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Parent Nutrition Education and the Influence on Family Lifestyle Behavior Changes

Kelsey Rich
Utah State University

PARENT NUTRITION EDUCATION AND THE INFLUENCE ON FAMILY LIFESTYLE BEHAVIOR CHANGES

by

Kelsey Rich

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Approved:

Heidi LeBlanc, MS, CFCS Major Professor	Lisa Boyce, PhD Committee Member
Janet Anderson, MS, RD Committee Member	Debra Christofferson, MDA, RD Committee Member

Mark R. McLellan, PhD
Vice President for Research and
Dean of the School of Graduate Studies

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ABSTRACT

Parent Nutrition Education and the Influence on Family

Lifestyle Behavior Changes

by

Kelsey Rich, Master of Science

Utah State University, 2012

Major Professor: Heidi LeBlanc, MS
Department: Nutrition, Dietetics, and Food Sciences

Recently, childhood overweight and obesity has reached epidemic proportions. The co-morbidities associated with adult obesity are now being seen in the pediatric population; therefore, there is a call for preventative efforts. A diet high in fruits, vegetables, and whole grains in conjunction with an active lifestyle discourages the presence of obesity. Currently, most childhood obesity prevention efforts have taken place in the school setting and have only had short-term success. For long-term success, obesity prevention programs need to involve parents and be implemented in a wide range of settings, including the home. This study was developed to assess the effectiveness of parent nutrition education in changing family lifestyle behaviors. It incorporated current

research findings on childhood obesity prevention by involving parents in the intervention via nutrition education workshops. Parents participated by attending group classes or by viewing the lessons on a computer at home. Lessons were taught to 28 parents with children aged infant through 5 years by nutrition education assistants (NEAs) from the Supplemental Nutrition Assistance Program (SNAP). Fourteen of the parents had 3-5 year-old children who were receiving hands-on nutrition education and food exposures in their preschool classrooms as part of another study. The topics of the parent nutrition lessons included: overcoming barriers to family mealtime; feeding preschoolers: introduction to new foods; meal planning and quick meals; and incorporating whole foods into family mealtime. The parent nutrition education taught healthy lifestyle behaviors and encouraged the whole family to make small changes together, creating a successful environment. Completion of parent nutrition education resulted in significant changes in family lifestyle behaviors, average body mass index (BMI) of the parents, and nutrition knowledge. Children had significant changes in fruit, vegetable, protein, beans, dairy, refined grain, discretionary calories, and oil consumption. Results suggest that SNAP-Ed parent nutrition education was effective at improving family lifestyle behaviors, decreasing parent BMI, increasing parent nutrition knowledge, and improving dietary quality in children. The analysis of this study has led to the development of a program model that can be shared with other Extension service programs in other states to aid in the fight against childhood obesity.

PUBLIC ABSTRACT

Parent Nutrition Education and the Influence on Family

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Kelsey Rich, Master of Science

Utah State University in the collaboration with the Supplemental Nutrition Assistance Program-Education (SNAP-Ed) proposes to develop and implement a program to help families develop healthy eating habits and lifestyle behaviors. Recently, childhood overweight and obesity has reached epidemic proportions. The diseases associated with adult obesity are now being seen in the pediatric population; therefore, there is a call for preventative efforts. A diet high in fruits, vegetables, and whole grains in combination with an active lifestyle discourages the presence of obesity. Currently, most childhood obesity prevention efforts have taken place in the school setting and have only had short term success. For long term success, obesity prevention programs need to involve parents and be implemented in a wide range of settings, including the home.

The proposed program will consist of 4 parent lessons written by nutrition professionals and the lessons will be assessed to determine their effectiveness in changing family lifestyle behaviors. Parents will be able to participate in lessons via in-class group lessons or at home online. Nutrition education assistants employed through SNAP-Ed will teach the lessons. If effective, the proposed program will be capable of being repeated in various locations and shared with other Extension service programs across the nation.

The project team proposes a 2-year, $2200 project to promote healthy family lifestyle behaviors changes, which in turn will help in the prevention of childhood obesity. It was estimated that by the year 2020, Americans will spend approximately 320 billion dollars per year on obesity. The small cost of the proposed program is small in comparison to the costs associated with obesity and is capable of having a large impact.

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INTRODUCTION

Background

In recent years, the occurrence of children becoming overweight or obese has increased. Due to the detrimental health consequences associated with obesity, there is a call for preventative efforts.[1] The Expert Committee on the Prevention, Assessment, and Treatment of Child and Adolescent Overweight and Obesity defines obesity as a body mass index (BMI) $\geq 95^{th}$ percentile and overweight as a BMI between the 85^{th} and 94^{th} percentile.[2] This study was developed to assess the effectiveness of parent nutrition education in changing family lifestyle behaviors, which in turn, will help to prevent the development of childhood obesity. A total of 28 parents participated in this study. Of the 28 participants, 14 parents had 3-5 year old children participating in a nutrition study that involved food exposures and hands-on nutrition lessons in their preschool class.

Hypotheses and Objectives

Hypotheses

1. The series of Supplemental Nutrition Assistance Program-Education (SNAP-Ed) parent nutrition education workshops will lead to a change in family lifestyle behaviors which will help prevent childhood obesity.
2. Families who have children participating in hands-on nutrition lessons and food exposures at preschool in conjunction with the parent nutrition education workshops will have a greater increase in fruit, vegetable, and whole grain

consumption compared to families who only receive the series of parent nutrition education.

Objectives

1. Improve lifestyle behaviors among families through a series of SNAP-Ed parent nutrition education.
2. Determine if fruit, vegetable and whole grain consumption is greater when interventions are applied to a wide range of settings (i.e. parent nutrition lessons in conjunction with preschooler nutrition education).
3. Implement a SNAP-Ed Extension Service program that is effective in the prevention of childhood obesity and can be repeated at various locations.

The results of these objectives will be discussed in chapters two and three.

Review of Literature

Childhood Obesity

Overweight and obesity among children is an epidemic, not only in North America, but internationally.[3] The increase in childhood obesity prevalence has been seen in preschool children to adolescents. In the United States, those from racial and ethnic minorities have been particularly been affected by the obesity epidemic. *The 2010 Dietary Guidelines for Americans* reported that 32% of children and adolescents between the ages of 2 and 19 years are overweight or obese, with 17% of children being obese.[4] Similarly, the 2009 Pediatric Nutrition Surveillance System (PedNSS) reported the prevalence of obesity among children from birth to age four was 14.7%. This is a 2.3%

increase compared to children of similar ages from 2003-2006. Additionally, the PedNSS reported a higher prevalence of obesity among American Indian and Alaska Native (20.7%) and Hispanic (17.9%) children and a lower prevalence among white (12.3%), black (11.9%), and Asian or Pacific Islander (11.9%) children.[1]

