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The Effectiveness of the Implementation of the Kids Eat Right RD Parent Empowerment Program at Johnson City Head Start Centers

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The Effectiveness of the Implementation of the Kids Eat Right *RD Parent Empowerment Program* at Johnson City Head Start Centers

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by

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ABSTRACT

The Effectiveness of the Implementation of the *Kids Eat Right RD Parent Empowerment Program* at Johnson City Head Start Centers

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Obesity among children is a public health concern. Preschool-aged children, especially those from low-income families, are no exception to the obesity epidemic. During the *RD Parent Empowerment Program*, parents of Head Start children in Johnson City, TN completed a structured education program over the course of 4 workshops related to healthy habits of families. The goal was to empower parents to shop smart, cook healthy, and eat right. The Family Nutrition and Physical Activity (FNPA) screening tool was used as an assessment tool to evaluate behavior change over the course of the program. Improvement in overall FNPA score was seen at the conclusion of the program. Individual assessment of breakfast consumption, family meal patterns, fruit and vegetable intake, beverage choices, and restriction occurred. Participation in the RD Parent Empowerment Program resulted in maintaining healthy behaviors or improved behaviors for many participants. A larger sample may provide more conclusive results.

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CHAPTER 1

INTRODUCTION

Childhood obesity is a public health concern with almost 17% of US children and adolescents considered obese. Obesity among preschool children ages 2-5 years old was 10.4% in 2007-2008[1]. Additional research suggests that 18.4% of 4-year-old children in the US are obese with varying degrees among races/ethnicities.[2] Overweight and obesity in children is based on Body Mass Index (BMI) expressed as weight in kilograms divided by height in meters squared (kg/m^2), which is then compared to the 2000 Centers for Disease Control and Prevention (CDC) BMI-for-age-growth charts. A BMI value above the 95th percentile of the age- and sex-specific growth charts classifies a child as obese,[1] whereas a BMI between the 85th and 95th percentiles classifies a child as overweight. Although BMI cannot directly measure body fat, it can provide an estimate on body composition.[3]

Obesity rates in Tennessee (TN) are high[4,5] and rates among children are no different. Tennessee has the 6th highest childhood obesity percentage[6] with evident differences among races[7] and a link to socioeconomic status (SES).[7,8] Washington County in Northeast Tennessee is home to many children who live in poverty,[9] as well as 36.5-42% of school-aged children who are considered overweight or obese.[6]

Childhood obesity is a concern because of comorbid conditions that occur in obese children and may persist through and potentially worsen in adulthood. Furthermore, obesity in childhood is likely to continue in adulthood. Discrimination and psychological effects are also seen among overweight and obese children.[3]

Obesity in children may be related to a number of factors. An unequal ratio of calories consumed to calories expended is a simple explanation, but the disease goes deeper than a math equation. Brain chemistry, cultural influences, and energy-dense foods contribute to obesity.[10] SES of the family[11] and parental guidance are especially influential within the preschool population because of the heavy reliance on caregivers to meet needs including those related to food. Family behaviors related to breakfast consumption, meals together, fruit and vegetable intake, sugar-sweetened beverage consumption, and food restriction are investigated as potential contributors to childhood obesity.[12]

Head Start is a federally funded child development program primarily designed for preschool children of low-income families. Nationally, children enrolled in Head Start and their families often participate in research studies as a representation of the low-income population because of the regulations related to SES that are used for admission criteria. Research topics include population demographics, child readiness for school, information on family satisfaction with the program, and child/family wellbeing.[13] Additionally, research addresses health issues for recognition and intervention within the population. Parent education intervention studies within Head Start encourage the likelihood of success for the Kids Eat Right *RD Parent Empowerment Program* because parents will be provided with a plethora of information related to a healthy lifestyle in hope of maintaining positive behaviors or initiating change where needed. The program is systematic in that all sites across the nation provide similar information but allows for individualization to the local Head Start community in Johnson City, TN, where 7 Head Start classrooms provide services to primarily 4-year-olds and their families (Leah Arthur, e-mail communication, April 24, 2013).

The *RD Parent Empowerment Program* is a series of 4 workshops that are presented to parents designed to assist participants with developing the skills and confidence needed to provide a positive and healthy family environment. Parents learn the *8 Habits of Healthy Kids™* throughout the sessions and are provided with a workbook and kid-friendly cookbook.[14] The Family Nutrition and Physical Activity (FNPA) Screening Tool is used as a pre- and post-program survey tool to provide families with information regarding their own healthy habits and for researchers to evaluate the effectiveness of the program (Lisa Medrow, e-mail communication, May 27, 2013).

The Family Nutrition and Physical Activity (FNPA) Screening Tool was formulated[15] and validated[16] as an easy to use screening tool for assessing the environmental and behavioral factors that may increase the likelihood of a child becoming overweight. It assesses 10 constructs of healthy families, which include family meal patterns, family eating habits, food choices, beverage choices, restriction/reward, screen time and monitoring, healthy environment, family activity involvement, child activity involvement, and family routine.[15]

The purpose of this study is to determine the effectiveness of the implementation of the *RD Parent Empowerment Program* based on the results of the Family Nutrition and Physical Activity (FNPA) screening tool in Head Start centers in Johnson City, Tennessee. There is a definite impact from the family on a child's health and the FNPA is used to spotlight areas for improvement within families. The *RD Parent Empowerment Program* gives parents the tools and confidence necessary to make positive changes to shape the wellbeing of the children and families as a whole.

CHAPTER 2

LITERATURE REVIEW

Overweight Children, Specifically Preschool Age Group

Results from the National Health and Nutrition Examination Survey (NHANES) estimate that in 2007-2008, 16.9% of US children and adolescents aged 2-19 years were obese. Furthermore, the obesity rate in children and adolescents from 1971-1974 was 5.0% and rose significantly over time until rates in 1999-2000 reached 13.9%. The change in rates from 1999-2000 to 2007-2008 were not significant[1] except among 6- to 19-year old males who were most obese.[17] Obesity among preschool aged children (2-5 years old) has increased from 5.0% in 1971-1974 to 10.4% in 2007-2008.[1] Further research in 2009 indicated that 18.4% of 4-year-old US children are obese (BMI equal to or greater than the 95th percentile).[2] Most excess weight in childhood is gained before the age of 5.[18] A study of approximately 8550 children was used to estimate obesity rates overall and within racial/ethnic groups. American Indian/Native Alaskan children had the highest rate at 31.2%. See Table 1 for further statistical breakdown.[2]

Table 1: Childhood obesity rates by race and ethnicity

Race/Ethnicity	**%**
American Indian/Native Alaskan	31.2
Hispanic	22.0
Black, non-Hispanic	20.8
White, non-Hispanic	15.9
Asian	12.8
All	**18.4**

Adapted from Anderson.[2]

Overweight and obesity in children is based on Body Mass Index (BMI) expressed as weight in kilograms divided by height in meters squared (kg/m^2) which is then compared to the

2000 CDC BMI-for-age-growth charts. A BMI value above the 95th percentile of the age- and sex-specific growth charts classifies a child as obese,[1] whereas a BMI between the 85th and 95th percentiles classifies a child as overweight. Although BMI cannot directly measure body fat, it can provide an estimate on body composition.[3]

Proposed Causes of Rise in Childhood/Pediatric Obesity

Many question the cause of the marked rise in obesity over recent years. The simplest explanation is that energy intake in the form of calories is greater than energy expenditure related to basal metabolism and physical activity. Unfortunately, more than a caloric imbalance influences the obesity epidemic. Biologically, fasting and feeding regulation in the brain is not well understood, although an association has been noted. Furthermore, a genetic influence is responsible for determining body size and vulnerability to weight gain to some degree, although genetics are not solely responsible for weight regulation. Cultural influences related to perceptions of healthy weight, especially among children, also impact obesity trends. Other factors that are partially responsible for increased obesity rates include more hectic work schedules, decreased physical activity, eating as a means of socialization rather than to meet metabolic needs, and increased availability of inexpensive, palatable, energy-dense foods.[10]

Ford and colleagues investigated dietary changes among 2- to 6-year-old children from 1989 to 2008, a 20-year period that coincides with the rising obesity trends. Increases in consumption of foods high in added sugars, solid fats, and sodium were observed in the diet. Furthermore, an increase of 109 kcal/day was recorded over the 20-year period. Fruit intake increased slightly over the study period.[19] Obesity is seen as a product of these inexpensive

energy-dense foods, especially within the low-income population. These foods are often highly palatable due to the added sugars and fats.[20]

Parental influence is often looked to as a factor in childhood obesity. In a study by Berkowitz and colleagues, "high risk" children were considered those with mothers whose pre-pregnancy BMI was above normal. No differences were observed in the child's weight or skinfold thickness tests within the first 2 years of age. From age 2-5, the group of high-risk children who were also overweight had an increase in BMI that was not present in high-risk children of normal weight or low-risk children. The potential genetic factor of a child being overweight if the mother is also overweight has been identified and further supported.[21,22] Previous support was identified in children beginning at age 7 related to both maternal and paternal BMI, as well as if none, one, or both parents were overweight. BMI was consistently higher in children with 2 overweight parents supporting a relationship to genetic and environmental factors in childhood obesity.[21] Children of overweight and obese parents are more likely to become overweight as they age.[22] Many factors contribute to childhood obesity; therefore, prevention and treatment options should be multi-faceted through counseling, education, and policy-making.

