrition education in order to increase fruit and vegetable consumption in parents of obese and overweight children. Based on the analysis of data from this project, recommendations are being made to appropriate healthcare providers at the pediatric practice and the hospital system in which the practice collaborates. These recommendations include assessing parents' awareness of modeling and readiness because this may increase the rate of success in the nutritional program; continuing to identify those parents of obese and overweight children and provide them with nutritional and parental modeling education. The pediatric practice should continue to work with the 13 parents for another six to nine months in order to identify the long-term results of the parental modeling and nutritional education intervention. It may be that the three months during which this project was conducted was not long enough to see a sustained benefit of the education provided.

Another recommendation would be to replicate this study within the hospital organization's other pediatric practices. This would impact a similar demographic population, but on a larger scale. Such a replication could validate more of the findings in this project. To decrease the withdrawal rate, the practices may benefit from an online patient portal classroom with only those parent participants as enrollees. Parental modeling, nutritional educational sessions, and questionnaires could be offered through this portal. Also, the practice may benefit by implementing the use of social media such as a blog, Facebook or Skype to conduct nutritional and modeling sessions via the web; which may in fact be a more convenient venue for parents to utilize and remain involved. Since patient portals, Facebook, Skype, or a blog can be accessed via computer, tablet, or

cell phone, this would be a possible venue for parents to use at their convenience. This may also encourage more parents to be participants and establish a support system.

Recommendations for Future Research

Expansion of this project to parents of obese and overweight children in various age groups may be critical to the success of the organization's fight against childhood obesity. This study should be replicated in other pediatric practice settings using a methodology that includes blinded and control groups. Further research is needed on (a) the effectiveness of parental modeling and the direct impact it has on obese and overweight children, (b) the effectiveness of a parent-focused nutrition education initiative on obese and overweight children, and (c) the ability of parents and their children to describe and identify the guidelines related to fruits, vegetables, and portion size.

When conducting this research in other practice settings it is important to develop a system for parental referral into the study that is kept in a data base over seen by a clerical person. Such a system would allow for the names of those parents who are referred to not get lost, duplicated, or miss-transcribed. It is also recommended that each referral be handled by the same clerical person each time at the practice to ensure that all parents who are referred are placed in a spreadsheet that is submitted to the PI on a weekly basis prior to the study beginning. This will avoid any inaccuracy or duplication of names being given to the PI.

Implications for nursing practice and research

The project demonstrates the effectiveness of a team approach and the positive effects of a parent focused nutritional educational and parental modeling intervention for

parents of obese/overweight children. Healthcare providers can use a parent focused nutritional educational intervention in research and clinical practice to teach management, prevention, nutrition, and parental modeling of nutritional concepts by parents of obese/overweight children. Nurses can use a parent focused nutritional educational intervention to teach parents about the importance of fruit and vegetable intake as well as the importance of parental modeling.

Parents can identify changes in their nutritional intake and modeling as well as changes in their child's nutritional intake. Nurses can be instrumental in helping parents describe and identify the "MyPlate" guidelines related to fruits and vegetables and portion sizes for adults and children; identify the skills needed to plan, implement, and maintain behavior change; and discuss how modeling serves as a cue for the child's behavior. Nurses can also assist in helping parents understand that implementing nutritional changes or modeling changes entails difficult work and that relapse is not uncommon and the parent should not view this as a failure. Instead, view it as an opportunity to learn and get back on track as soon as possible.

Parents need to be empowered to improve their child's health, manage their child's nutritional intake, and ultimately prevent the development of serious illnesses in their children later in life. Healthcare providers are in a great position to ensure that every parent of obese/overweight children are supported and provided with the necessary tools in order for change to occur. Nutritional education and parental modeling may add another component that can improve clinical and psychosocial outcomes. However, further research is needed.

Summary

The results of this project show statistically significant improvement *($p < .05$)* in parental modeling and nutritional behaviors of parents of obese and overweight children. The healthcare providers at the pediatric practice must continue to work with these families to maintain behavior changes. A parent-focused nutrition educational intervention has a positive impact on parents' nutritional intake and parental modeling behaviors. It is essential to continue to improve outcomes, monitor parents' sustainability, and encourage parent nutritional and modeling education. By continuing with the parent modeling and nutritional educational intervention, there is great opportunity to decrease a child's weight, thus decreasing the number of overweight or obese children presenting at the pediatric practice.