Overweight and obesity are independent risk factors for morbidity and mortality throughout an individual's life span. The co-morbidities associated with overweight and obesity in the adult population are similar to those seen in the pediatric population. Hypertension, type 2 diabetes, and dyslipidemia are now frequently seen in overweight and obese children. Currently, type 2 diabetes is the most prevalent form of diabetes in adolescents and children.[3] Until recently, these co-morbidities were typically only seen in the adult population.[4] Being overweight or obese during childhood increases the duration that an individual will have to live with co-morbidities associated with obesity by one or two decades and will increase their risk of obtaining many adult diseases. Overweight and obesity in the pediatric population is also associated with psychological and behavioral problems. The psychological problems associated with obesity include: negative self-esteem, withdrawal from peer interaction, depression, anxiety, and the feeling of chronic rejection.[3]

Obesity is the result of genetic and environmental interactions (i.e. excessive caloric intake and sedentary lifestyle).[5] Studies of twins brought up in different environments have shown that genes determine 60-85% of the predisposition for obesity development. Twin studies have also provided additional insight into the metabolic mechanisms for physiologic risk by aiding in the discovery of leptin, ghrelin,

adiponectin, and other hormones that influence appetite, satiety, and fat distribution.[2] In most cases the genes for obesity are expressed in environments that encourage their expression.[6] During early childhood, adaptability is high and genetic potential can be adjusted to result in incongruous phenotypes, depending on environmental factors.[7] Therefore, "a child's genetic make-up 'loads the gun' and their environment 'pulls the trigger.'"[6]

Studies have shown that the risk for adult obesity in both non-obese and obese children increases if at least one parent is overweight. However, for children who are 10 years old or older, the child's own obesity or overweight status was a better predictor of adult obesity than having an overweight parent.[3] Data from longitudinal studies show the prediction for adult weight status was most accurate for BMI at the age of 18, accuracy of this prediction decreased for BMI at the age of 13. From this, it can be concluded that the age of a child when obesity presents itself increases the probability that obesity will follow them into adulthood.[3]

The increase in obesity prevalence is too rapid to be explained by a genetic shift. Rather, it is largely due to lifestyle behavior changes that have caused an imbalance of energy.[2] Economic, social, and technological advances that have emerged in the last few decades and inexpensive, calorie dense foods are now readily available.[8] Labor-saving equipment has significantly reduced the amount of physical activity and electronic devices have found their way into homes, encouraging a more sedentary lifestyle.[8] Sedentary habits have been associated with obesity due to decreased energy expenditure. The results of a cross sectional study performed in Europe suggested a dose response

correlation with the amount of time spent in front of the television and the level of obesity. Obesity has been positively associated with the amount of time spent in a vehicle, sitting, in front of the television, and playing electronic games.[9]

Appetitive traits, such as internal satiety cues, smell and taste of palatable foods, rewards from eating preferred foods, and food preferences have been recognized as having an impact on a child's intake, and therefore, influence their weight status. Many of these traits are strongly influenced by both genetics and the environment. A study with twin adults discovered that as much as 69% of eating behaviors may be genetically determined. Other research done with children has shown that eating without the presence of hunger is influenced equally by genetics and the environment.[10] It has become clear that childhood obesity treatment must focus on both the child and his/her environment to be successful. Additionally, successful childhood obesity prevention will require a far-reaching public health program.[6]

Prevention Efforts

Prevention should be the primary goal with childhood obesity. If successful, obesity in the adult population will also decrease.[3] Modifiable and non-modifiable risk factors both play a role in the childhood obesity epidemic. Modifiable risk factors for children include lack of regular exercise, excessive television viewing or computer usage, low family income, non-working parents, over-consumption of high calorie foods, unconscious snacking/eating, and over-exposure to high caloric food advertisements. The most common non-modifiable risk factor is genetics. Intervention programs aimed at childhood obesity are often focused on the modifiable risk factors.[11] Intervention

programs utilize behavior modification techniques to promote lifelong lifestyle changes. In addition, parent involvement in behavior modification programs has a larger impact than those with little or no parent involvement.[12]

Lifestyle modification involves both behavioral and cognitive changes. Lifestyle modification emphasizes long term lifestyle and behavior change and encourages increased caloric expenditure while decreasing caloric intake.[13] Evidence suggests that encouraged consumption of low caloric dense foods and discouraged consumption of high caloric dense foods leads to small positive changes. Placing an emphasis on the consumption of plant based foods, vegetables, and fruits are major steps in decreasing energy-dense food intake.[3] Consumption of small, frequent meals may also be influential in decreasing caloric intake.[14]

In addition to encouraged healthy eating habits, physical activity should be promoted.[14] *The 2008 Physical Activity Guidelines for Americans*[15] recommends that children and adolescents participate in at least one hour of physical activity daily. Physical activity should be of either moderate or vigorous intensity. Sedentary activities should be discouraged.[15] The American Academy of Pediatrics recommends that children two years of age or older should spend no more than 2 hours a day watching television or participating in other forms of entertainment media.[14]

Obesity Prevention Settings

Most obesity prevention interventions to date have taken place solely in schools. These interventions have had limited short-term success.[16] Additionally, despite the evidence that early intervention may have life-long success on obesity risk, few attempts

have been made to establish preventative efforts in early development settings. Most childhood obesity interventions have taken place in older children and adolescents and have only resulted in short-term success.[7]

Obesity Reviews, the official journal for the International Association for the Study of Obesity, publishes obesity related papers from all disciplines. In 2010, the *Obesity Reviews* examined 17 studies published from 1998-2008. From the 17 studies, 11 studies were considered effective. The studies that had effective interventions had similar qualities: better study quality, parental involvement, restructure of home environment, prompt self-monitoring, and specific goal setting. Obesity prevention efforts need to be implemented in a range of settings, including the home, to have long-term success and sustainability.[16]

Family Mealtime and Obesity

There is clear evidence that the frequency of family mealtime is positively associated with the quality of dietary intake. Frequency of family mealtime is associated with increased intakes of fruits, vegetables, grains, and calcium-rich foods and decreased soft drink consumption.[17] In a family mealtime study by Fulkerson,[18] parents reported the challenges and desired areas for change concerning family mealtime. The most frequently desired areas of change were: 1) meal planning, food preparation, and meal clean-up, 2) more time to plan and eat at mealtime, 3) less food pickiness among children, 4) quick and nutritionally balanced meal ideas, and 5) less conflict at mealtime.[18] Helping families overcome the perceived challenges of family mealtime will facilitate an environment where family mealtime can become a consistent priority.

Children are genetically predisposed to accept substances that are sweet and salty. In addition to a child's preference for sweet and salty, children are also predisposed to neophobia, or the fear of new foods. As a result, children's diets typically lack variety. Children can learn to overcome neophobia and become comfortable to try new foods to increase the variety in their diet.[19] A study that compared actual intake of 3,300 children and adolescents to the nutrition recommendations set by the United States Department of Agriculture (USDA) found that children do not consume enough fruits, vegetables, and grains. Additionally, approximately 50% of children's total energy intake came from discretionary fat and sugar consumption.[19] Similarly, *the 2010 Dietary Guidelines for Americans* reported that several cross sectional surveys on children in the United States have found inadequate dietary fiber intake.[20] Low fiber intake is associated with low fruit, vegetable, and whole grain consumption.[4, 20] Family mealtime during childhood encourages lifelong healthy food habits, which can aid in the prevention of obesity.