Problems Related to Childhood Obesity

Obesity among children is a concern because of the effects it can have on the body. Risk of high blood pressure, high cholesterol, impaired glucose tolerance, insulin resistance, and type 2 diabetes is increased in obese children. Furthermore, joint problems,[3] pain,[23] fatty liver disease, gallstones, reflux, and breathing difficulties are more likely in obese children.[3] An

association between asthma symptoms and obesity, specifically in preschool children, is evident for both sexes.[24] These problems can lead to chronic conditions later in adulthood.[3] Overweight and obese children are more likely to have bilateral flatfoot, and risk is increased with higher weight.[25] In a retrospective study of 526 pediatric medical charts, obese pediatric patients were more likely to have skin abscesses than any other weight group; however, no statistical differences were observed in this study related to comorbid diagnoses of dyslipidemia, type 2 diabetes, or impaired glucose tolerance among weight groups.[26]

Children who struggle with weight are also more likely to be subjected to discrimination that can lead to social and psychological problems that can continue throughout life.[3] Much of the research conducted within the obese child population does not include those with a dual diagnosis of obesity and psychiatric disorders. The struggles of this population are becoming increasingly evident, as a known relationship has been established between obesity and depression (using food to regulate emotion), oppositional defiant disorder (eating to regulate conflict), and attention-deficit/hyperactivity disorder (dysregulation of caloric intake). Increased research is needed in this area for added understanding and assistance for the pediatric population.[27]

Obesity in childhood is likely to persist into adulthood.[3] Research suggests that a child's BMI is likely to predict BMI as an adult; however, its ability to predict adiposity or body fat content is questioned. As a division of the *Bogalusa Heart Study*, 2610 children aged 2-17 were medically followed until ages 18-37. The average amount of time between initial measurements and follow-up was 17.6 years. By comparing BMI and triceps skinfold thickness from baseline and follow-up, it was determined that childhood BMI was most strongly and significantly

correlated to adult BMI. Furthermore, childhood BMI was significantly associated with adult skinfold thickness indicative of adiposity. Generally, correlations were stronger in males and those who were older at initial assessment (9-17 years). The associations of childhood BMI to adult BMI and adiposity were moderate when looking specifically at 2-5 year-old study participants. Those in the 2-5 year-old age range who were overweight were more than 4 times as likely to have mean skinfold thickness measurements in the upper gender specific quartile (≥21 mm among men; ≥30.3 mm among women) as adults than their normal weight counterparts. Skinfold thickness values in the upper quartile indicate a greater amount of body fat. Overall, about 20% of overweight adults or adults with mean skinfold thickness measurements in the upper quartile in the study were also overweight as children.[28]

Finally, attention to the economic impact of childhood obesity is becoming evident. Johnson and colleagues noted the increased likelihood of obese children to have medical expenses but did not find statistically significant differences among short-term medical expenses when normal-weight children were compared to overweight or obese children. It is suggested that analysis of longitudinal data would be more likely to determine an association to the potential increased financial expense of childhood obesity.[29] In a population of children benefitting from parental insurance coverage, 0.7% of children had a diagnosis of obesity and 0.9% were diagnosed with type 2 diabetes, a condition that is likely related to obesity. Researchers suggest that this extremely low diagnosis rate is likely related to physicians' underdiagnosis of obesity in children. Among the population with a diagnosis of obesity, the average claims cost was $2907 compared to $1640 for the non-obese populations. Furthermore, the average claims cost of children with type 2 diabetes ($10789) was greater

than the cost of adults ($8844) with type 2 diabetes. It is also likely that parents miss work, therefore decreasing company productivity, for reasons due to their child's obesity-related illnesses and harmful psychological effects of the disease.[30]

Effects of Socioeconomic Status (SES) on Childhood Obesity

In 2009, documented poverty in the United States was at its highest, and the *Pediatric Nutrition Surveillance System* reported that approximately one-third of low-income children aged 2-4 years were obese or overweight. Childhood obesity within the low-income population is of concern because "families generally have less access to both healthy food choices and opportunities for physical activity."[11]

Low SES is often associated with consumption of inexpensive, energy-dense foods that provide palatable, high caloric values for little cost with few nutritional benefits.[20] These foods are often high in added fats and sugar, and include cereals, potatoes, and meat products with little consideration for vegetables, fruit, and whole grains. Over time, choices of inexpensive energy-dense foods may lead to increased consumption of calories and may change the brain's chemistry to desire such foods. It is very likely that low SES increases the high-calorie low-nutrient food choices as a means for saving money but also increases the chances for obesity. A gradual shift to consuming energy-dense foods like fruits, vegetables, and whole grains that are inexpensive while still palatable is recommended. This shift has been fairly successful in the area of changing the intake of full-fat dairy products to reduced-fat dairy products. With increased education and appropriate policy-making, obesity as a product of low SES can be altered.[20]

In socioeconomically disadvantaged neighborhoods in Victoria, Australia lower BMI in children is associated with a mother who saw greater value in physical activity. Conversely, BMI was greater among the study population if there was a TV in the bedroom or if food was often used as a reward for good behavior.[31]

A review of 45 studies conducted over a 15-year period was used to determine if a relationship existed between adiposity in children aged 5-18 years and SES. In 42% of the studies reviewed, an inverse relationship was observed between adiposity and SES, suggesting that adiposity was greater when SES was lower. No association was observed in 27% of the studies, while a combination of inverse and negligible associations were seen in the remaining 31% of the studies. The mixed associations were due largely to analyses based on subgroups within the study populations. There was only one suggestion of a positive association, greater BMI associated with higher SES, seen only in an adjusted analysis. Parental education level was used as an indicator of SES throughout the review and was determined to be the strongest predictor of an inverse relationship to child adiposity.[32]

An additional study investigated overweight and obesity among low-income Head Start children determining there was no association between BMI in children receiving Supplemental Nutrition Assistance Program (SNAP) benefits and those not receiving the benefits.[33] This study should be interpreted with caution, however, because both populations (those participating in SNAP and those not) were already considered “low-income” and “at-risk” because of the enrollment in Head Start. A control group of average or above average SES was not established.

Results from the 2007 National Survey of Children’s Health indicate that children age 10-17 years are more likely to be inactive and have increased screen time in unfavorable social

conditions, which include unsafe neighborhoods, garbage/litter in neighborhood, poor/dilapidated housing, and vandalism. These conditions were associated with 20% of children exposed being obese and 37% being overweight compared to 14.7% and 29.8% of obese and overweight children, respectively, who were not exposed to the most unfavorable social conditions. Overall, the odds of obesity and overweight among the study cohort of children was significantly greater in families with lower household income and education level.[34]

Children living in families with low income and parents with low education levels are at an increased risk of childhood obesity and the complications that accompany it. Safety of neighborhoods, physical activity efforts, and availability of high-quality food also makes an impact. Childhood obesity prevention efforts among the low-income/low-SES population are encouraged because of the vulnerability of the children within this class.

Childhood Obesity in Tennessee

In 2010, Tennessee was reported as the second most obese state in the country with 31.6% of its residents considered obese.[4] In 2011, the state was reported in a tie for being the 15th most obese state, but the rate, 29.2%, did not significantly decrease from the previous year.[5] Data from 2007 indicates that 36.5% of children ages 10-17 years were overweight or obese.[8] Additionally, compilation of BMI data for the 2007-2008 school year indicated 40.9% of school-aged children were overweight or obese. This number decreased to 39% during the 2008-2009 school year, representing over 8,000 students who achieved a healthy body weight during the second school year of study.[35] Currently, Tennessee is ranked 6th in the nation for

greatest percentage of childhood obesity.[6] Ethnicity and race play a significant role in Tennessee's childhood obesity differences because 37.4% of Hispanic and 43.9% of African American children are overweight or obese compared to only 21.2% of white children. Furthermore, obesity rates among children are lower in those with private insurance compared to those with public or no insurance,[7] suggesting a socioeconomic link to childhood obesity in Tennessee. In 2010, there were 14.5% obese, low-income children aged 2-5 years in Tennessee.[8]

Childhood Obesity in Johnson City, TN

Washington County is in Northeast Tennessee and has a reported obesity rate of 29.2%[36] and an overweight and obesity rate of 67.6%.[9] The surrounding counties have obesity rates greater than 29.7%,[37] and obesity has been identified as one of four top health priorities by Mountain States Health Alliance, a healthcare system serving the region. Washington County has a low average household income level with 16% of households making less than $15,000 annually and 20.8% of children living in poverty.[9] Two school systems, Washington County Schools and Johnson City Schools, exist within the county. In the 2011-2012 Annual Report from Tennessee Coordinated School Health, Johnson City schools had an overweight/obese incidence of 36.5% with BMI improvements observed in 3 schools since the previous report in the 2007-2008 report. For the same report time period, Washington County Schools observed an at-risk of overweight or already overweight/obesity rate of 42% with 5 schools decreasing values since the previous report.[6]

Effects of the Family on Child Nutrition

Research efforts have focused on the influence of the entire family system in relation to child nutrition, weight status, and overall health. Preschool-aged children are especially influenced by family dynamics because of the reliance on parents or caretakers to provide for them. Child-parent interactions have been identified as ways to promote healthy or unhealthy weight in children. In-home family meals can have more positive benefits related to diet quality, while eating away from home can have negative impacts. Family meals without watching television can allow for bonding and opportunities to teach good nutrition.[12] Furthermore, time spent watching TV is a positively associated predictor of BMI among 3-4 year-olds,[38] as is the child having a TV in the bedroom specifically for 9-12 year olds.[39] Physical activity time is negatively associated with BMI in preschool-aged children,[38] and inadequate nighttime sleep for infants and preschool children is also a potential risk factor for obesity.[40] Daily routines that encourage parents and children to spend time together have been shown to have positive effects on healthy eating.

Because of the power parents have related to influencing the behaviors of children, education within the population is crucial. Children often replicate eating and physical activity habits of parents, and this modeling behavior needs to be capitalized upon. Care providers are responsible for selecting and preparing food especially for young children; therefore, the responsibility of implanting healthy dietary habits in children is that of the provider. Parental modeling of physical activity is also critical in getting children to be active. Gradual changes across generations have been shown to have the greatest impact on promoting healthy

behaviors within families.[12] Additional attention should be paid to racial/ethnic differences when attempting to combat obesity risk in the preschool years.[41]

Children Consuming Breakfast

Little is known about the preschool population in relation to skipping breakfast and the effects of the habit. Two studies that interpreted data from a large, population-based cohort in Quebec aimed to gain an understanding of trends related to breakfast consumption in preschoolers.[42,43] First, researchers determined if a relationship existed between overweight and breakfast consumption. Of the cohort, 9.8% did not eat breakfast every day and were considered "breakfast skippers." Of the breakfast skippers, 17% were overweight, while only 8% of those who regularly ate breakfast were overweight. This showed an association between preschool children skipping breakfast and being overweight.[42]

The same Canadian cohort research was used to determine if breakfast skipping was related to daily energy intake, nutrient intake, and overall BMI. Differences existed among breakfast skippers and those who ate breakfast every day. Lower protein intake, greater energy intake at lunch, dinner, and afternoon and evening snacks, greater carbohydrate intake at dinner and afternoon and evening snacks, and greater energy intake at snacks was apparent in the breakfast skippers group. Furthermore, breakfast skippers showed double the odds of being overweight compared to regular breakfast eaters. Intake at dinner was different between groups and was the meal that most strongly related to increased BMI among the breakfast skippers. However, overall intake throughout the day was similar, suggestive of compensation throughout the day for those who did not consume breakfast. An interaction between meal

patterns and meal timing may be related to preschool children being overweight. The reported diet quality was lower among breakfast skippers.[43] Additional research supports the relationship between skipping breakfast and compromised diet quality among children and adolescents.[44-47]

An additional study of young children focused on a subgroup of 1-5 year old African American children who were a part of NHANES. Within this group, 7.4% skipped breakfast and 45% regularly consumed ready-to-eat cereal (RTEC). Others consumed breakfast that did not include RTEC. Children in the RTEC group had the lowest BMI and waist circumference values than either of the other breakfast groups. Additionally, both groups that consumed breakfast had fewer overweight children than the group of breakfast skippers. Breakfast skippers consumed fewer calories overall than those who consumed breakfast, suggesting there was no compensation for the missed meal. However the skippers also consumed fewer micronutrients compared to the breakfast consumers leading to the conclusions that breakfast consumption should be encouraged and RTEC may be beneficial.[44] Ready-to-eat cereals were explored and encouraged in additional studies as a means for increasing fiber and micronutrients.[45,46]

Further studies of children and adolescents associate increased meal frequency (>3 meals per day)[48] and daily breakfast consumption with lower BMI,[45,48,49] while some reviews cannot reach a consensus about an association.[46,47,50] Although a direct association cannot be determined at this time, it is possible that breakfast habits related indirectly to other behaviors.[51] Finally, it is proposed that a "reverse causality" may exist in relation to overweight children and skipping breakfast in that "overweight subjects are skipping breakfast in *response* to their weight; skipping breakfast is not *causing* overweight."[50] It is hopeful that this

association to weight and body image concern is not apparent in preschool children because of the implications of future disordered eating patterns for such a young population.