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Appendix A
Critical Analysis Table

Authors/Year	Type of Study	Intervention	Duration of Study, Sample Size, Sex of Populations Studied, Age, Race	Outcomes
Golan, Weizman, Apter, & Fainaru, 1998	Randomized Controlled Trial	**Experimental Group:** Parents Only The topics discussed in parent only sessions included: • Nutritional behavior modification and education • Problem solving and parental modeling • Physical activity **Control Group:** Child Only The topics discussed in child only sessions included: • Problem solving cognitive restructuring • Physical activity • Nutritional behavior • Nutritional education	6 months to one year, 29, Male and Female, 6 to 12 years, Mixed not specified	The parents-only and child-only groups lost a significant amount of weight from baseline to the end of treatment. However, the parents-only group lost significantly more weight. Post-treatment: There was a decrease in overweight percentage 14.6%
Graves, Meyers, & Clark, 1998	Randomized Controlled Trail	**Behavioral group**: • Reviewed food intake and activity sheets • Presented behavioral methods for weight reduction, self-	6 months, 40-1, Male and Female, 6 to 12 years, not specified	Children and parents in the behavioral group and problem-solving group decreased their BMI and their body weight

Authors/Year	Type of Study	Intervention	Duration of Study, Sample Size, Sex of Populations Studied, Age, Race	Outcomes
		monitoring, nutritional and exercise information, **Problem-solving group**, • Same as the behavioral group with an addition of problem solving skills. **Instruction only group**: • Same exercise and nutritional plan as the other two groups with an addition to exercise for 15 minutes. Progress was reviewed and weights were check for all groups attended 1 month, 2 month, 3 month and 6 month follow up sessions.		percentage overweight more than children in the instruction-only group. Children and parents in the behavioral and problem-solving groups increased their consumption of vegetables and fruits and decreased their consumption of foods high in fat considerably more than the children in the instruction only group.
Epstein, Paluch, Gordy, Saelens, & Ernst, 2000	Randomized Controlled Trail	Problem solving taught to child, also taught to child and parent and standard treatment was given without problem solving.	24 months, 62, Male and Female, 6 to 12 years, 97% white, 2% Black, 2% Hispanic	Parents receiving problem-solving training improved more during treatment than those not receiving problem solving. Children showed overall increases in problem solving. However, the study showed no advantages for

Authors/Year	Type of Study	Intervention	Duration of Study, Sample Size, Sex of Populations Studied, Age, Race	Outcomes
				child weight control when parent and/or child are provided problem-solving training. It further revealed that adding problem solving to nutritional behavior treatment is not superior to nutritional behavioral treatment alone.
Golan, 2006	Good/ Randomized Study	In the **children-only group,** children were targeted with a conventional dietary intervention. Children were taught to follow a balanced diet to increase physical activity, and to decrease sedentary behaviors through controlling food stimuli; practicing problem solving and cognitive restructuring, and use of social support. The sessions were held weekly for the first two months and bi-weekly. In the **parent-only group**, change was delivered through the parents,	6 months, 1 and 2 year follow up, followed by a 7 year follow up. 60 children (30 parents of 30 of the children), male and female, age varied, not specified	Children in both groups showed a significant decrease in percentage overweight after 12 months. Superiority was observed in the parents-only intervention, with 15% weight reduction at program termination in the parent only group compared with only 8% in the conventional group. At the end of the intervention, 35% of the children in the parents' only group reached a non-obese status. Analyses revealed a significant difference between the two groups in the percentage of