Parental Role in Childhood Obesity Prevention

Parent involvement is a key component in childhood obesity prevention interventions. Parents are the role models and providers of food and physical activity opportunities.[16] Physical activity and dietary habits are established during the early years of life.[14] Thus, parent involvement has powerful effects on a child's perceptions and behaviors towards food and physical activity.[16] During early childhood, children are constantly being introduced to new foods. Neophobia and the initial rejection of new foods is a normal behavior in preschool aged children.[21] Research has shown that it can take 8 to 12 exposures to a new food before a child will develop a preference and

consume that food item.[8] Feeding practices are intended to promote positive and healthy eating behaviors that will foster a child's development; however these practices may produce unintended negative consequences.[21] Therefore, parent's role in the feeding process should be examined when researching the influences on child weight status.

Parents are key players in the development of childhood obesity because they directly influence the child's genetic potential and their environment.[10] Parents determine what foods are offered to their children and provide the atmosphere in which children are eating.[21] Research has shown a strong correlation between parental food preferences and their child's food preferences, particularly with fruits, vegetables, sweetened beverages, and meats. Young children learn about eating and foods by watching the eating habits and food preferences of their parents and/or caregivers. Research has demonstrated that children are more likely to eat an unfamiliar food item after watching their mother consume the same food item. These findings, with the findings of other research studies, suggest that parental influence can play a significant role in the prevention of childhood obesity by establishing healthy eating behaviors in their children. Additionally, parents are solely responsible for purchasing and preparing healthy-good quality food for their children.[10] A measure of parental influence on the child's eating behaviors is a necessary component of future childhood obesity research.

Not only can a parent's food preferences influence their child's intake, but also their child-feeding parenting style can impact the eating behaviors of their child. There are two main child-feeding parenting styles: authoritative and authoritarian. The authoritative parenting style focuses on child-centered feeding.[10] Parents set clear, age

appropriate expectations for children at mealtimes, but are responsive to the messages the child sends. The authoritarian parent style focuses on parent-centered feeding. Like the authoritative parenting style, there is a high level of parental control over eating. However, with the authoritarian parenting, there is a low level of response to the messages the child sends during feeding, including their internal hunger and satiety signals. Research has shown that authoritative parenting is generally associated with a lower risk of child obesity and with an improved intake of wholesome foods compared to authoritarian parenting. Other research has shown that authoritarian parent style is associated with fivefold increased risk of obesity. On the other extreme, neglectful or permissive parenting had a twofold increased risk of obesity.[10]

Research has shown that parent-child feeding interactions during feeding play an important role in shaping a child's food preferences and eating behaviors. Child feeding practices are defined as behavior strategies that aim to control a child's eating behaviors. Child feeding practices can include: modeling eating behaviors, pressuring a child to eat certain foods or meals, rewarding children with energy dense foods, and determining the availability and accessibility of certain foods.[10]

It has been found that use of controlling feeding practices (coercing, rewarding, pressuring) has a negative impact on a child's acceptance of foods and his/her eating behaviors. For example, a child's preference for reward food is increased when he/she is rewarded with a brownie after eating vegetables. Likewise, pressuring children to consume fruits and vegetables is associated with decreased fruit and vegetable intake and picky eating in children.[21]

Research has also shown that parents are less successful in regulating caloric intake when they utilize external cues, such as an empty plate, rather than listening to their child's internal cues of hunger and satiety. For example, children who are instructed to clean their plate after stating they are full consume a greater number of calories than children who are allowed to eat when they are hungry and stop when they are full. Therefore, it is clear that child-feeding practices demonstrated by a caregiver can have a positive or negative impact on a child's weight status.[10]

Purpose of Program Implementation

Decreasing the prevalence of obesity is a high priority for government officials and health care providers. Unlike the majority of previous childhood obesity prevention studies to date, this study focused on prevention during early development with parental involvement. Evidence suggests that for long-term obesity prevention success both parental involvement and program implementation during the early childhood years are necessary. This study incorporated current research findings on childhood obesity prevention by involving parents with children aged infant to five years in the intervention via nutrition education workshops.

Some of the parents involved in this study also had children who received hands-on education and food exposures in their preschool class. Parent involvement in these nutrition workshops encouraged lifestyle changes to take place at a young age. In this study, parents received a series of nutrition education from SNAP-Ed. The goal of SNAP–Ed "is to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent

with the current Dietary Guidelines for Americans and MyPlate." SNAP-Ed focuses on 1) health promotion and 2) primary prevention of chronic disease by establishing healthy eating and physical activity habits. The USDA Food and Nutrition Service encourages each State to focus their SNAP-Ed efforts on behavior modifications such as: consuming a balanced diet by following MyPlate and *Dietary Guidelines for Americans*, increasing physical activity and decreasing sedentary habits, and maintaining an appropriate calorie balance for age.[22] The nutrition education was designed to help families overcome the perceived barriers of family mealtime and encouraged the development of healthy eating behaviors.

Participants took part in 4 nutrition lessons over the course of 3 to 4 months. Lesson one reviewed the importance of family mealtime and discussed suggestions on how to overcome the common barriers of family mealtime. Lesson two discussed the mealtime environment, proper behavior at the table, new food introductions at the table, picky eating in children, planned mealtime and snacks, and physical activity. The third lesson discussed planning balanced nutritious meals, grocery shopping on a budget, and quick meal preparation and ideas. The last lesson discussed how to incorporate whole foods such as, fruits, vegetables, and whole grains into family mealtime.

This simple method to prevent childhood obesity through parent and child nutrition workshops taught healthy lifestyle behaviors and encouraged the whole family to make small changes together, creating a successful environment. The analysis of this study has led to development of a program model that can be shared with other Extension

service programs in other states, and with child nutrition programs within and outside of Utah.

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CHAPTER 2

EFFECTS OF PARENT NUTRITION EDUCATION ON LIFESTYLE BEHAVIOR CHANGES

Abstract

Objective: 1) Improve lifestyle behaviors among families with preschool children. 2) Implement a Supplemental Nutrition Assistance Program-Education (SNAP-Ed) Extension Service program in an effort to prevent childhood obesity and that can be repeated at various locations.

Design: Observational study that looked at the impact of a series of parent nutrition lessons on changing family lifestyle behaviors.

Setting: Dolores Dore Early Care and Education Center, Best Friends Child Development Center, and Up to 3 Early Intervention.

Participants: Parents with young children aged infant to five (n=28).

Interventions: A series of 1-hour nutrition lessons.

Variables Measured: The level of family lifestyle behavior change after participating in a series of parent nutrition lessons.

Analysis: Paired dependent t-tests pre- to post-test and Analysis of Variance (ANOVA) between groups.

Results: Completion of parent nutrition education resulted in significant changes in family lifestyle behaviors, average parent body mass index (BMI), and nutrition knowledge.

Conclusion and Implications: Parent nutrition education improved family lifestyle behaviors, decreased parent BMI, and increased parent nutrition knowledge.

Keywords: obesity; BMI; family lifestyle; fruit; vegetables; grain; feeding behavior; SNAP-Ed.