Breakfast consumption cannot be directly correlated to BMI and weight status in children; however, it is considered a healthy habit for children to develop for increased overall diet quality and may improve academic performance.[47] RTEC may become a recommended ingredient in healthy breakfasts for ensured consumption of fiber, carbohydrates, dairy products, and micronutrients. Further investigation as to whether breakfast consumption impacts body weight is warranted; however, no harm is implied by breakfast consumption in childhood.

Eating Family Meals Together

Eating meals together as a family is an aspect of family routines in which differences may impact the health outcomes of children. Family routines include 2 features. First is the organizational and planning aspect. Second, it is the part of family routines that establish emotional connections. Recognition of the importance of family mealtimes within family routines is important for healthy children.[52] Preschool children are especially susceptible to routines that involve family meals as research shows a 40% lower prevalence of obesity among children who regularly eat dinner as a family, get adequate sleep at night, and are limited in daily screen time.[2]

The effects of shared family meals are often investigated solely in terms of how the practice affects child weight. Many studies have been conducted with this outcome in mind and recent reviews have found inconsistent results regarding a relationship between the frequency

of family meals and childhood obesity. In 2011, Hammons and Fiese reviewed 17 studies and found that there is a significant relationship between the frequency of shared family meals and nutritional health and weight status in children. Findings conclude that children are 12% less likely to be overweight, 20% less likely to eat unhealthy foods, and 24% more likely to eat healthy foods if families share 3 or more meals together per week. Little consideration was given to study characteristics in this review.[54] Valdés and colleagues scrutinized study designs and characteristics in a more recent review that included newly published studies and found that 6 out of 11 cross-sectional and 1 out of 4 longitudinal studies indicated significant inverse relationships between family meal frequency and childhood overweight. Because this was not an overwhelming majority of studies finding similar outcomes, researchers concluded that a link could not be confirmed and more research is needed in the area of family meals and their effects on childhood overweight.[55]

Other studies focus less on weight as an outcome and put more of an emphasis on general health outcomes related to family meals. The number of servings of fruit and milk[56] as well as vegetables provided to children are positively associated to the number of nights a family eats dinner together.[56,57] Additionally, a study of Scottish 5-year-old children found no significant association between diet quality and children eating with their parents; however, the diet quality was significantly and incrementally associated with children eating the same foods as their parents. Furthermore, diet quality was improved if children snacked less and ate a main meal, had pleasurable meal times, and if mothers viewed meals as an opportunity for quality time.[58] Although family meals may not be associated with weight outcomes in children, benefits of meals being a part of family routines exist.

Fruit and Vegetable Intake

Fruits and vegetables (FV) provide children with low energy-dense nutrients and phytochemicals[59] that may prevent chronic diseases later in life. Establishing eating habits in young children that meet the recommendations for FV intake are likely to continue through life.[60] Low-energy density diets that are high in FV can provide less energy from food but can nearly double the weight (in grams) of food consumed and contribute to satiety. Less fat and added sugars combined with twice as many fruit and vegetable servings lead to a negative linear relationship between dietary energy density and FV intake.[61]

Based on NHANES data from collection periods beginning in 1999, 48.2% of the sample of 2-3 year olds consumed the recommended 4 servings per day of FV. Only 5.3% of males and 9.8% of females aged 4-8 years consumed the recommended 6 and 5 servings per day, respectively.[62] Average intake estimates for 2-5 year old children are 1.29 cups of fruit (including fruit juice) per day, and 0.76 cups of vegetables.[59] Further intake estimates in a study of mother/child dyads reported that children aged 5-6 years are consuming 41% of fruit and 39% of vegetable recommendations, while mothers consumed 26% and 41%, respectively.[63]

Researchers have investigated many components of family life that may influence FV consumption in preschoolers, as well as how much children like FV. First, parental intake and modeling behaviors are associated with increased FV consumption.[63-66] Increased consumption of FV[63] and low-energy density diets[61] are associated with lean children in some studies, while others suggest no weight association to vegetable intake and an association to fruit intake (including fruit juice) to only those children who are at-risk-for-overweight.[59] Other positive associations to FV intake in preschool children are providing children with FV in the home,

increased variety in the home including ready-to-eat FV options, and having set meal times.[64] Children were more willing to taste and consume FV if a greater percent of food cost and food purchases in the home were produce items[65] and if meals were prepared from scratch. Watching TV during meal times and increased use of convenience foods at meals were associated with decreased FV consumption in children.[66] Providing preschool children with a low-fat herb dip in combination with vegetables can increase acceptance of vegetables as a snack.[67] Overall, increased childhood exposure to FV leads to increased acceptance.

Sweetened Beverages

Sugar-sweetened beverages (SSB) add calories to overall dietary intake while contributing little-to-no nutritional value.[12] Consumption of SSB, including fruit juice, among young people in the United States may be as high as 88-89% consuming at least one serving of SSB or fruit juice on a given day. Furthermore, results from a large population-based study indicate that half of preschool-aged children are consuming an average of 11.1 oz of fruit juice, while the recommended intake amount for this age group is no more than 4-6 oz per day.[68] From the 1970s to mid-2000s, fruit juice intake increased from approximately 30% to more than 50% of children. Fruit drink intake has remained steady at about 35% of children as consumers for the same time period. Soft drinks are consumed by about 1/3 of children and intake often increases with age.[69] This excess of nutrient-poor calories may increase the likelihood of preschool children becoming obese. The risk increases among African American and Hispanic populations.[41]

Milk consumption is reported to have decreased over time,[69] specifically among 2-5 year old children by 3% from 1988-1994 to 1999-2004.[68] SSB are often proposed to be the chosen replacement drink of children. In a laboratory feeding study, children aged 3-7 years were provided with *ad libitum* lunchtime meals; SSB intake was negatively associated with milk consumption and subsequently calcium and vitamin D intake. Age was positively associated with SSB consumption. Low milk intakes were observed in children beginning in those younger than 5 years of age, suggesting changes in beverage preference occur early in life.[70]

Some evidence supports an association that SSB intake positively correlates to childhood BMI,[71-73] while additional research has found no significant relationship.[70] Other associations of SSB intake in relation to health outcomes are the predictive relationship to adiposity in girls beginning at age 5 through follow-up at age 15,[71] as well as increased cardiometabolic markers including elevated C-reactive protein[72] and waist circumference,[71,72] and decreased high-density lipoprotein cholesterol. Specifically within 2-5 year old children, a significantly positive association was observed in SSB consumption and low-density lipoprotein cholesterol. Additional differences in metabolic markers were evident based on race.[72] Overall, the risk of obesity and adverse health in childhood is increased when SSB are consistently incorporated into the diets of children, even those as young as preschool-age.

Food Restriction

Child health is often associated with the home feeding environment, which includes the practice of parental restrictive feeding. When compared to Caucasians, the odds ratio of African Americans and Hispanics practicing restrictive feeding is 2.59 and 3.35, respectively.[41] Studies

related to this topic generally provide parents with a survey tool, for example the Child Feeding Questionnaire,[74] that is able to categorize parents as restrictive or not while also assessing other feeding practices. These results can then be compared in a cross-sectional analysis or longitudinal study to child characteristics and habits. In most instances a causal relationship between restrictive eating practices and child weight status cannot be determined due to the study designs. Associations between the two can, however, be made in most cases.

Child weight is often used as a marker for effectiveness or harmfulness of restrictive feeding practices; however, results of BMI associations are inconsistent. In African American preschool children with obese mothers, restrictive feeding was indicative of increased child BMI.[75] Furthermore, a study of racially diverse parents and children found that children with restrictive non-obese parents were more likely to be overweight.[76] Other studies saw no effects of compounding variables like race on the positive association of restrictiveness and BMI.[77,78] However, a study of about 5000 4-year-old study participants in the Netherlands showed no association between the parental practice of "monitoring" food choices and child BMI.[77]

Some studies show no effect of restrictive feeding practices on child BMI,[79-81] while other research indicates that restrictive feeding may lead to leaner children with lower BMIs. Children who were 5-6 years old at baseline with greater restriction had a lower BMI at follow-up 3 years later. Conversely, the baseline group of 10-12-year-old children saw no association, suggesting that restriction has more of an impact on child weight at younger ages.[82]

Additional research efforts may include test meals or snacks that lack the immediate influence of a parent but are able to convey patterns of intake when children are restricted. In an ethnically diverse sample of children, test meals were provided and results compared

parents' responses to a feeding questionnaire. No association was found between BMI and the level of parental restriction; however, restricting a child's access to "undesirable" foods was positively correlated to BMI. Furthermore, a positive association between child weight and level of restriction was observed in non-obese parents. The energy density of the meals was also evaluated in this laboratory setting and was found to be negatively associated to restriction.[76]