Authors/Year	Type of Study	Intervention	Duration of Study, Sample Size, Sex of Populations Studied, Age, Race	Outcomes
		emphasizing a healthy life style and not weight reduction. Each group attended 14 one-hr sessions, starting with four weekly sessions, then four bi-weekly sessions, the remaining six sessions were held once every six weeks.		non-obese children at the end of the intervention.
Berry, Savoye, Melkus, & Grey, 2007	Randomized Pilot Study	Coping Skill Training (CST), Nutrition and Exercise Education Program (NEEP), Behavior Modification	6 months, 80, Male and Female, 7 to 17 years, 29 white, 28 Black, 23 Hispanic	Results from the pilot study demonstrate that the addition of CST for parents enhanced outcomes in an established weight management program for overweight youth Both parents and children in the experimental group had better outcomes compared with those in the control groups received NEEP and some form of exercise training, outcomes improve in both groups.
Golan & Weizman, 2001	Good/ Model Management	The intervention integrates behavioral, social learning, and family parental cognition, emphasizing "parent presence".	N/A	The model's aims are enabling parents to provide healthy food choices and to facilitate healthy eating practices for their children. Information

Authors/Year	Type of Study	Intervention	Duration of Study, Sample Size, Sex of Populations Studied, Age, Race	Outcomes
				includes the impact of nutrition on health and the basics of a balanced diet with adequate calories, low fat and high fiber, sources of fat in the diet, appropriate substitution, high nutrient foods and proper serving sizes, the importance of increasing daily lifestyle activity, and exercising for health promotion.
Haire-Joshu, Brownson, Nanney, Houston, Steger-May, Schechtman, & Auslander, 2003	Randomized Nested Cohort Design	The Parents As Teachers High 5, Low Fat Program	2yrs, 738 parents, Male and Female, 16 to 77 years, African American	The study revealed parents reduced their intake to less than 30% calories from fat and increase fruits and vegetable consumption by .53%.
Haire-Joshu et al, 2008	Randomized Nested Cohort Design	Home based High 5 program using Parents As Teachers	5yrs, 1306 parents and children, 1 to 30 plus years, Caucasian	Parents' improved nutritional behavioral (increased vegetables and fruit consumption) was a significant predictor of the child's improved nutritional behavioral change.

Authors/Year	Type of Study	Intervention	Duration of Study, Sample Size, Sex of Populations Studied, Age, Race	Outcomes
Tibbs, Haire-Joshu, Schechtman, Brownson, Nanney, Houston, & Auslander, 2001	Cross-sectional	High 5, Low Fat dietary change program	4yrs, 456 parents, ages not specified, African American	Parent modeling of improved nutritional behaviors was related to the performance of increase consumption of vegetables and fruits, lower fat intake, and low fat nutritional patterns.

Appendix B

UNF
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Office of Research and Sponsored Programs
1 UNF Drive
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904-620-2455 FAX 904-620-2457
Equal Opportunity/Equal Access/Affirmative Action Institution

MEMORANDUM

UNF IRB Number: 11-050
Approval Date: 06-21-2011
Expiration Date: Exempt - None
Processed on behalf of UNF's IRB KLC

DATE: June 21, 2011

TO: Ms. Zenesha Barkley

VIA: Dr. Li Loriz
Nursing

FROM: Dr. Katherine Kasten, Chairperson
On behalf of the UNF Institutional Review Board

RE: Review by the UNF Institutional Review Board IRB#11-050:
"AN EDUCATIONAL INTERVENTION TO INCREASE FRUIT AND VEGETABLE CONSUMPTION IN PARENTS OF OBESE AND OVERWEIGHT CHILDREN"

This is to advise you that your project, "AN EDUCATIONAL INTERVENTION TO INCREASE FRUIT AND VEGETABLE CONSUMPTION IN PARENTS OF OBESE AND OVERWEIGHT CHILDREN" was reviewed on behalf of the UNF Institutional Review Board and has been declared Exempt, Category 2." Therefore, this project requires no further IRB oversight unless substantive changes are made.

This approval applies to your project in the form and content as submitted to the IRB for review. Any variations or modifications to the approved protocol and/or informed consent forms as they relate to dealing with human subjects must be cleared with the IRB prior to implementing such changes. Any unanticipated problems involving risk and any occurrence of serious harm to subjects and others shall be reported promptly to the IRB within 3 business days.