Introduction

In recent decades, the incidence of overweight and obesity among young children has increased. *The 2010 Dietary Guidelines for Americans* reported that 32% of children and adolescents between the ages of 2 and 19 years are overweight or obese, with 17% of children being obese. Hypertension, type 2 diabetes, and dyslipidemia are now frequently seen in overweight and obese children. Until recently, these co-morbidities were typically only seen in the adult population.[1] Due to the detrimental health consequences associated with obesity, decreasing its prevalence is a high priority for government officials and health care providers.[2]

Childhood obesity prevention programs should utilize behavior modification techniques to promote lifelong lifestyle changes.[3] Lifestyle modification places emphasis on long term lifestyle and behavior change and encourages increased energy expenditure while decreasing caloric intake.[4] Increased consumption of plant-based foods including: fruits, vegetables, and whole grains are major steps that can decrease caloric intake. However, most children consume excessive amounts of fat and sugar and do not consume enough fruits, vegetables, and whole grains.[4]

It has been found that the frequency of family mealtime is associated with increased intakes of fruits, vegetables, and grains, and decreased soft drink consumption.[5] In a family mealtime study by Fulkerson[6], parents reported the challenges of family mealtime. The most frequent challenges dealt with meal planning, busy schedules, picky eating among children, lack of quick and healthful meal ideas, and family conflict.[6] The

perceived challenges of family mealtime need to be overcome in order for family mealtime to become a consistent priority.

To date, the majority of childhood obesity interventions have had short-term success and have occurred in schools with older children and adolescents.[7, 8] Evidence suggests that eating behaviors are learned at an early age, and therefore, preventative efforts during early childhood may have life-long success in preventing obesity.[8] Additionally, previous studies have shown that interventions that involved parents were more effective. It is clear that obesity prevention efforts need to be implemented in a wide range of settings, including the home, to have long-term success and sustainability.[8]

This study was conducted to evaluate the effectiveness of parent nutrition education on changing family lifestyle behaviors associated with childhood obesity. These behaviors include: frequency of family mealtime, physical activity, and healthy eating behaviors. Unlike the majority of obesity prevention studies to this point, this intervention was solely given to parents with young children aged infant to five years. Twenty-eight parents completed this study, 14 of which had 3-5 year-old children who were involved in a study where they received hands-on nutrition education and food exposures in their preschool classroom. The objectives of this study were to: 1) Improve lifestyle behaviors among families through a series of parent nutrition education workshops and 2) Implement a Supplemental Nutrition Assistance Program-Education (SNAP-Ed) Extension Service program in an effort to prevent childhood obesity and that can be repeated at various locations. The goal of SNAP–Ed "is to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current Dietary Guidelines for

Americans and MyPlate." SNAP-Ed focuses on 1) health promotion and 2) primary prevention of chronic disease by establishing healthy eating and physical activity habits. The USDA Food and Nutrition Service encourages each State to focus their SNAP-Ed efforts on behavior modifications such as: consuming a balanced diet by following MyPlate and *Dietary Guidelines for Americans*, increasing physical activity and decreasing sedentary habits, and maintaining an appropriate calorie balance for age.[9] It was hypothesized that the series of SNAP-Ed parent nutrition education would lead to a change in family lifestyle behaviors and aid in the prevention of childhood obesity.

Methods

Subjects

The series of nutrition education was developed for parents of young children between the ages of infant to five years. Three hundred and eight parents were recruited from Dolores Dore Early Care and Education (DDE Center), Best Friends Child Development Center (Best Friends CDC), and Up to 3 Early Intervention. Parents with children aged infant through five years who were not associated with the above programs above but wanted to be involved were also allowed to participate. A power analysis procedure was performed using SAS (version 9.2, SAS Institute, Inc., Cary, NC, 2008). The power analysis procedure determined that a sample size of at least 17 was needed. Fifty-two of the recruited parents completed pre-evaluation forms and 28 completed pre- and post-evaluations and the series of nutrition education.

DDE Center is located in Logan, Utah on Utah State University's campus. They provide care for children of students, staff, or faculty of Utah State University. Best

Friends CDC is located in Logan, Utah on the campus of Logan Regional Hospital. They care for young children of Intermountain Healthcare Employees. The main office of Up to 3 Early Intervention program is located in Logan, Utah on the campus of Utah State University. The Up to 3 Early Intervention program provides services to families with children under the age of 3 with developmental delays, disabilities, or diagnosed conditions with a high probability of resulting developmental delays.

It is important to note that the 3-5 year-old children at the DDE Center and Best Friends CDC were involved in a nutrition study that occurred in the same time frame as this study. In the preschool nutrition study, the children received hands on nutrition education on a whole food (i.e. jicama, rutabaga, onions, pears, kiwi) and then received a snack that contained the whole food discussed.

Prior to beginning the study or obtaining data collection, the Institutional Review Board (IRB) approved all procedures of the study. Parents were recruited via word of mouth, face-to-face contact, brochures, and through the staff of the different facilities. See Appendix A and B for recruitment brochures. The study was conducted on a voluntary basis and a letter of information was given to all parents before they began the study. See Appendix C-F for IRB letters of information.

Procedures

A committee of nutrition, family, and preschool professionals who work for Utah State University collaborated to determine lesson topics and reviewed the curriculum which was developed. The series of SNAP-Ed nutrition education originally consisted of five nutrition lessons. Lesson titles included the following:

- Family Mealtime and Overcoming the Barriers of Family Mealtime
- Feeding Preschoolers: Introduction to New Foods
- Meal Planning, Shopping, and Quick Meal Ideas
- Incorporating Fruits and Vegetables into Family Mealtime
- Incorporating Whole Grains into Family Mealtime

Due to enrollment periods at the preschools, the number of lessons was eventually reduced to four. In order to accommodate this change and provide all the learning materials, the lessons Incorporating Fruits and Vegetables into Family Mealtime and Incorporating Whole Grains into Family Mealtime were combined to make a lesson entitled Incorporating Whole Foods into Family Mealtime. Topics discussed in each lesson are shown in Table 1.

The curriculum was made available in two different formats: lesson plan for a live group class or recorded PowerPoint presentations. The PowerPoint presentations were made visually attractive and interactive through the use of SoftChalk®, a curriculum software program that engages the learner through interactive activities and quizzes. The SoftChalk® lessons were made available to view on a home computer in two different formats, Digital Video Disc (DVD) and online.