Additional experimentally designed studies provided children with snack options to assess restrictive feeding practices. In one study young children were given red and yellow chocolate candy (sweet) and red and yellow crisps (salty). The experimental group was told not to eat the red food. Following the allotted time of the restriction, children were allowed to consume as much of each color of food as they wanted. The desire for the forbidden food was increased following the restricted period and greater proportions of the restricted food were consumed following the restriction period compared to those given no restrictions; however, energy intake was not different among the experimental and control groups.[83] A similar study of older children was conducted using sweets and fruits as two prohibited experimental groups. Results were similar to the red/yellow food trial with increased desire for the forbidden candy, but not the fruit, and increased consumption of the forbidden foods. The energy intake of the restricted groups was, however, increased when compared to the control group in this study.[84]

Finally, in a 2-part study of well-educated parents in England, researchers provided parents of 1-7 year-old children with chocolate coins in the first part of the study. Over the course of a weekend, the restrictive group was told to provide the child with one introductory piece of chocolate, then follow restriction guidelines for the remainder of the weekend. The nonrestrictive group was allowed to give the child candy as requested following the

introductory piece. The second part of the study used the same design with 4-11 year-old children over the course of 2 weeks. It was found that the restricted groups consumed less candy over the experimental periods. Overall, children decreased preoccupation with the candy regardless of the restrictive level; however, the non-restricted group had a greater disinterest in the candy. This is suggestive that restriction may mediate preoccupation with foods that parents determine to be prohibited.[85] Experimental results suggest that restrictive feeding practices have a greater effect on younger children,[83-85] supporting the previously discussed work of Campbell and colleagues.[82]

Research related to parental restrictive feeding practices is inconsistent when looking at child anthropometrics and experimental intake amounts. Although it is hypothesized that restrictive eating may lead to increased BMI, it is also plausible that high BMI or perceived overweight in children leads parents to restrict food. It is suggested that a child's internal satiety mechanism can be adversely affected if food is restricted. This poor appetite regulation may eventually lead to overeating and unintentional weight gain.[84] Eating in the absence of hunger has been seen in girls exposed to restrictive feeding practices.[79,86] Furthermore, restriction may be closely related to the inhibitory control of children. Those with low inhibitory control/high parental restriction were more likely to gain weight over time and be heavier than their counterparts with high inhibitory control/high parental restriction or high inhibitory control/low parental restriction.[87] Additional research associates disinhibited eating with parental food restriction, but again, causality cannot be determined.[78,88] Restricting food may also contribute to a child's preoccupation with the food item or similar items, as was seen in the work done by Ogden and colleagues.[85]

Finally, researchers suggest that parents should attempt a more lenient control over child food choices by not restricting but rather monitoring and exposing children to desirable foods rather than exposing them to undesirable foods and withholding. In this scenario parents simply should not purchase foods that would be restricted to have in the home. If the child is unaware of the restriction, the effects are likely to be less pronounced.[77,79,82]

Head Start

"Head Start is a federal program that promotes the school readiness of children ages birth to 5 from low-income families by enhancing their cognitive, social and emotional development."[13] Since the program's beginning in 1965, nearly 30 million children and their families have benefited from the services provided by Head Start with intervention models based on the needs of the local community. Head Start also emphasizes the parents' role as a child's first and most important teacher through relationship building that supports families as learners, lifelong educators, advocates and leaders.[13]

Nationally a majority of Head Start services are provided to 3 and 4 year old children (34% and 47%, respectively).[89] Others benefiting from Head Start include children from birth to 2 years in the Early Head Start program, children 5 years and older, and pregnant women. In 2011 approximately 2/3 of enrollees identified themselves ethnically as Non-Hispanic/Non-Latino Origin. In a separate category for race, 41% were white, 28% were Black/African American, 16% were Unspecified/Other, 8% were Bi-/Multi-Racial, and the remaining respondents were American Indian/Alaska Native (4%), Asian (2%), or Hawaiian/Pacific Islander (0.6%). English was reported as the primary language in 70% of homes and Spanish in 26%.[89]

During the 2011 Fiscal Year Head Start projects were allocated approximately $7.3 billion dollars from the federal government to aid programs in all 50 states, the District of Columbia, six territories, and American Indian and Alaska Native (AIAN) programs in 26 states. An additional $245,817,000 was put towards support activities including training, research, and program reviews. Of the project appropriations, Tennessee received almost $131,000,000 to be used for a total of 17,323 children.[89] In order for funding from the U.S. Department of Agriculture (USDA) to cover meals and snacks, Head Start centers must participate in either the Child and Adult Care Food Program (CACFP) or the school meals programs (National School Lunch Program, National School Breakfast Program). Nutritional requirements outlined by the programs must be adhered to within the centers for all meals.[90]

Head Start in Johnson City, TN

During the 2012-2013 year Head Start in the Johnson City, TN area provided services for 7 classrooms with a total attendance of 117 children. Of those children, 5 were 3 years old (5%) and 112 were 4 years old (95%). The majority of enrollees were white (55%). Hispanic children represented 20% of attendees, 16% were African American, and 9% were Bi-racial. The primary languages of the Johnson City Head Start families were English (81%) and Spanish (19%). Funding for the program is allocated by region, and the Johnson City centers are included in a 50-classroom region covering southwest Virginia and northeast Tennessee. The total funding for those 50 classrooms to be split according to program guidelines for the year was $6,396,688 (Leah Arthur, e-mail communication, April 24, 2013).

According to the Johnson City Head Start Parent Involvement Coordinator and the Family Resource Specialist (Leah Arthur and Mallory Thurman, oral communication, September 17, 2012), Johnson City Head Start centers strive to provide weekly nutrition lessons, at least 30 minutes of physical activity per day, and adult modeling of healthy eating habits at meals and snacks. Centers provide meals and snacks to students and must accommodate allergies and religious beliefs that impact food choices. Transportation is available for most students and is seen as an indispensable luxury as many students would not be able to attend if not for the provided transportation. Parental involvement is also important to the Head Start centers and is encouraged through volunteer opportunities, family involvement programs, and monthly parent meetings (Leah Arthur and Mallory Thurman, oral communication, September 17, 2012).

Previous Health Research Initiatives within the Head Start Community

Research within the Head Start community has been ongoing for more than the last 20 years of the program's existence. Data collection has included population demographics, child readiness for school, information on family satisfaction with the program, and child/family wellbeing.[13] More recently research has drawn attention to the increasing need for addressing health issues present within the low-income Head Start community. It is estimated that about 1 in 3 children of Head Start are overweight or obese.[90] A focus of research has been on parental behaviors and their impact on the children. Some research has been solely based on recognizing problem areas with only suggestions of changes to be made,[90-93] while others have implemented educational programs to encourage and initiate healthy behaviors within the population.[94-97]

Problem Recognition. In a survey completed by Head Start program directors about the barriers faced in obesity prevention, one section addressed the perceived barriers on the parental level. The most frequently reported barriers on the parent level were the lack of money to purchase healthy foods (40%), a lack of knowledge about what foods and beverages are part of a healthy diet (19%), and cultural beliefs about food that are not always consistent with healthy eating (13%). Additionally, directors felt that only 3% of parents do not have a problem encouraging children's healthy eating. In relation to gross motor activity barriers on the parent level, directors reported the most frequent barriers were lack of time for parents to participate with children (34%), lack of knowledge about how the encourage gross motor activity (30%), and not thinking the neighborhood was safe for outside play due to crime (16%). This study identified the challenges faced by Head Start parents when trying to combat obesity with healthy eating and physical activity.[90]

Results from focus groups conducted with Head Start parents support the previously discussed barriers described by program directors. After conducting five focus groups with a total of 18 Head Start parents, 5 general themes became apparent, all relating to the concept that "parents are in need of accurate nutrition information and assistance with making healthy choices for themselves and their families." The five themes are listed in Table 2. From these themes, researchers concluded that parent interventions should focus on increasing knowledge of healthy foods, proper portion sizes, and healthy preparation methods. Evaluating how healthy a food is and where to obtain accurate health information are also topics to be included when providing interventions to parents, especially those within the Head Start population.[91]

Table 2: Themes emerging from Head Start parent focus groups

Theme #	Description
1	Participants described a wide range of available foods in their homes, most notably processed meats, canned vegetables, dairy products, boxed food mixes, cereals, pastas, and sugar-sweetened beverages.
2	Family members were the most important and influential sources of support for diet and exercise behaviors.
3	Participants reported a desire to make changes in their diet, exercise or weight, but most did not feel they needed to make changes in their children.
4	Participants revealed a lack of general knowledge about nutrition, exercise, and healthy lifestyle.
5	Participants reported several common barriers including not wanting to deny themselves their preferred foods, dislike of exercise, lack of time for shopping and planning meals, feeling tired, and the cost of healthy food.

Adapted from Davis.[91]

In a qualitative study of Head Start parents, discussions were analyzed to determine parental feeding practices, self-efficacy, and barriers related to 6 predetermined feeding constructs.[92] The constructs were "offering new foods many times, offering a variety of vegetables, having the child seated while eating, permitting the child to decide how much to eat, establishing regular mealtimes, and not using food as a reward." Overall, the division of responsibility during meals and snacks was skewed because parents were deciding when the child was finished eating. Additionally, snacks were viewed as being unhealthy. Most parents discussed positive mealtime interactions, but this benefit was contradicted with low parental self-efficacy and increased perception of barriers in meal planning based on time and money. This study did not implement an intervention; however, it called for nutrition educators to enter the Head Start community to increase the parents' knowledge and comfort level related to healthful foods and mealtime behaviors.[92]

Interventions used within the Head Start Community. In a controlled treatment trial, 89 Head Start mothers in the treatment group were provided with 13 weekly nutrition newsletters

and were encouraged to attend 4 nutrition workshops. There were no interventions provided to the control group. Participants were from 6 New York City centers and 5 Maryland centers. Upon completion of the program, Maryland treatment group parents reported higher diet quality and increased consumption of nutritious foods in their children's diets than those in the control group. There were no significant changes between parents of the control or treatment groups in New York. Positive changes were made in meal planning, food shopping, food preparation, and cooking practices for the treatment groups of both sites, indicating the benefits of nutrition education programs for parents of children enrolled in Head Start.[94]

In a study by Adedze et al, parents of Head Start children viewed a DVD that illustrated desirable parenting behaviors to improve healthy nutrition. Parents reported relating to barriers experienced when trying to provide their families with healthy meals and ways to be physically active. The educational presentation stimulated parent action to eat meals together, limit fast foods, increase fruit and vegetable intake in the home, be physically active as a family, and attempt the recipes and activities included on the DVD. After viewing the DVD that illustrated desirable parenting behaviors to improve healthy nutrition, parents reported feeling motivated to eat meals together, limit fast foods, increase fruit and vegetable intake in the home, be physically active as a family, and attempt the recipes and activities included on the DVD. The survey following the DVD also exposed barriers parents feel when trying to provide their families with healthy meals and ways to be physically active.[95] The feedback in a follow-up survey gives presenters and researchers the opportunity to better tailor future initiatives.