As you may know, **CITI Course Completion Reports are valid for 3 years**. Your completion report is valid through 11/20/2012. If your completion report expires within the next 60 days or has expired, please take CITI's refresher course and contact us to let us know you have completed that training. If you have not yet completed your CITI training or if you need to complete the refresher course, please do so by following this link: http://www.citiprogram.org/. Based on your research interests we ask that you complete either the "Group 1 Biomedical Research Investigators and Key Personnel" CITI training or the "Group 2 Social Behavioral Researcher Investigators and Key Personnel" CITI training.

Should you have any questions regarding your project or any other IRB issues, please contact Kayla Champaigne

Participant #_____

Appendix C

Parental Dietary Modeling Questionnaire

I understand that this is a University of North Florida student project. I further understand that the information obtained will be used in the student's dissertation. The purpose of this project is to measure the impact of a parent-focused nutritional educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician. The questionnaires, responses will be kept confidential. For each question place an "X" by one answer.

Questions	Modeling Construct	Responses				
		Never	Rarely	Sometimes	Often	Almost always/always
1. When I eat fruits and vegetables in front of my child and show my child that I enjoy eating them, my child tries them.	Disinhibiting Behavior					
2. My child and I sit and eat meals together.	Response Facilitation					
3. My child eats fruits and vegetables from the standards and rules I set.	Cognitive Standards					
4. I limit my child's intake of non fruits and vegetable snack foods.	Cognitive Standards					
5. My child learns to drink 100% fruit juice and vegetable juice from me.	Observational Learning					
6. I eat fruits and vegetables I want my child to eat.	Observational Learning					

Participant #_____

Appendix D

Food Frequency Questionnaire

I understand that this is a University of North Florida student project. I further understand that the information obtained will be used in the student's dissertation. The purpose of this project is to measure the impact of a parent-focused nutritional educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician. The questionnaires, responses will be kept confidential.

Office use only

Date completed:
day month year

Name:

Date of birth:
day month year

Food Questionnaire

Different eating patterns may affect people's health. To help us understand these eating patterns, we would like you to **think back over the past 4 weeks** and answer the following questions about the foods you usually eat.

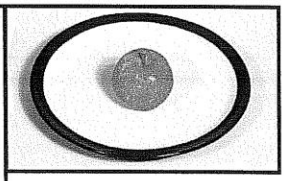
Put a tick in the box which best tells **HOW OFTEN** you usually eat the foods.

Example

If you eat apples on 3 or 4 days each week, put a tick in the '3-4 times a week' box.

2. Apples or pears

Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☑	☐	☐	☐



If you never or rarely eat a food, tick in the box 'never or less than once a month' and go to the next question.

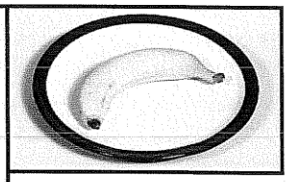
It may be helpful to ask the person who does the cooking and shopping in your household to help you fill in the questions.

PLEASE DO NOT SKIP ANY FOODS

Put a tick ☑ in the box which best tells HOW OFTEN you eat the food.

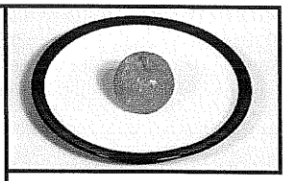
Fruit

1. Banana, raw



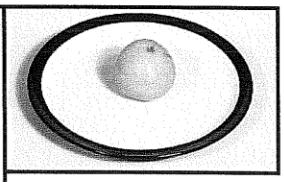
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

2. Apples or pears



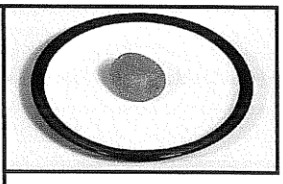
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

3. Oranges or mandarins



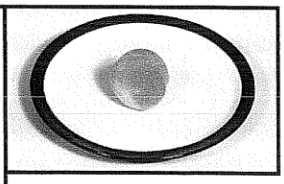
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

4. Kiwifruit



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

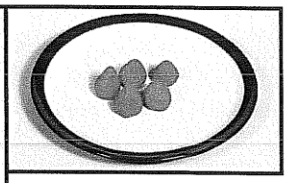
5. Nectarines, peaches, plums or apricots



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

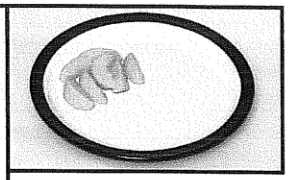
Put a tick ☑ in the box which best tells HOW OFTEN you eat the food.