Parents, who signed up to participate, were given the option of participating via group classes or at home using a computer to view the SoftChalk® lessons. The group classes were taught by a nutrition education assistant employed by SNAP-Ed. At the

Table 1: Lesson Titles and Topics Discussed

Lesson Title	Topics Discuss
Family Mealtime and Overcoming the Barriers to Family Mealtime	– Definition of family mealtime – Benefits of family mealtime – Mealtime conversations – Overcoming barriers to family mealtime – Involving your children in family mealtime preparation
Feeding Preschoolers: Introduction to New Foods	– Tips to develop healthy eating habits in preschoolers – Techniques that will make feeding preschoolers a success – How to introduce new foods to preschoolers – Physical activity recommendations for preschoolers
Meal Planning, Shopping and Quick Meal Ideas	– Budgeting food money – Menu planning tips – Importance of breakfast – Healthy breakfast options – Healthy snacks – Grocery shopping tips – Basic components of a food label – Unit pricing – Quick meal ideas – Labor saving techniques – Food safety
Incorporating Whole Foods into Family Mealtime	– Nutritional benefits of fruits, vegetables, and whole grains – Overcoming the barriers of incorporating fruits, vegetables, and whole grains into family mealtime – Food safety practices with fruits and vegetables – Proper storage of fruits and vegetables – Increasing fruit, vegetable, and whole grain consumption at family mealtime and snacks – Whole grains vs. enriched grains vs. refined grains – Fiber – Identifying whole grains with a nutrition label and ingredient list

start of the study, participants using SoftChalk® DVD lessons were each given a packet that contained the handouts for each lesson. Those who used the online SoftChalk® lessons were given an electronic copy of the lesson handouts. SoftChalk® participants were instructed to space each lesson at least a week a part. Research assistants sent group class participants reminders about upcoming classes and those who participated via SoftChalk® reminders to complete the next lesson.

For this study, there were three separate rounds of data collection. The first round began in January 2011 and ended in May 2011. The first round of participants were recruited from the DDE center and they received the five nutrition lessons. There were 11 total participants (9 group classes and 2 SoftChalk® DVD). One group class was held every month at the DDE Center. Parents who participated with the SoftChalk® lessons were instructed to complete one lesson a month. The second round began in June 2011 and finished in August of 2011. Participants in the second round were recruited from Best Friends CDC. There were 9 participants in the second round of the study, all of which participated via SoftChalk® DVD lessons. They received four total lessons and were instructed to complete one lesson every 2-3 weeks. The final round started in October 2011 and was completed in December 2011. The final round of participants were recruited from Up to 3 Early Intervention. The final round had 8 participants (1 group class and 7 online SoftChalk®). The final round received a total of four lessons. The group lessons occurred every 2-3 weeks on the campus of Utah State University, and those who participated via SoftChalk® were instructed to complete one lesson every 2-3 weeks. In order to be included in this study, parents had to participate in at least 3 of the nutrition lessons. There were a total of 28 participants in this study. Ten participants

attended group classes and 18 participants used the SoftChalk® lessons. Fourteen of the participants had 3-5 year-old children participating in the preschool nutrition study at either DDE Center or Best Friends CDC.

Measures

A committee of nutrition, family, and preschool professionals collaborated to determine what data would be collected and measured. The following evaluation tools were used in the pre- and post-evaluations: SNAP-Ed Behavior Checklist, SNAP-Ed Food Frequency-2010 (FFQ), and Nutrition Knowledge Survey. Participants were also asked to report their pre-and post- height and weight. The reported height and weight were then used to calculate a pre-and post-body mass index (BMI) for each participant. SNAP-Ed Class Participant Forms were completed after each nutrition education. The Behavior Checklist, FFQ, and Class Participant Form were required documents per the SNAP-Ed program. Ten registered dietitians reviewed the research proposal and validated the nutrition knowledge survey. See Appendix G-J for evaluation tools. Individuals who attended the group classes completed the evaluations during class. Those who participated via SoftChalk® completed the evaluations at home. Those who used DVDs completed the evaluations on paper, while those who used the online lesson format completed the evaluations online via Remark Web Survey®.

- Behavior Checklist

  The behavior checklist asked respondents to rate 20 different behaviors. Before beginning the SNAP-Ed nutrition lessons, participants rated their current behavior using the following Likert scale: 1) Never, 2) Seldom, 3) Sometimes, 4) Usually, and

5) Always. There were 5 categories of behavior that were measured: 1) Meal planning and shopping, 2) Food safety, 3) Healthy food choices, 4) Physical activity, and 5) Family mealtime. After completing the series of lessons, participants completed the behavior checklist once again.

- Food Frequency

  Participants completed 2 FFQs prior to the series of lessons, and then once again after lessons were completed. One FFQ reported usual intake of their child in the previous month and the other FFQ reported their (the parent) usual intake over the previous month. The FFQ measured the usual intake of: fruits, vegetables, meats, beans, dairy, whole grains, refined grains, sugar, fat, oil, and alcohol. Participants reported usual intake of each food item using the following frequency scale: never or less than 1 week, 1-3 per week, 4-6 per week, 1 per day, 2-3 per day, 4-5 per day, and 6 per day.

- Nutrition Knowledge Survey

  The nutrition knowledge survey was given to participants before and after the series of SNAP-Ed nutrition lessons. There were 18 questions. Each question was taken from the SNAP-Ed curriculum used in this study. Three questions were asked for each of these categories: family mealtime, feeding preschoolers, meal planning, fruit and vegetables, whole grains, and physical activity.

- Class Participant Form

The class participant form was completed after each lesson. The class participant form reported: demographics; class satisfaction survey; whether respondents qualify for SNAP benefits, or other assistance programs; how SNAP-Ed can improve. The

following scale was used to determine class satisfaction: 1) None, 2) Little, 3) Some, 4) Average, and 5) Quite a bit. Respondents used the scale to describe their overall class satisfaction in each of these four categories: overall usefulness of lesson, overall effectiveness of presentation, overall quality of session, and overall knowledge gained.

Analysis

The analysis was conducted using IBM SPSS (version 20, SPSS Inc., Chicago, IL, 2011). A paired t-test was conducted between pre- and post- evaluations to assess significant changes in reported BMI, behavior, and parent nutrition knowledge. Additionally, repeated measures were conducted using general linear model to assess if there was any differences between the lesson methods used. Statistical significance was defined to be $p< 0.05$.

Results

Demographics

Twenty-seven of the twenty-eight (96%) participants reported to be female. All of the 28 participants were reported to be between the ages of 18-59 years and of white race. One of the 28 (4%) participants reported to be of Hispanic origin or Latino descent. Of the 28 participants, 2 (7%) received Food Stamps, 4 (14%) qualified for Food Stamps, and 10 (36%) qualified for other assistance. Parents needed to attend at least 3 of the nutrition education to be included in the study. Of the 28 participants, 15 (54%) attended all of the nutrition lessons.

BMI and Behavior

An average score for each category of the behavior checklist was calculated for every participant using the scores from the individual behaviors. Paired t-tests between the pre- and post- reported anthropometrics, the pre- and post- individual behaviors, and the pre- and post- behavior categories were then conducted. A response frequency was conducted for each of the individual behaviors and each behavior category. In addition, an effect size was calculated for each behavior utilizing Cohen d. Cohen d is the mean difference from pre- to post-test divided by the standard deviation for the pre-test. A response frequency was also performed to determine changes in response from pre- to post-test. It was acknowledged that the two different class methods may have had different effects on changing family lifestyle behaviors. Therefore, an analysis of variance (ANOVA) was conducted on the individual behaviors and each behavior category to account for any differences between the two different class methods.

The anthropometric paired t-test results can be seen in Table 2. Prior to beginning parent nutrition education, the average reported weight of participants was 165.4 pounds (lbs) with an average BMI of 26.8. After completion of the parent education, the average reported weight was 163.7 lbs with an average BMI of 26.6. A $p<0.001$ indicated that there was a significant change in reported weight.