"Eat Healthy, Stay Active!" was a 6-month educational intervention implemented in 75 Head Start centers in 6 states that promoted healthy nutrition and increased physical activity

for parents, children, and staff.[96] Anthropometric measurements were obtained at the beginning and end of the intervention. Additionally, parents and staff members completed a questionnaire to assess knowledge of food groups, knowledge of healthful foods, health consequences of obesity, shopping behaviors, eating behaviors, and physical activity intensity and frequency before and after the 6-month intervention phase. Informative intervention materials for adults were presented separately for parents and staff. Included were details related to factors in obesity and chronic disease prevention, as well as basic concepts such as MyPyramid, food groups, portion control, shopping on a budget, and integrating physical activity into daily life. Parents received a minimum of 6 hours of activity throughout the program. Interventions for children were incorporated into Head Start curriculum and paralleled adult education. Children learned about food groups and the importance of healthy eating and exercise. At the conclusion of the pilot study, there was statistically significant loss of BMI and a significant decrease in proportion of participants considered obese at baseline to those considered obese at follow-up among all age groups. Additionally, weight change in parents was associated with weight change in children, complimenting the importance of approaching health as a family matter. Improvements were visible in knowledge and behaviors and nearly all participants showed an increase in exercise frequency and duration. Results lead researchers to the conclusion that the "Eat Healthy, Stay Active!" program may be effective at reducing obesity and improving health behaviors in the high-risk Head Start population. It is important to recognize that the study population may have had greater motivation for change than the Head Start population as a whole because retention was voluntary.[96]

Hindin et al. investigated *A Media Literacy Nutrition Education Curriculum for Head Start Parents about the Effects of Television Advertising on Their Children's Food Requests.* Researchers recognized a need for parent education due to the amount of misinformation in the plethora of food advertisements aimed at young children to promote calorically dense foods. Furthermore, it has been determined that increased commercial exposure leads to increased requests and energy consumption and that parents who teach their children about understanding and analyzing commercials positively impact young children's snack requests. Researchers provided a 4-week behavior-focused education series for parents to enhance their ability to talk about commercials with their children and to read food labels to make educated decisions about purchases related to commercial influences. At the end of the intervention, critical analysis of commercials, as well as an understanding of media elements and persuasive techniques, was evident among parents. Self-efficacy of parents related to understanding food labels, judging claims about advertisements, and talking to their preschoolers about the advertisements was increased following the intervention. This educational series increased positive health behaviors of its participants who were members of the Head Start Community. Additionally, the dietetics profession was recognized as the leader in providing skills to the public that will help them to evaluate television and media advertising.[97]

Multiple studies have shown that easily implemented programs with simple concepts can have overwhelmingly positive effects on the nutrition knowledge levels of parents and children within the Head Start community.[94-97] The supportive Head Start environment provides "structure and [a] holistic approach to families,"[96] which supplies an ideal setting for systematic

programs from which research data can be collected. The inclusion of community input in order to focus on local needs helps to ensure responsiveness and overall benefit to participants.[96]

Parent education intervention studies encourage the likelihood of success for the Kids Eat Right *RD Parent Empowerment Program* because parents will be provided with a plethora of information related to a healthy lifestyle in hopes of maintaining positive behaviors or initiating change where needed. The program is systematic in that all sites across the nation provide similar information but allows for individualization to the local Head Start community in Johnson City.

RD Parent Empowerment Program

Benefits of self-empowerment educational health programs have been suggested in populations with diabetes,[98] parents of critically ill patients,[99] and mothers with the option of breastfeeding. Specifically, breastfeeding empowerment among Korean mothers provided the means for mothers to identify and solve problems on their own.[100] Previously conducted empowerment programs increase the likelihood of the *RD Parent Empowerment Program* having positive effects on parents and families related to overall health behaviors. Furthermore, Kids Eat Right recognizes parents as "the behavior leaders at home," and their empowerment will make them quality role models for their children.[12]

The *RD (Registered Dietitian) Parent Empowerment Program (PEP)* assists parents with developing the skills and confidence needed to provide a positive and healthy family environment. It is part of the Academy of Nutrition and Dietetics Foundation's *Kids Eat Right* initiative. The *RD Parent Empowerment Program* features the *8 Habits of Healthy Kids™* (8

Habits).[14] A full list of the habits can be found in Appendix A. Originally, the program was based only on the 8 Habits, but it was determined that parents were in need of more support. It was decided that RDs would act as the facilitators (BJ Carter, MS, e-mail communication, May 29, 2013) in 4 themed workshops that cover the topics "8 Healthy Habits of Healthy Children and Families," "Shop Smart," "Cook Healthy," and "Eat Right." Educational sessions are discussion-based and RD facilitators are provided with a detailed outline describing the lessons. A cooking demonstration was also a part of each workshop.[101] The program goal is to increase parent self-efficacy for providing healthy home environments over the course of 4 parent education sessions in participating schools and communities. Parents are provided with a guidebook that supports the information discussed in each session that can be referred to after the conclusion of the program, as well as the kid-friendly *Wiz, Zip, Zap* cookbook.[14]

The creators and educators of the *RD Parent Empowerment Program* encouraged facilitators to make each site experience individualized in order to increase understanding and outcome changes within the parent populations. Research suggests that tailoring information to an individual or community is more effective than an undifferentiated, general message.[102] The *RD Parent Empowerment Program* uses targeted communication to focus on parents who will benefit from the shared messages of the workshops and Parent Guidebooks. Facilitators are then able to tailor communications for parents attending the workshops.[103]

Parents complete the Family Nutrition and Physical Activity (FNPA) Screening Tool at the first and last parent education session as a qualitative measure of changes that have been made within the family over the course of the program. In the 2013 year of the *RD Parent Empowerment Program*, the FNPA screening tool replaced a previously used compilation of

field-tested survey questions that provided feedback on families' eating and activity behaviors. The FNPA screening tool was available as a pre-/post-test option for the program (Lisa Medrow, e-mail communication, May 27, 2013), and its constructs fit well with the 8 Habits that were already in place to be used with the program (BJ Carter, MS, e-mail communication, May 29, 2013).

Family Nutrition and Physical Activity Screening Tool

Creation and Validation

In 2009 the Family Nutrition and Physical Activity (FNPA) Screening Tool was formulated[15] and validated[16] as an easy to use screening tool for assessing the environmental and behavioral factors that may increase the likelihood of a child becoming overweight. To create the FNPA screening tool an extensive literature review was conducted by the Academy of Nutrition and Dietetics, previously the American Dietetic Association, that followed the established Evidence Analysis procedures. The strength of the evidence available linking overweight and obesity to environmental and behavioral factors was assessed through the review process. Parental influences were the main focus of the review because parents have the decision-making power related to their child(ren)'s behaviors, as well as physical and social environments.[15,16]

Ten constructs, or general categories, related to family behaviors were determined to have a positive association with overweight and obesity in children. The 10 domains to be addressed within the FNPA screening tool were established as family meal patterns, family eating habits, food choices, beverage choices, restriction/reward, screen time and monitoring,

healthy environment, family activity involvement, child activity involvement, and family routine.[15] These ideas became the 10 main points of the FNPA screening tool from which 21 questions were created. A scale of 2, 3, or 4 points was given to possible answers for each question, and 7 questions were reverse coded so a pattern of high scores for all questions was not favorable. After tallying answers, high overall scores on the FNPA screening tool were regarded as a low-risk family environment related to overweight and obesity in the child(ren).[15,16]

Initially the survey tool was provided to parents of first grade students in a large Midwest urban school district. A total of 854 completed FNPA screening tools eligible for analysis were collected and compared to student body mass index (BMI) data that were provided by school nursing personnel. Psychometric properties were assessed using factor analysis followed by the investigation of the factor structure. The alpha reliability of the FNPA screening tool indicated the internal consistency of the tool. The overall score of each family was compared to family SES/income and ethnicity. Generally families with higher incomes ($p<0.05$) or who were Caucasian ($p<0.05$) had higher FNPA scores, which represented more favorable family health environments. Additionally, schools with higher SES had more favorable scores ($p<0.05$) than middle or low socioeconomic schools.[15]

The child's BMI was positively correlated ($p<0.01$) to mother's and father's BMI individually. Negative correlations ($p<0.01$) were observed comparing child BMI to the constructs of breakfast/family meal, model nutrition, high calorie beverages, TV in the bedroom, child's physical activity, and total FNPA score. Significant negative correlations ($p<0.05$) between child's BMI and parent's physical activity and sleep schedule also existed.

After dividing responses into tertiles, families with high scores representing a favorable, low risk environment were compared to families with middle (moderate risk) and low (high risk) overall scores. Results were predictive (p=0.026) of a child's risk for being "overweight" or "at risk for overweight" for those in the high risk group. Preliminary validation was completed for the FNPA screening tool at the conclusion of the initial assessment, and a call for further validation using a longitudinal survey was made.[15]

As a follow-up longitudinal study, BMI data were collected on the same students of the preliminary validation study a year after the initial collection.[15] Of the initial 854 students,[16] a total of 704 children were eligible for the follow-up data collection. Results of BMI change over time compared to FNPA scores indicated that the score was most associated with BMI change in those with high initial BMI values. This suggests that the less healthy a home environment is, the more influential it will be on overweight children. Although limitations to the screening tool exist, it was concluded that "the FNPA screening tool provides a way to potentially identify families that may be inadvertently predisposing their child to becoming overweight."[16]

Previous Uses

Since its validation in 2009 the FNPA screening tool has been used in research related to home obesigenic environment of children,[104] parenting styles,[105] and cardiovascular disease (CVD) risk factors in children.[106] It is also recommended that the screening tool be used by nutrition professionals when counseling on awareness and prevention of obesity because of its ease in administration and interpretation. The tool can be used in paper form in the counseling setting or recommended to parents as an online tool to be completed at home.[107] The online

version of the FNPA screening tool asks questions, determines a score, and gives feedback as to what parents are currently doing that is healthy and areas where improvements could be made with suggestions.[15]