6. Strawberries or other berries



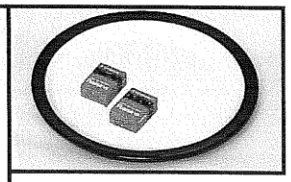
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

7. Canned or cooked fruit, eg. canned peaches



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

8. Dried fruit, eg. raisins



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

9. Other Fruit (1) If you often have another fruit, not listed - give the name and tick a box to show how often you eat it ____

Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

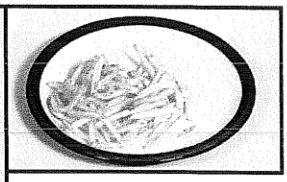
10. Other Fruit (2) If you often have another fruit, not listed - give the name and tick a box to show how often you eat it ____

Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

Put a tick ☑ in the box which best tells HOW OFTEN you eat the food.

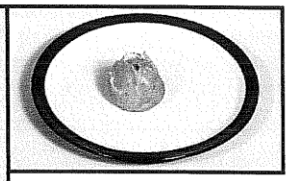
Vegetables

11. Fried potatoes, eg. hot potato chips, kumara chips, french fries, wedges or hash browns



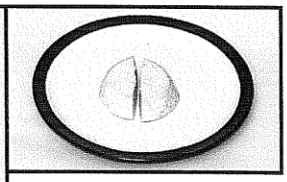
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

12. Other potatoes, eg. boiled, mashed, baked or roasted



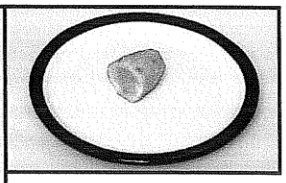
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

13. Taro



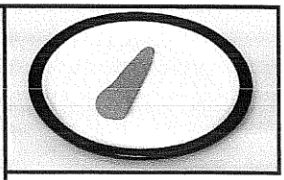
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

14. Kumara



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

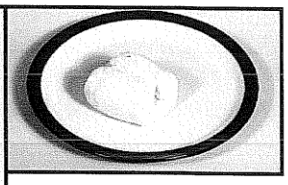
15. Carrots (raw or cooked)



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

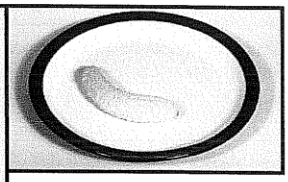
Put a tick ☑ in the box which best tells HOW OFTEN you eat the food.

16. Cassava



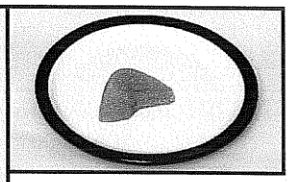
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

17. Cooked green banana



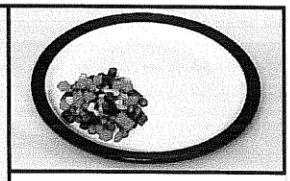
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

18. Pumpkin



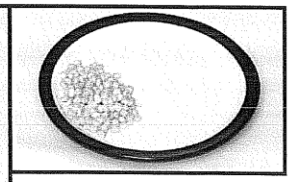
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

19. Mixed vegetables



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

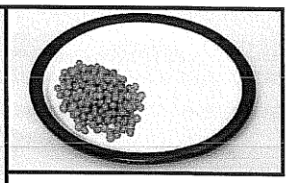
20. Corn



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

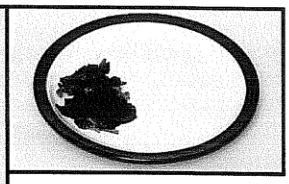
Put a tick ☑ in the box which best tells HOW OFTEN you eat the food.