Table 2: Anthropometric Paired t-Tests

		n	Mean	SD	p-value
BMI	PRE	27	26.8	6.2	<0.001
	POST	27	26.6	6.15	
Weight	PRE	27	165.4	42.97	<0.001
	POST	27	163.7	42.49	

Table 3: Meal Planning Behavior Paired t-Tests

Behavior Category		n	Mean*	SD	d	p-value
Meal Planning	PRE	26	3.4	0.60		
	POST	26	4.2	0.59	1.26	0.16
Individual Behaviors		**n**	**Mean***	**SD**	**d**	**p-value**
Plan meals ahead of time	PRE	25	3.4	0.71		
	POST	25	4.1	0.73	0.96	0.30
Compare prices before buying food	PRE	26	3.5	1.03		
	POST	26	4.2	0.76	0.71	0.04
Have enough food to last through the end of the month	PRE	25	2.8	1.35		
	POST	25	3.8	1.07	0.77	0.39
Shop with a grocery list	PRE	25	4.0	0.74		
	POST	25	4.4	0.65	0.65	0.15

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

The meal planning behavior paired t-test results can be found in Tables 3 and 4, respectively. The meal planning category had a p-value of 0.16, which indicated that the change was insignificant. However, a Cohen d of 1.26 indicated that the parent nutrition lessons had large effect on overall reported meal planning behaviors. The p-values of the individual behaviors indicated that all of the behavior changes were insignificant, with the exception of comparing prices before purchasing food (p=0.04). However, the Cohen d for all individual behaviors indicated that the lessons had a large effect on changing the individual meal planning behaviors. The ANOVA indicated that there were no significant differences for the meal planning category between the two class methods. However, the within subject p-value for planning meals ahead of time (p=0.03) was significant, indicating a significant difference in reported behavior between the subjects of one or both class methods. Additionally, the between subject p-value for having enough food to last through the end of the month (p=0.03) was significant. This indicated that those who participated in the lesson

SoftChalk® were more likely to report to have enough food to last until the end of the month than those who participated in group lessons.

Table 4: Meal Planning Behavior ANOVA

							Within Subject			Between Subject		
Behavior Category		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
	PRE	Group	9	3.4	0.56							
		SoftChalk	17	3.4	0.64							
	POST	Group	9	3.9	0.78							
Meal Planning		SoftChalk	17	4.4	0.38	1	0.57	2.36	0.14	0.87	2.00	0.17
							Within Subject			**Between Subject**		
Individual Behaviors		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
	PRE	Group	8	3.6	0.92							
		SoftChalk	17	3.4	0.61							
	POST	Group	8	3.8	0.71							
Plan meals ahead of time		SoftChalk	17	4.3	0.69	1	1.81	5.27	0.03	0.20	0.31	0.58
	PRE	Group	9	3.3	1.12							
		SoftChalk	17	3.6	1.00							
Compare prices before buying	POST	Group	9	3.9	0.93							
food		SoftChalk	17	4.4	0.62	1	0.21	0.41	0.53	1.78	1.60	0.22
	PRE	Group	8	2.5	1.20							
		SoftChalk	17	2.9	1.43							
Have enough food to last	POST	Group	8	3.0	1.07							
through the end of the month		SoftChalk	17	4.2	0.83	1	1.72	1.42	0.25	7.65	5.14	0.03
	PRE	Group	8	4.1	0.84							
		SoftChalk	17	3.9	0.70							
	POST	Group	8	4.4	0.92							
Shop with a grocery list		SoftChalk	17	4.5	0.52	1	0.31	0.92	0.35	0.06	0.09	0.77

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

Table 5: Food Safety Behavior Paired t-Tests

Behavior Category		**n**	**Mean***	**SD**	**d**	**p-value**
	PRE	26	4.5	0.35		
Food Safety	POST	26	4.8	0.26	0.74	<0.001
Individual Behaviors		**n**	**Mean***	**SD**	**d**	**p-value**
Refrigerate meat and dairy within 2	PRE	26	5.0	0.00		
hours of shopping	POST	26	4.9	0.39	.	.
	PRE	26	3.5	1.18		
Thaw frozen foods in refrigerator	POST	26	4.2	0.77	0.62	0.001
Wash hands before food preparation	PRE	26	4.6	0.57		
or eating	POST	26	4.9	0.27	0.53	0.002
Prepare raw foods separately from	PRE	26	4.9	0.27		
other foods	POST	26	5.0	0.00	.	.

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

Table 6: Food Safety Behavior ANOVA

							Within Subject			Between Subject		
Behavior Category		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
		Group	9	4.5	0.34							
	PRE	SoftChalk	17	4.5	0.36							
		Group	9	4.7	0.27							
Food Safety	POST	SoftChalk	17	4.8	0.26	1	0.01	0.36	0.55	0.09	0.51	0.48
							Within Subject			**Between Subject**		
Individual Behaviors		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
		Group	9	5.0	0.00							
	PRE	SoftChalk	17	5.0	0.00							
Refrigerate meat and dairy		Group	9	5.0	0.00							
within 2 hours of shopping	POST	SoftChalk	17	5.0	0.00	1	0.04	2.36	0.48	0.04	2.00	0.48
		Group	9	3.7	1.00							
	PRE	SoftChalk	17	3.4	1.28							
Thaw frozen foods in		Group	9	4.0	0.87							
refrigerator	POST	SoftChalk	17	4.4	0.70	1	1.09	2.76	0.11	0.03	0.02	0.90
		Group	9	4.2	0.67							
	PRE	SoftChalk	17	4.8	0.39							
Wash hands before food		Group	9	4.8	0.44							
preparation or eating	POST	SoftChalk	17	5.0	0.00	1	0.42	4.33	0.001	2.00	9.15	0.28
		Group	9	5.0	0.00							
	PRE	SoftChalk	17	4.9	0.33							
Prepare raw foods separately		Group	9	5.0	0.00							
from other foods	POST	SoftChalk	17	5.0	0.00	1	0.04	1.11	0.3	0.04	1.11	0.30

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

The paired t-test and ANOVA results for food safety behaviors can be found in Tables 5 and 6, respectively. The food safety category had a p-value of <0.001 and a Cohen d of 0.74. This indicated that the parent nutrition lessons had a significant and large effect on overall reported food safety behaviors. The p-values for thawing frozen foods in the refrigerator (p=0.001) and washing hands before food preparation (p=0.002) indicated that these reported behaviors were significantly changed from pre- to post-test. The Cohen d for these two behaviors indicated that the parent nutrition lessons had a moderate-to-large effect on changing these behaviors. Prior to lessons, parents reported that they always refrigerated meat and dairy within two hours of shopping and that they always prepared raw foods separately from other foods, therefore no change or effect was seen for these two behaviors. A within subject p-value of 0.001 for washing hands before

food preparation indicated a significant difference in reported behavior between the subjects of one or both class methods. The food safety category and all other individual food safety behaviors had insignificant within and between subject p-values. This indicated that there were no significant differences in reported food safety behaviors between the two class methods.