In an effort to improve children's nutrition knowledge and assess and improve the obesigenic home environment, researchers used a dual approach through educating kindergarten aged children during school hours while supplementing classroom lessons with parent education materials that were sent home. A control group also participated and did not receive classroom education or parent education materials. Kindergarteners were chosen as the child study population because of the large impact parents have on their decisions related to food purchasing and preparation. Early intervention in unfavorable environments is crucial for maximum benefits. Prior to the education component of the study, parents completed the pre-FNPA screening tool. University nutrition students provided the education to children and the materials were sent home to parents. Following the month of education, parents again were administered the FNPA screening tool, referred to as the post-FNPA. Analysis of the pre- and post-FNPA scores showed small but significant ($p<0.001$) improvements in the home environment of those in the experimental group. An increase in FNPA score was associated with a decreased obesigenic home environment. Changes were commonly seen in the decreased use of packaged foods and increased use of freshly prepared meals, increased fruit and vegetable consumption, and increased family activity time.[104]

Additionally, results from the FNPA screening tool provided to 145 parents of 3rd to 5th grade students in rural South Carolina were compared to survey data that identified parenting styles in order to determine whether a relationship exists between family health, specifically

nutrition and physical activity, and parenting style. If a relationship exists, parenting style could be an area of focus when providing appropriate family nutrition and physical activity information. It was determined that lower FNPA scores (indicative of fewer healthy practices) were significantly associated with the laissez-faire, or passive, parenting style ($p=0.05$), while higher FNPA scores indicating healthier families were associated with democratic parenting ($p=0.01$). The FNPA screening tool was useful in determining a relationship between family health and parenting styles. If results from this study can be replicated, attention to discouraging permissive parenting may be a critical addition to family health programs.[105]

Yee and colleagues aimed to resolve if the FNPA screening tool could be used for more than determining an association of family behaviors and child weight by comparing FNPA scores to CVD risk factor scores in children. A continuous CVD risk score including total cholesterol to high-density lipoprotein-cholesterol ratio, mean arterial pressure, and waist circumference was created for each study participant. CVD risk was chosen as the health concern to be investigated because of the strong correlation between obesity and CVD, as well as the likelihood of the disease continuing to adulthood if diagnosed in childhood or adolescence. Participants were 119 fifth grade children enrolled in the (S)Partners for Heart Health intervention program. Results showed that children in the low mean FNPA score group were more likely to be overweight or obese than those with a higher FNPA score ($p<0.05$). The FNPA score was negatively correlated ($p<0.05$) to the continuous CVD risk score, but not to 2 of the 3 variables that determined the risk score. Waist circumference was the only value that was significantly correlated to FNPA score and was, therefore, the cause of the correlation to the continuous CVD risk score. The negative correlation to waist circumference further supports the

ability of the FNPA screening tool to identify an environment supportive of overweight children. The FNPA tool only accounted for about 5% of variance in the CVD risk score, indicating that other factors including genetics and race should be considered. Overall, the FNPA screening tool was successful at identifying CVD risk associated with overweight. Additional research is needed if the FNPA screening tool is to be used as a means for identifying CVD risk, but it has been deemed useful as a quick assessment of the health of a family's environment.[106]

The FNPA screening tool can be used to determine the effectiveness of the implementation of an education program or as a screening tool for risk factors related to family environments or adverse health outcomes from which preventative education and/or treatment can then be tailored. It has been validated as a useful tool for combating obesity in children with a focus on prevention of an obesigenic environment during childhood. Nutrition professionals are encouraged to make use of the screening tool in everyday practice in order to provide the highest quality nutrition education to families.

CHAPTER 3

METHODS AND MATERIALS

Program Description

The Kids Eat Right *RD Parent Empowerment Program* is designed to help empower parents to have healthy families. The program uses the *8 Habits of Healthy Children and Families* and provides parents with information related to the topics Shop Smart, Cook Healthy, and Eat Right.[14] The *RD Parent Empowerment Program* is a series of 4 workshops that were presented to families with children attending any of the 4 Head Start Centers in Johnson City, TN.

The amount of time to conduct the 4 educational sessions was 3 months, February 15-May 15, 2013. This time frame was used to give parents ample time to implement healthy habits at home while avoiding a lengthy break between each session and also to refrain from overwhelming parents with too much information too quickly. Workshop dates and times are listed in Table 3.

Table 3: Workshop Title and Implementation date and time

Workshop	Subject	Date and Time
1	8 Habits of Healthy Children and Families™	Thursday, February 28—5:30 p.m.
2	Shop Smart	Thursday, March 21—5:45 p.m.
3	Cook Healthy	Thursday, April 18—5:45 p.m.
4	Eat Right	Thursday, May 2—5:30 p.m.

In order to determine the best way to implement the *RD Parent Empowerment Program*, facilitators met with the regional Parent Involvement Coordinator and the Family Resource Specialist of one of the Head Start centers involved in the program. Characteristics of

the communities served by Johnson City Head Start were discussed. Incentive options and previous successes at parent-based meetings were also discussed in hopes of attaining high participation rates among parents. Head Start parents were also invited to discuss what would benefit families the most. Parents' input assisted with determining the day of the week and times that sessions were conducted.

Advertising for the program began in December 2012 with the use of large posters that were hung in the entrance/lobby in each of the 4 Head Start Centers. Posters conveyed information about meeting times, location, free childcare, door prizes, free food, and how to register. Fliers similar to the posters were distributed in February, 5 days prior to the first workshop. Stickers with the program name, location, date, and time were also put on kids as they went home 1 week prior and 1 day prior to first workshop. Reminder fliers and stickers were also used for the remaining workshops.

Each workshop was based on the RD Facilitator Guide provided by Kids Eat Right. The workshops were presented by 2 dietetic interns under the supervision of a Registered Dietitian/Dietetic Internship Director. At each workshop parents and children were greeted upon arrival. Children went to a separate play area to be supervised by other dietetic interns during the workshop. Parents began completing the FNPA survey (Appendix B) upon arrival at the first session. If a parent was a new participant at the second session, an FNPA survey was completed. All attendees completed another FNPA survey at the fourth workshop as the post-evaluation. Refreshments were provided at each of the 4 workshops. At the first workshop attended, parents were given a program guidebook and kid-friendly cookbook and asked to bring them back to each workshop. As the workshop was being conducted and following the

completion of the FNPA surveys, data were entered in an online portal in order to provide parents with results at the completion of the first workshop. The Facilitator Guide was used at each workshop with a few adjustments made in order to tailor the message to the group of parents. Additional handouts were provided at each workshop to compliment the discussed material and the workbook. A cooking demonstration of a recipe from the kid-friendly cookbook was conducted at the conclusion of each workshop. Meals including the cooking demonstration recipe were offered to parents and children in attendance at each workshop as an added incentive. FNPA survey results were returned to parents and briefly discussed in general terms as a group, not individually. Phone calls were made to parents to remind them of upcoming workshops. Each workshop was conducted in a similar way.

Incentives in the form of door prizes were given at each session. Parents were encouraged to attend as many of the 4 workshops as possible in order to receive a monetary gift. A grant from the Kids Eat Right and the MetLife Foundation, worth $700.00, was used to provide incentives and purchase food and supplies to be used for the cooking demonstrations and refreshments. Additionally, Johnson City Head Start was awarded $250.00 for allowing the *RD Parent Empowerment Program* to be implemented in their facilities.

Survey Design and Data Collection

The Family Nutrition and Physical Activity (FNPA) survey tool was used for pre- and post-evaluations during the Kids Eat Right *RD Parent Empowerment Program*. The FNPA survey tool was formulated[15] and validated in 2009.[16] The FNPA screening tool was administered to those enrolled in the *RD Parent Empowerment Program* upon entry to assess high-risk areas related

to overweight and obesity within the population. Each participant (parent) received the results of his/her FNPA survey to identify individual areas of healthy behaviors and areas needing improvement. At the fourth workshop parents again completed the FNPA survey to determine if behaviors had changed over the course of the program. A comparison of surveys before and after the series of workshops was used to assess the effectiveness of the Kids Eat Right *RD Parent Empowerment Program* within the Johnson City Head Start Centers.

Study Sample

Parents, guardians, and primary caretakers of children enrolled in any of the 4 Johnson City Head Start Centers who were 18 years and older were eligible to participate in the Kids Eat Right *RD Parent Empowerment Program*. The study sample includes those who completed FNPA surveys at the first or second and fourth workshops.

Variable Selection

Pre- and post-evaluations from the Kids Eat Right *RD Parent Empowerment Program* were used to analyze demographics, total FNPA score, and individual questions from the survey tool. Analysis of individual questions related to: 1) family meal patterns of breakfast consumption and meals together, 2) food choices related to fruits and vegetables, 3) beverage choices related to sweetened beverages, and 4) restriction of child food choices.

Research Topics

The following research topics were assessed based on results of the pre- and post-evaluations of the *RD Parent Empowerment Program* using the FNPA survey tool:

1. Parents report an improvement in FNPA score after participating in the Kids Eat Right *RD Parent Empowerment Program*.
2. Parents report an improvement in positive dietary behaviors after participating in the Kids Eat Right *RD Parent Empowerment Program*. The following 4 of 10 FNPA constructs were evaluated:
    a. Family Meal Patterns
        i. My child eats breakfast.
        ii. Our family eats meals together.
    b. Food Choices
        i. My child eats fruits and vegetables at meals and snacks.
    c. Beverage Choices
        i. My child drinks soda pop or sugary drinks.
    d. Restriction and Reward
        i. Our family monitors eating of chips, cookies, and candy.

Institutional Review Board Approval

Institutional Review Board (IRB) approval was obtained for the Kids Eat Right *RD Parent Empowerment Program* to be conducted in Johnson City Head Start Centers from the Office of

Research and Sponsored Programs at East Tennessee State University. Exempt approval was granted in February 2013 (Appendix C).

Data Analysis

The Statistical Package for Social Sciences (SPSS), version 19.0 was used for all data analyses. Descriptive statistics were reported for demographic information. Paired samples t-tests were used to determine means and standard deviations (SD) for the group pre- and post-FNPA scores and the changes in desired behaviors.

CHAPTER 4

RESULTS AND DISCUSSION

Demographics

The *RD Parent Empowerment Program* conducted in partnership with Johnson City Head Start Centers invited 7 Head Start classrooms with approximately 15 students each for a total of 105 families to participate in the program. Thirteen parents attended either workshop 1 or 2, some attending both, with 12 completing the pre-assessment FNPA survey. One attendee chose not to complete a survey. Six parents continued attending the *RD Parent Empowerment Program* and completed the post-evaluation FNPA survey during workshop 4. This is a 50.0% completion rate for the *RD Parent Empowerment Program*. Three parents attended all 4 workshops. Attendance by workshop is shown in Table 4 and is further broken down by parent in Table 5.