21. Peas



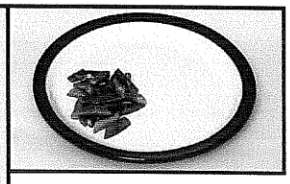
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

22. Silverbeet, spinach, puha or watercress



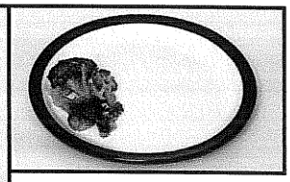
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

23. Green beans



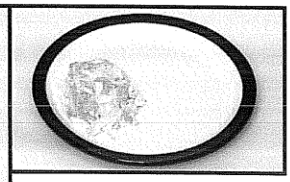
Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

24. Broccoli



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

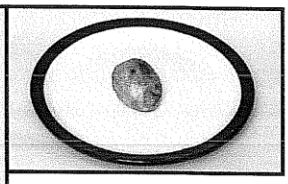
25. Cauliflower or cabbage



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

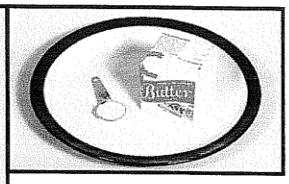
Put a tick ☑ in the box which best tells HOW OFTEN you eat the food.

26a. Thinking about **cooked vegetables,** how often would you have **roast vegetables?**



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

26b. Thinking about **cooked vegetables** again, how often would you have **butter or margarine** on them?

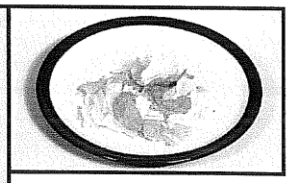


Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

26c. Which of these do you usually have on vegetables? *(tick one box)*

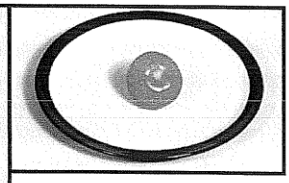
☐ butter
☐ low-fat spread
☐ margarine
☐ blend (margarine and butter)
☐ Don't have either
Name of margarine or blend ☐

27. **Lettuce or green salad**



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

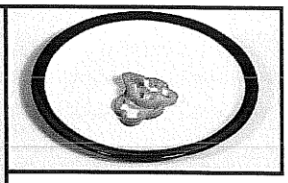
28. **Tomatoes** (raw or cooked)



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

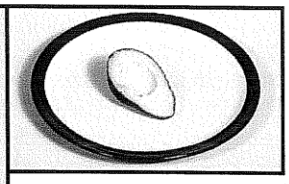
Put a tick ☑ in the box which best tells HOW OFTEN you eat the food.

29. Capsicum (green, red or yellow peppers)



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

30. Avocado



Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

31. Other Vegetable (1) If you often have another vegetable, not listed - give the name and tick a box to show how often you eat it

Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

32. Other Vegetable (2) If you often have another vegetable, not listed - give the name and tick a box to show how often you eat it

Never or less than once a month	1-3 times a month	1-2 times a week	3-4 times a week	5-6 times a week	Once a day	2 or more times a day
☐	☐	☐	☐	☐	☐	☐

Thank you very much for completing this questionnaire.

Reference:

Ministry of Health . 2003. NZ food NZ children: Key results of the 2002 national children's nutrition survey. Wellington: Ministry of Health.

Appendix E

Permission to Use Copyrighted Food Frequency Questionnaire

Dear Zenesha

We are happy for you to use the questionnaire as it is publicly available. If you could acknowledge its source in your work that would be much appreciated.

Kind regards

Niki Stefanogiannis
Team Leader / Senior Advisor (Public Health Medicine)
Population Surveys
Health & Disability Intelligence Unit
Health & Disability Systems Strategy Directorate
Ministry of Health
DDI: 04 816 4424

[attachment "nzfoodnzchildren-questionnaire.pdf" deleted by Niki Stefanogiannis/MOH]

Participant # _____

Appendix F

Demographic Questionnaire

I understand that this is a University of North Florida student project. I further understand that the information obtained will be used in the student's dissertation. The purpose of this project is to measure the impact of a parent-focused nutritional educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician. The questionnaires, responses will be kept confidential. For each question circle one answer.