Table 7: Healthy Eating Behavior Paired t-Tests

Behavior Category		n	Mean*	SD	d	p-value
Healthy Eating	PRE	26	3.7	0.62		
	POST	26	4.3	0.28	1.05	0.07
Individual Behaviors		**n**	**Mean***	**SD**	**d**	**p-value**
Make food purchases based on healthy choices	PRE	26	3.8	1.06		
	POST	26	3.8	0.61	0.0	<0.001
Prepare foods without adding salt	PRE	26	3.6	1.06		
	POST	26	3.8	0.94	0.18	<0.001
Read nutrition facts label before purchasing	PRE	26	3.2	1.05		
	POST	26	4.2	0.80	0.99	0.08
Children in household eat something within 2 hours of waking	PRE	26	4.7	0.53		
	POST	26	5.0	0.20	0.43	0.17
Eat at least 3 servings of vegetables a day	PRE	26	3.1	1.03		
	POST	26	4.2	0.49	1.04	0.18
Eat at least 2 servings of fruit a day	PRE	26	3.4	0.95		
	POST	26	4.4	0.69	0.98	0.06
Eat at least 2 servings of dairy a day	PRE	26	4.0	0.96		
	POST	26	4.4	0.80	0.35	0.02
Replace saturated and trans-fats with heart healthy fat	PRE	25	3.5	0.92		
	POST	25	4.0	0.68	0.61	0.03

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

Table 8: Healthy Eating Behavior ANOVA

							Within Subject			Between Subject		
Behavior Category		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
	PRE	Group	9	3.7	0.83							
		SoftChalk	17	3.7	0.51							
	POST	Group	9	4.3	0.33							
Healthy Eating		SoftChalk	17	4.4	0.26	1	0.02	0.13	0.73	0.007	0.02	0.88
							Within Subject			**Between Subject**		
Individual Behaviors		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
Make food purchases based on healthy choices	PRE	Group	9	3.9	0.93							
		SoftChalk	17	3.7	0.59							
	POST	Group	9	4.6	0.53							
		SoftChalk	17	4.3	0.50	1	0.02	0.06	0.81	0.58	1.26	0.27
Prepare foods without adding salt	PRE	Group	9	3.7	0.50							
		SoftChalk	17	3.6	1.28							
	POST	Group	9	4.0	0.87							
		SoftChalk	17	3.7	0.99	1	0.14	0.42	0.525	0.41	0.24	0.63
Read nutrition facts label before purchasing	PRE	Group	9	3.3	1.50							
		SoftChalk	17	3.1	0.75							
	POST	Group	9	4.2	1.09							
		SoftChalk	17	4.2	0.64	1	0.15	0.26	0.616	0.30	0.25	0.62
Children in household eat something within 2 hours of waking	PRE	Group	9	4.8	0.44							
		SoftChalk	17	4.7	0.59							
	POST	Group	9	5.0	0.00							
		SoftChalk	17	4.9	0.20	1	1.09	0.004	0.11	0.03	0.26	0.90
Eat at least 3 servings of vegetables a day	PRE	Group	9	3.3	1.12							
		SoftChalk	17	3.0	1.00							
	POST	Group	9	4.1	0.60							
		SoftChalk	17	4.2	0.44	1	0.62	1.20	0.28	0.13	0.16	0.70
Eat at least 2 servings of fruit a day	PRE	Group	9	3.3	1.00							
		SoftChalk	17	3.5	0.94							
	POST	Group	9	4.0	0.87							
		SoftChalk	17	4.5	0.52	1	0.45	1.04	0.32	1.31	1.43	0.24
Eat at least 2 servings of dairy a day	PRE	Group	9	3.8	1.30							
		SoftChalk	17	4.2	0.73							
	POST	Group	9	4.1	1.05							
		SoftChalk	17	4.5	0.62	1	0.001	0.002	0.96	1.96	1.80	0.19
Replace saturated and trans-fats with heart healthy fat	PRE	Group	8	3.3	1.28							
		SoftChalk	17	3.6	0.71							
	POST	Group	8	3.6	0.74							
		SoftChalk	17	4.2	0.56	1	0.20	0.52	0.48	2.45	2.86	0.10

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

The healthy eating behaviors paired t-test and ANOVA results can be found in Table 7 and 8, respectively. The healthy eating category had a p-value of 0.07 and a Cohen d of 1.05. This indicated that the reported change for the healthy eating category was not statistically significant. However, the Cohen d indicated that the parent nutrition

lessons had a large effect on improving healthy eating behaviors. The following reported individual healthy eating behaviors significantly changed from pre- to post-test: purchasing foods based on healthy choices ($p<0.001$), preparing foods without adding salt ($p<0.001$), consuming at least 2 serving of dairy per day ($p=0.02$), and replacing saturated fats with heart healthy fat ($p=0.03$). The Cohen d indicated that the parent nutrition lessons had a small to moderate effect on the following reported behaviors: preparing foods without adding salt ($d=0.18$), consuming at least 2 servings of dairy per day ($d=0.35$), children in household eat something within 2 hours of waking ($d=0.43$), and replacing saturated fats with heart healthy fat ($d=0.61$). The Cohen d suggested that the parent nutrition lessons had a large effect on the following reported behaviors: reading nutrition facts label before purchasing ($d=0.99$), consuming at least 3 serving of vegetables per day ($d=1.04$), and consuming at least 2 servings of fruit per day ($d=0.98$). The ANOVA results for both the healthy eating behavior category and the individual healthy eating behaviors showed that there were no significant differences in reported healthy eating behaviors between the individuals of the two class methods. Additionally, there were no significant differences in reported behavior between the subjects of both class methods.

Table 9: Physical Activity Behavior Paired t-Tests

Behavior Category		**n**	**Mean***	**SD**	**d**	**p-value**
Physical Activity	PRE	26	3.6	1.13	0.63	0.009
	POST	26	4.3	0.57		
Individual Behaviors		**n**	**Mean***	**SD**	**d**	**p-value**
Choose to be physically active, at least 30 minutes 5 days a week	PRE	25	3.3	1.31	0.64	0.01
	POST	25	4.2	0.69		
Choose to walk, take the stairs, or be active in other ways	PRE	26	3.8	1.11	0.52	0.006
	POST	26	4.4	0.56		

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

The paired t-test and ANOVA results for physical activity behaviors can be seen in Table 9 and 2-10, respectively. The physical activity behavior category had a p-value of 0.009 and a Cohen d of 0.63. This indicated that there was a significant change in physical activity from pre- to post-test and that the parent nutrition lessons had a moderate-to-large effect on changing reported physical activity behaviors. Both of the individual physical activity behaviors significantly changed from pre- to post-test. The Cohen d for both individual behaviors indicated that parent nutrition lessons had a moderate-to-large effect on changing the individual physical activity behaviors. The ANOVA results indicated no significant differences between the two different class methods for both the physical activity behavior category and the individual physical activity behaviors. The ANOVA also showed no significant differences in reported behavior between the subjects of both class methods.