Table 4: Attendance by workshop

	Workshop #			
	1	**2**	**3**	**4**
Attendance	8*	8	5	7*

*One person (the same person for both workshops) chose not to complete the survey

Table 5: Attendance by workshop with parent breakdown

Survey Number	#1	#2	#3	#4	Total
401	X	X	X	X	**4**
No Survey	X			X	**2**
402	X				**1**
403	X				**1**
404	X	X	X	X	**4**
405	X	X	X	X	**4**
406	X				**1**
407	X				**1**
526		X	X	X	**3**
527		X			**1**
529		X	X	X	**3**
530		X			**1**
531		X		X	**2**

Of the 6 individuals who only completed the pre-evaluation, 83.3% (n=5) were female and one attendee did not report gender. In relation to age ranges, 16.7% (n=1) were 18-24 years old and 35-44 years old each. Fifty percent (n=3) were 25-34 years old. One person (16.7%) did not report an age. Surveys were available in English and Spanish, with 83.3% (n=5) of participants completing an English survey and 16.7% (n=1) completing the Spanish version.

An additional 6 individuals completed both the pre- and post-evaluations. All participants with complete data were female, and also completed the English version of the survey (n=6, 100%). There was one participant (16.7%) in each of the 18-24 year old and 55-64 year old age categories. The remaining 4 participants (66.7%) were 25-34 years old. Demographic data are shown in Table 6.

Table 6: Demographics split by those who only completed a pre-evaluation and those with complete data (pre- and post-evaluation)

	Pre-evaluation data only		**Complete Data**	
	n	**%**	***n***	**%**
Parent Gender				
Male	0	0	0	0
Female	5	83.3	6	100
No Data	1	16.7	0	0
Parent Age				
18-24yrs	1	16.7	1	16.7
25-34yrs	3	50	4	66.7
35-44yrs	1	16.7	0	16.7
45-54yrs	0	0	0	0
55-64yrs	0	0	1	16.7
No Data	1	16.7	0	0
Survey Language				
English	5	83.3	6	100
Spanish	1	16.7	0	0

From this point forward, data are reflective of only the six participants with complete data.

Research Topics

Topic 1: Parents report an improvement in overall FNPA score after participating in the Kids Eat Right RD Parent Empowerment Program.

To answer this question, a paired sample t-test was used to analyze significance of change in FNPA survey score from the beginning of the program to its completion. A greater score on the FNPA survey tool is indicative of a healthier family. Improvement during the program would be seen as an overall increase in evaluation score. Five of the 6 parents improved their scores over the course of the program. The 5 parents who improved scores

attended 3 or 4 workshops, while the parent whose score decreased attended only the second and fourth workshops. The pre-evaluation and post-evaluation scores of the 6 parents with complete data are shown in Table 7.

Table 7: Pre-evaluation and post-evaluation FNPA score comparisons of complete data

Parent	Pre-Evaluation Score	Post-Evaluation Score
401	65	75
404	69	81
406	62	72
526	58	59
529	60	63
531	76	69

The mean score for the pre-evaluation was 65. The mean score for the post-evaluation was 69.83. Although an improvement in score was observed for the group, the change was not significant (P=0.163). Data are shown in Table 8.

Table 8: Paired sample t-test of pre- and post-evaluation FNPA survey tool scores

	Mean Pre-Evaluation	Mean Post-Evaluation	P value
Group	65	69.83	.163

*p value<.05

The lack of significance related to improvement in FNPA score during the *RD Parent Empowerment Program* is likely related to the sample size being extremely small. Such few data values decrease the likelihood of finding significance, although improvement was observed based on mean values. Additionally, the survey tool may not be specific enough to detect small behavior changes within the families. Other educational programs for parents of Head Start children with larger pools of participants reported significant increases in the nutritional health of the family following the intervention.[94,96] Positive changes in parent FNPA scores were

observed in the study done by Roofe in that the home environment became less obesigenic.[104] However, children were also educated in order to parallel parent education material in some studies,[94,104] a practice that was not done in the *RD Parent Empowerment Program*.

It was hypothesized that results of Research Topic 1 would show an improvement in FNPA score of parents that participated in all sessions of the Kids Eat Right *RD Parent Empowerment Program*. Data could not prove this to be statistically correct. However, data suggest that those who participated in 3 or 4 sessions of the *RD Parent Empowerment Program* maintained or improved their FNPA survey score upon program completion. The *RD Parent Empowerment Program* may be useful in providing parents with information as to how to incorporate healthy habits into their families.

Topic 2: Parents report an improvement in dietary behaviors after participating in the Kids Eat Right RD Parent Empowerment Program.

The following 4 constructs were evaluated using 5 questions from the FNPA survey tool: family meal patterns (breakfast consumption, eating family meals together), food choices (fruit and vegetable consumption), beverage choices (soda and sugary drink consumption), and restriction and reward (monitoring sweets and salty foods).

To determine improvement in dietary behaviors, survey responses were separated by question then analyzed using paired sample t-tests. Positive behaviors were designated as 4 on a scale of 1 to 4 for all questions with the exception of the "Beverages" question. The Beverages question was reverse coded on the survey. A score of 1 was most desirable for reverse coded

questions. Reverse coding was used in the FNPA survey tool so that a high score was not favorable for all answers. This was accounted for in the tallying of total score.[15,16]

Some behaviors remained consistent for many participants. The practices of usually or always eating breakfast and eating meals as a family did not change over the course of the program for 5 of the 6 families. As was true with the overall FNPA score, Parent 531 was the only participant who showed a decrease in positive behaviors related to breakfast consumption and eating meals as a family. The pre-evaluation means for both questions were 3.67. The post-evaluation means were 3.33 for both questions, showing a decrease in positive behavior. The decreases in means were due to the single values that decreased in each group. There was no statistically significant change in desired behavior (P=0.363). The behaviors related to breakfast consumption and family meals were representative of the FNPA survey construct "Family Meal Patterns." It was hypothesized that the child would eat breakfast most days of the week and that the family would eat meals together most days of the week. This cannot be assumed true because responses stayed the same for those who attended 3 or 4 workshops, and decreased for the participant who attended 2 workshops. It is important to note that the 5 parents with consistent responses at pre- and post-evaluation reported habits at baseline were desirable; therefore, little positive change was attainable.

The reported occurrence of fruit and vegetable intake at meals and snacks was less consistent as a result of the *RD Parent Empowerment Program*. Three parents reported no change in their children usually eating fruits and vegetables, while 1 parent reported an improvement and 2 parents reported to regress in the behavior. Pre-evaluation mean survey response was 3.17. Post-evaluation mean survey response was 2.83. There was not a significant

change in desired behavior (P=0.465) for the intake fruits and vegetables. It was hypothesized that the child would eat at least 3 servings of fruits/vegetables most days of the week. Upon completion of the *RD Parent Empowerment Program*, the quantitative evaluation of fruit and vegetable servings cannot be determined. Furthermore, it cannot be verified that the *RD Parent Empowerment Program* improved the behavior of children eating fruits and vegetables at meals and snacks.

The child's consumption of sweetened beverages including soda pop or sugary drinks was consistently reported as sometimes for 5 of the 6 families. The response for Parent 401 changed from "sometimes" at pre-evaluation to "usually" at post-evaluation. One explanation for the decrease in desired behavior for Parent 401 may be related to juice consumption. It is possible that at baseline, juice was not considered to be a sugary drink, but upon completion of the program, the use of juice was recognized as less desirable but the habit had not been changed. The mean pre-evaluation score for sweetened beverage intake was 2.00. The mean post-evaluation score for sweetened beverage intake was 2.17. Although an increase in mean was observed, this question was reverse coded and, therefore, a higher score indicates a decrease in desired behavior. There was no statistically significant change in desired behavior (P=0.363) for beverage choices of children. It was hypothesized that the child would decrease intake of soda pop or sugary beverages most days of the week. This hypothesis could not be proven, although most parents reported a consistently low intake of sweetened beverages.

In the FNPA survey food restriction practices are assessed using the statement: "Our family monitors the eating of chips, cookies, and candy."[15] Parents participating in the *RD Parent Empowerment Program* showed the greatest improvement on this question. Two

parents improved scores from “sometimes” (2) to “always” (4), while the remaining parents remained consistent in this practice usually or always. The pre-evaluation mean was 3.00, with a post-evaluation mean of 3.67. The improvement in score was not significant (P=0.175). There was no regression observed in this practice over the course of the program. The use of the word “monitors” in the survey questions may be an important factor as research does not necessarily support or discount the use of restriction as a healthy habit. Research does, however, suggest that children of parents who monitor the food choices of the child may exhibit healthier weights.[84] It was hypothesized that the family would decrease the consumption of chips, cookies, or candy most days of the week. Although the actual amount of these foods that were consumed cannot be assessed with the available data, the practice of monitoring the consumption was favorable.

Refer to Table 9 for scores of each survey question separated by participant. Statistical comparisons of mean scores using paired sample t-tests for each survey topic are shown in Table 10. Some scores were relatively high initially (3s and 4s, 2s for reverse coded question – indicating sometimes/always for positive behaviors) leaving little room for improvement. Furthermore, parents may have viewed their behaviors at baseline as healthy, while in reality they learned throughout the course of the program that there were improvements that could be made. This may have been translated as lower scores to some FNPA survey questions. Although no hypotheses could be confirmed, it is unlikely that participants’ families would become less healthy as a result of the *RD Parent Empowerment Program*.