Relationship to child:
Mother
Father
Grandmother
Grandfather
Other

Age Range:
18-25
26-30
31-35
36-40
41 and over

Race/Ethnicity:
Caucasian
African American
Asian/Pacific Islander
Native American Hispanic
Mixed
Other

Education:
Less than High School
Some High School
High School Graduate
Some College or Technical School
College Graduate
Master's Degree
Doctoral Degree

Household Income:
Less than $10,000
$10,000-$19,000
$20,000-$29,000
$30,000-$44,000
$45,000-$59,000
More than $60,000

Adult Living in Household:
1
2
3
More than 4

How many Children Live in the Household:
1
2
3
More than 4

Participant # _____

Appendix G
Informed Consent

I _____, agree to participate in the Nutritional Educational Intervention Study conducted by Zenesha Barkley. I understand that this is a University of North Florida student study. I further understand that the information obtained will be used in the student's dissertation. The purpose of this project is to measure the impact of a parent-focused educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician. This program of nutritional education includes the following components:

1). The participant will complete a demographic questionnaire.

2). Complete pre-intervention questionnaire and after the nutritional education sessions will complete a post-intervention questionnaire.

3). Participate in three 1 1/2 hour nutritional sessions once a month for three months.

4). There is no cost to the participant.

5). Confidentiality of the participant will be maintained in the data. You will not be identified in any data collected.

6). No participant will be linked to an individual score.

7). A participant may withdraw from the study at any time.

PARTICIPATION:
Participation is VOLUNTARY. Refusal to participate will involve no penalty. If you refuse to participate or withdraw your consent your child's right to health care at the pediatrics' office will not be affected. At any time you may withdraw your consent and discontinue participation without penalty. You will not need to provide any explanation from withdrawing from the study.

PARTICIPANT CONFIDENTIALITY:
Your name will not be associated in any way with the information collected about you or with the study finding from this research. The Principal Investigator will use a study number instead of your name. The Principal Investigator will not share information about you unless you give written permission or by law. Permission granted on this date

Participant #_____

to use and disclose your information remains in effect until further notice. By signing this form you give permission for the use and disclosure of your information for purposes of this study at any time in the future. If you elect to withdraw from the study, the Principal Investigator will remove your data from the study, but your child's care will continue with the pediatrician without penalty. No explanation will be requested for withdrawal from the study.

RISK:
There are no foreseeable risks to taking part in this study. Participants may contact the Principal Investigator Zenesha Barkley by email at xxxxxxxxxx@unf.edu. This email will be checked several times during each day and remain active 1 year after the study is completed. Participants may also contact Zenesha Barkley by phone (xxx) xxx-xxxx from 8:00 am to 6:00pm Monday thru Friday for questions related to the study. For questions regarding the rights of study subjects you may contact Dr. Katherine Kasten, IRB Chairperson, the University of North Florida's Institutional Review Board, (xxx) xxx-xxxx, for questions regarding the rights of research subjects.

PURPOSE:
The purpose of this evidence based practice project is to determine if a parent-focused educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician.

PROCEDURE:
If you decide to participate in this study, you will be asked to do the following: Complete three questionnaires (demographic, parental dietary modeling, & food frequency). Attend three group nutritional education sessions that will be 1 1/2 hour with a registered dietician and registered nurse. You will be asked to complete the same questionnaires (parental dietary modeling & food frequency) during the last session which will be 3 months later.

BENEFITS TO PARTICIPANT:
There are no foreseeable risks to taking part in this study. This study will contribute to participants' nutritional knowledge, understanding of parental modeling, nutritional behavior change, and acknowledgement of improved nutritional patterns. The goals of the intervention is that the parents will be able to: 1) Describe and identify the pyramid food guidelines related to fruits and vegetables and portion sizes; 2) Identify the skills needed to plan, implement, and maintain behavior change; and 3) Discuss how modeling serves as a cue for the child's behaviors.

ALTERNATIVE TREATMENTS:
If you chose not to participate in this study your child will continue to receive care by the pediatrician.

Participant #_____

PAYMENT TO PARTICIPANTS:
There will be no direct monetary reimbursement for participating in this study. You will not be charge a fee. All material given to the participants will remain with participants at the end of the study.

PARTICIPATION OF MINORS:
A participant must be over the age of 18 to participate.

PARTICIPATION CERTIFICATION:
I have read, or someone has read to me, and I understand the information provided above. Opportunity was given to me to ask questions and all questions have been answered to my satisfaction. I have been given a copy of this form.

I understand by signing this form, I willingly volunteer to participate in this study.

_____ _____
Parent Participant Date

_____ _____
Principal Investigator Date

Participant #_____

Appendix H
Pediatrician Agreement

I _____, agree to refer participants in the Nutritional Educational Intervention Project conducted by Zenesha Barkley. I understand that this is a University of North Florida student project. I further understand that the information obtained will be used in the student's dissertation. We have an "Oversight Committee" that function as an Institutional Review Board, and I have reviewed "An Educational Intervention to Increase Fruit and Vegetable Consumption in Parents of Obese and Overweight Children" and Zenesha Barkley has my support to conduct this project at the practice. The purpose of this project is to measure the impact of a parent-focused nutritional educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician. This program of nutritional education includes the following components:

1). The participant will complete a demographic form.

2). Complete pre-intervention questionnaire and after the nutritional education sessions will complete a post-intervention questionnaire.

3.) Participate in three 1 1/2 hour nutritional sessions once a month for three months.

4.) There is no cost to the participant.

5). Confidentiality of the participant will be maintained in the data. Participants will not be identified in any data collected.

6). No participant will be linked to an individual score.

7). A participant may opt out of the project at any time.

_____ _____
Physician Date

_____ _____
Principal Investigator Date

Participant #_____

Appendix I
Registered Dietician Agreement

I _____, consent to present nutritional education to participants of the Nutritional Education Intervention Project conducted by Zenesha Barkley. I understand that this is a University of North Florida student project. I further understand that the information obtained will be used in the student's dissertation. I have the authority and I have reviewed "An Educational Intervention to Increase Fruit and Vegetable Consumption in Parents of Obese and Overweight Children" and approve for Zenesha Barkley to conduct this project. The purpose of this project is to measure the impact of a parent-focused nutritional educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician. This program of nutritional education includes the following components:

1). The participant will complete a demographic form.

2). Complete pre-intervention questionnaire and after the nutritional education sessions will complete a post-intervention questionnaire.

3.) Participate in three 1 1/2 hour nutritional sessions once a month for three months.

4.) There is no cost to the participant.

5). Confidentiality of the participant will be maintained in the data. Participants will not be identified in any data collected.

6). No participant will be linked to an individual score.

7). A participant may opt out of the project at any time.

_____ _____
Registered & Licensed Dietician Date

_____ _____
Principal Investigator Date

Appendix J
Recruitment Letter

Dear Parents/Caregivers,

You are invited to participate in a nutritional education intervention project as part of a doctoral student's project at the University of North Florida. The purpose of this project is to measure the impact of a parent-focused nutritional educational intervention to increase fruit and vegetable consumption in parents of obese and overweight children who have been identified as overweight or obese by the pediatrician. Your pediatrician will refer you to the nutritional program if your child has been diagnosed as being overweight or obese.

Your participation is completely voluntary. Your care by your pediatrician will not be affected by your participation or your decision not to participate. If you volunteer to participate, you will be asked to do the following: Complete three questionnaires (demographic, parental dietary modeling, & food frequency). Attend three group nutritional education sessions that will be 1 1/2 hours each with a registered dietician and registered nurse the first Saturday of each month for three months at the Pediatrician's office. You will be asked to complete the same questionnaires (parental dietary modeling & food frequency) during the last session which will be 3 months later. Those who complete the questionnaires, responses will be kept confidential.

This study will contribute to participants' nutritional knowledge, understanding of parental modeling, nutritional behavior change, and acknowledgement of improved nutritional patterns. The goals of the intervention are the parents will be able to: 1) Describe and identify the pyramid food guidelines related to fruits and vegetables and portion sizes; 2) Identify the skills needed to plan, implement, and maintain behavior change; and 3) Discuss how modeling serves as a cue for the child's behaviors.

If you have questions regarding this project, please call me at xxx-xxx-xxxx.

Thank you for your consideration,

Zenesha Barkley
Principal Investigator