Table 9: Change in survey results broken down by parent and survey question topic

	Pre-Evaluation Value	Post-Evaluation Value
401		
Breakfast	4	4
Family Meals	4	4
FV Intake	3	4
Beverages[a]	2	3
Restriction	4	4
404		
Breakfast	4	4
Family Meals	4	4
FV Intake	3	3
Beverages[a]	2	2
Restriction	2	4
405		
Breakfast	4	4
Family Meals	4	4
FV Intake	3	2
Beverages[a]	2	2
Restriction	2	4
526		
Breakfast	3	3
Family Meals	3	3
FV Intake	3	3
Beverages[a]	2	2
Restriction	3	3
529		
Breakfast	3	3
Family Meals	3	3
FV Intake	3	3
Beverages[a]	2	2
Restriction	3	3
531		
Breakfast	4	2
Family Meals	4	2
FV Intake	4	2
Beverages[a]	2	2
Restriction	4	4

[a]Reverse coded - desired behavior is "Never (1)/Sometimes(2)"; all other desired behaviors are "Usually(3)/Always(4)"

Table 10: Change in desired behavior of group over course of program

	Pre-Evaluation Mean	Post-Evaluation Mean	p value
Breakfast	3.67	3.33	.363
Family Meals	3.67	3.33	.363
FV Intake	3.17	2.83	.465
Beverages[a]	2.00	2.17	.363
Restriction	3.00	3.67	.175

*p value<.05

[a]Reverse coded - desired behavior is "Never/Sometimes"; all other desired behaviors are "Usually/Always"

Limitations

The *RD Parent Empowerment Program* conducted in Johnson City, TN in partnership with Head Start had some limitations. First, the sample size was small. Of the approximately 105 families that were invited to participate in the program, 13 began the program and 6 completed it. Only 3 parents attended all 4 workshops. Each workshop of the *RD Parent Empowerment Program* was conducted only once. The times were consistently on Thursday evenings and may have conflicted with potential participants' schedules. Furthermore, the sample was convenient and participation was voluntary. Parents who chose to participate may have already been motivated to live a healthy life and those truly in need of education for behavior change were not present. There was no control group and no blinding was used during the study. Participants were aware that their evaluation results would be used for comparison and may have provided untrue answers in order to appear healthier than reality. Possible data entry errors may have skewed results. There were no male parents involved in the study. Additional demographics, like race and income level, as well as anthropometric data were limited due to the inclusion in a larger research study that did not have approval to collect

this information. Finally, the use of incentives in the form of gift cards, door prizes, childcare, and food may have influenced participants.

CHAPTER 5

CONCLUSIONS

The purpose of this study was to assess the effectiveness of the implementation of the Kids Eat Right *RD Parent Empowerment Program* in Johnson City, TN Head Start Centers. The program provides parents with information to assist in integrating healthy habits into their families. The Family Nutrition and Physical Activity screening tool was used as the assessment tool for family habits prior to beginning the 4-session parent education program and upon completion of the program. Initiating healthy habits in families may help combat obesity rates among preschool children that are reported to be as high as 10.4-18.4% of US children.[1,2] Families of preschool children in Johnson City, TN are especially likely to benefit from nutrition education programming because schools in the area exhibit childhood obesity rates between 36.5 and 42%.[6] Poverty is also a concern in the area with 20.8% of children living in that socioeconomic classification.[9] Head Start was selected as the target for the *RD Parent Empowerment Program* based on enrollment criteria with the assumption that those benefitting from the program would be of low SES. Low SES is often associated with decreased access to healthy foods and low levels of nutrition education among parents. Conducting the *RD Parent Empowerment Program* in a Head Start community potentially reaches those in greatest need of nutrition information. Preschool children rely heavily on parents and caretakers to meet daily nutritional needs.[12] Breakfast consumption, eating meals together as a family, fruit and vegetable intake, beverage choices, and food restriction are focuses in this study, as well as overall family nutrition and health habits.

Although data from the *RD Parent Empowerment Program* do not indicate statistically significant changes in overall or specific dietary behaviors of families, a closer look at individual participants shows promising results. Total FNPA survey scores increased for 5 of the 6 participants upon completion of the program. Those with improved scores attended 3 or 4 of the 4 programs. Increased participation correlated to improved scores.

Most participants reported that the child usually or always ate breakfast and that meals were usually or always consumed as a family. This positive behavior did not change for 5 of 6 participants, suggesting that habits did not regress and also had little room for improvement across the span of the program. Low consumption of sweetened beverages was also evident at baseline. One participant reported to increase consumption of sweetened beverages at the conclusion of the program. It is possible that this negative behavior change was related to the recognition of juice as a sweetened beverage, although this is a speculated explanation based on parent group discussions.

No pattern related to the consumption of fruits and vegetables was exhibited over the course of the *RD Parent Empowerment Program*. Families reported increases, decreases, and maintenance of how often fruits and vegetables were included in meals and snacks. Parents completing the *RD Parent Empowerment Program* reported to generally increase the amount of monitoring practiced in their families related to the intake of chips, cookies, and candy upon completion of the programs.

Future efforts of the *RD Parent Empowerment Program* should focus on increasing parent participation. Adding more sites in which the program could be implemented at is one way to accomplish this. Furthermore, conducting each workshop more than once could

increase participation. Additional advertising and promotion of incentives to be provided might also increase participation. Increasing the amount of data collected could allow for stronger conclusions to be drawn related to the effectiveness of the program. Anthropometrics of parents and children would provide data that could be more equally compared to previously completed studies of parent education programs. Although the FNPA survey tool is relatively easy to use and quickly administered, it may not be specific enough to gauge behavior changes. Follow-up questions and/or the use of interviews or focus groups may provide more detailed insight on minor, yet beneficial, behavior changes that families make over the course of the program. Following up with parents who completed the *RD Parent Empowerment Program* 4-6 months after program completion would allow for the analysis of behavior maintenance in families. Communities should consider implementing the *RD Parent Empowerment Program* combined with long-term follow-up efforts for families with young children in order to instill healthy habits at a young age in hopes those habits continuing throughout life.

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APPENDICES

Appendix A

8 Habits of Healthy Kids

8 Habits of Healthy Kids[14]

Habit Number	Habit
1	Be physically active at least 1 hour a day
2	Spend less than 2 hours a day playing video, computer and cell phone games or watching TV
3	Eat a healthy breakfast every day
4	Eat vegetables and fruits at all meals and snacks
5	Make time for healthy family meals at home
6	Be wise about portion size
7	Drink water, low-fat or fat-free milk instead of soft drinks and other sweetened beverages
8	Ensure regular bedtime for your children and teens to include at least 9 hours of sleep every night

Appendix B

FNPA Survey Tool

RD Parent Empowerment (EN) http://rdpe_en.eatright-fnpa.org/public/partner.cfm

Consent Form

The Family Nutrition and Physical Activity Screening Tool is provided for your use by the **Academy of Nutrition and Dietetics Foundation**. It was developed in partnership with Iowa State University.

By using this tool, you agree to provide valid and accurate information. The primary purpose of this tool is to provide you with information that may be helpful for you and your family. Your completion of this brief survey provides your consent to allow the Academy Foundation to combine your data with others so that reports can be created and averages may be calculated. The data will be summarized, however, it will not be individually identified.

❑ **I Agree, Start Survey**

Demographics

Child's Age: _____
Child's Gender: ❑ Male ❑ Female
Parent/Guardian's Age: _____
Parent/Guardian's Gender: ❑ Male ❑ Female
Workshop Leader: _____
Workshop Date: _____
How many RD Parent Empowerment workshops have you attended:
❑ 1, this is my first workshop ❑ 2, including this workshop
❑ 3, including this workshop ❑ 4, including this workshop

Family Meals

My child eats breakfast at home or at school: **❑ Never ❑ Sometimes ❑ Usually ❑ Always**

Our family eats meals together: **❑ Never ❑ Sometimes ❑ Usually ❑ Always**

Family Eating Habits

Our family eats while watching TV: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Our family eats fast food: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Food Choices

Our family uses pre-prepared, heat-and-serve meals such as microwave dinners, frozen pizza, or macaroni-and-cheese: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

My child eats fruits and vegetables at meals or snacks: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Beverage Choices

My child drinks soda pop or sweetened beverages: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

My child drinks 1% or non-fat milk at meals or snacks: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Restriction / Reward

Our family monitors eating of chips, cookies, and candy: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Our family uses candy, ice cream or other foods as a reward for good behavior: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Screen Time and Monitoring

My child spends less than 2 hours on TV, video games and/or computer per day: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Our family limits the amount of TV our child watches: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Healthy Environment

Our family allows our child to watch TV in their bedroom: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

I find time to exercise every day for my health: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Family Activity Involvement

Our family encourages our child to be active every day: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Our family does physical activity together for example playing in the park, playing soccer, or dancing at home: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Section: Child Activity Involvement

My child does physical activity during his/her free time: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

My child is enrolled in sports or activities with a coach or leader: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Section: Family Routine

Our family has a daily routine for our child's bedtime: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

My child gets 9 hours of sleep a night: ❑ **Never** ❑ **Sometimes** ❑ **Usually** ❑ **Always**

Appendix C

IRB Approval

East Tennessee State University
Office for the Protection of Human Research Subjects • Box 70565 • Johnson City, Tennessee 37614-1707
Phone: (423) 439-6053 Fax: (423) 439-6060

IRB APPROVAL Initial Exempt

February 25, 2013

Ms. Michelle Lee
Dept of Allied Health
P.O. Box 70690
Johnson City, TN 37614

RE: The Effectiveness of the Implementation of the Kids Eat Right RD Parent Empowerment Program at Johnson City Head Start Centers
IRB#: 0213.20
ORSPA#: ,

On , an exempt approval was granted in accordance with 45 CFR 46. 101(b)(2). It is understood this project will be conducted in full accordance with all applicable sections of the IRB Policies. No continuing review is required. The exempt approval will be reported to the convened board on the next agenda.

- New exempt submission form, CV, Dear Parent letter, Flyer, Questionnaire, Data collection sheet

Projects involving Mountain States Health Alliance must also be approved by MSHA following IRB approval prior to initiating the study.

Unanticipated Problems Involving Risks to Subjects or Others must be reported to the IRB (and VA R&D if applicable) within 10 working days.

Proposed changes in approved research cannot be initiated without IRB review and approval. The only exception to this rule is that a change can be made prior to IRB approval when necessary to eliminate apparent immediate hazards to the research subjects [21 CFR 56.108 (a)(4)]. In such a case, the IRB must be promptly informed of the change following its implementation (within 10 working days) on Form 109 (www.etsu.edu/irb). The IRB will review the change to determine that it is consistent with ensuring the subject's continued welfare.

Full AAHRPP Accreditation

Accredited Since December 2013

Sincerely,
George Youngberg, M.D., Chair
ETSU/VA Medical IRB

Cc:

VITA

EMILY MICHELLE STERN

Education:

Red Lion Area School District, Red Lion, Pennsylvania

B.S. Nutrition and Foods, Appalachian State University, Boone, North Carolina, 2012

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Lee, Michelle L, Bevins, Jessica, Clark, Jordan, **Stern, Emily**, and Taylor, Samantha. (2013). A perspective into decisions, habits, and knowledge of eating behaviors of college students. Journal of the Academy of Nutrition and Dietetics, 113(Suppl. 3), A24.

Lee, Michelle L, Bevins, Jessica, Clark, Jordan, **Stern, Emily**, and Taylor, Samantha. A perspective into decisions, habits, and knowledge of eating behaviors of college students. [poster] The Academy of Nutrition and Dietetics Food and Nutrition Conference and Exhibition, Houston, TX. October 20, 2013.