Table 10: Physical Activity Behavior ANOVA

							Within Subject			Between Subject		
Behavior Category		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
	PRE	Group	9	3.6	1.21							
		SoftChalk	17	3.6	1.13							
	POST	Group	9	4.2	0.75							
Physical Activity		SoftChalk	17	4.3	0.47	1	0.07	0.14	0.71	0.1	0.06	0.80
							Within Subject			**Between Subject**		
Individual Behaviors		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
Choose to be physically active, at least 30 minutes 5 days a week	PRE	Group	8	3.3	1.49							
		SoftChalk	17	3.4	1.27							
	POST	Group	8	3.9	0.84							
		SoftChalk	17	4.3	0.59	1	0.27	0.41	0.53	0.74	0.47	0.50
Choose to walk, take the stairs, or be active in other ways	PRE	Group	9	3.8	1.09							
		SoftChalk	17	3.8	1.15							
	POST	Group	9	4.3	0.71							
		SoftChalk	17	4.4	0.49	1	0.003	0.007	0.94	0.00	0.00	0.99

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

The paired t-test and ANOVA results for the family mealtime behaviors can be found in Table 11 and 12, respectively. The family mealtime behavior category had a p-value of 0.10 and a Cohen d of 0.21. This indicated that the overall change in reported family mealtime behaviors was not statistically significant and that the parent nutrition lessons had a small effect on changing family mealtime behaviors. The individual behaviors within the family mealtime category had the following p-values: prepare meals at home at least 3 times a week (p=0.005) and eat meals together as a family at least 3 times a week (p=0.01). This indicated that both of the individual family mealtime behaviors significantly changed. The Cohen d for both behaviors indicated that the parent nutrition lessons had a small effect on changing reported family mealtime behaviors. A within subject p-value of 0.04 for the family mealtime behavior category and a within subject p-value of 0.004 for eating meals together as a family at least 3 times a week indicated a significant difference in these behaviors between the subjects of one or both class methods. The between-subject p-values for the family mealtime category and both of the individual family mealtime behaviors indicated that there were no significant differences in reported family mealtime behaviors between the two class methods.

Table 11: Family Mealtime Behavior Paired t-Tests

Behavior Category		**n**	**Mean***	**SD**	**d**	**p-value**
Family Mealtime	PRE	26	4.6	0.43		
	POST	26	4.7	0.38	0.21	0.095
Individual Behaviors		**n**	**Mean***	**SD**	**d**	**p-value**
Prepare meals at home at least 3 times a week	PRE	26	4.6	0.58		
	POST	26	4.7	0.47	0.19	0.005
Eat meals together as a family at least 3 times a week	PRE	26	4.6	0.43		
	POST	26	4.7	0.38	0.21	0.01

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

Table 12: Family Mealtime Behavior ANOVA

							Within Subject			Between Subject		
Behavior Category		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
		Group	9	4.7	0.43							
	PRE	SoftChalk	17	4.6	0.44							
		Group	9	4.5	0.43							
Family Mealtime	POST	SoftChalk	17	4.8	0.30	1	0.48	5.01	0.04	0.18	0.799	0.38
							Within Subject			**Between Subject**		
Individual Behaviors		**Method**	**n**	**Mean***	**SD**	**DF**	**MS**	**F**	**p-value**	**MS**	**F**	**p-value**
		Group	9	4.6	0.73							
	PRE	SoftChalk	17	4.6	0.51							
Prepare meals at home at least 3		Group	9	4.6	0.53							
times a week	POST	SoftChalk	17	4.8	0.44	1	0.09	0.68	0.42	0.17	0.40	0.53
		Group	9	4.8	0.44							
	PRE	SoftChalk	17	4.6	0.62							
Eat meals together as a family at		Group	9	4.4	0.73							
least 3 times a week	POST	SoftChalk	17	4.9	0.33	1	1.16	10.06	0.004	0.18	0.40	0.53

* Rating Scale: 1= Never, 2= Seldom, 3= Sometimes, 4= Usually, 5= Always

There was not a significant change in all reported behaviors from pre- to post-test. However, the response frequency illustrated improved responses for all behavior categories and all individual behaviors, with the exception of refrigerating meats and dairy within 2 hours of shopping. Response frequency results can be seen in Table 13.

Knowledge

The nutrition knowledge survey was scored out of 18. The average score of the pre-nutrition knowledge survey was 13.2. Upon completion of the nutrition education, the nutrition knowledge score was 14.9. A paired t-test was performed between the scores of the pre- and post-nutrition knowledge survey. The results indicated that the change in knowledge was significant with $p< 0.001$. See Table 14 for nutrition knowledge paired t-test results. An ANOVA was conducted between group class participants and SoftChalk® participants to account for any significant differences. Nutrition knowledge ANOVA results are shown in Table 15. A between subject p-value

Table 13: Behavior Checklist Response Frequencies

		Never	Sometimes	Seldom	Usually	Always
Meal Planning Category	Pre	0	3	14	10	0
	Post	0	0	3	18	6
Plan meals ahead of time	Pre	0	2	12	12	1
	Post	0	0	5	13	8
Compare prices before buying food	Pre	1	3	8	5	10
	Post	0	0	5	10	12
Have enough food to last through the end of the month	Pre	6	6	7	5	3
	Post	0	4	4	10	8
Shop with a grocery list	Pre	0	0	7	14	6
	Post	0	0	2	11	13
Food Safety Category	Pre	0	0	0	18	9
	Post	0	0	0	7	20
Refrigerate meat and dairy within 2 hours of shopping	Pre	0	0	0	1	26
	Post	0	0	1	0	26
Thaw frozen foods in refrigerator	Pre	1	5	6	9	6
	Post	0	0	5	11	11
Wash hands before food preparation or eating	Pre	0	0	1	9	17
	Post	0	0	0	2	25
Prepare raw foods separately from other foods	Pre	0	0	1	2	24
	Post	0	0	0	1	26
Healthy Eating Category	Pre	0	2	7	17	1
	Post	0	0	0	20	7
Make food purchases based on healthy choices	Pre	0	3	4	18	2
	Post	0	0	0	16	11
Prepare foods without adding salt	Pre	2	1	7	13	4
	Post	0	3	5	13	6
Read nutrition facts label before purchasing	Pre	3	4	10	8	2
	Post	0	1	3	13	10
Children in household eat something within 2 hours of waking	Pre	0	0	1	2	24
	Post	0	0	0	1	26
Eat at least 3 servings of vegetables a day	Pre	2	5	11	7	2
	Post	0	0	1	19	7
Eat at least 2 servings of fruit a day	Pre	1	4	8	12	2
	Post	0	0	3	11	13
Eat at least 2 servings of dairy a day	Pre	1	0	5	12	9
	Post	0	1	2	9	15
Replace saturated and trans-fats with heart healthy fat	Pre	1	2	9	13	2
	Post	0	0	1	16	10
Physical Activity Category	Pre	2	4	8	8	5
	Post	0	0	4	15	8
Choose to be physically active, at least 30 minutes 5 days a week	Pre	3	5	5	8	5
	Post	0	0	4	13	10
Choose to walk, take the stairs, or be active in other ways	Pre	1	3	4	12	7
	Post	0	0	1	15	11
Family Mealtime Category	Pre	0	0	0	13	14
	Post	0	0	0	11	16
Prepare meals at home at least 3 times a week	Pre	0	0	1	9	17
	Post	0	0	0	8	19
Eat meals together as a family at least 3 times a week	Pre	0	0	1	7	19
	Post	0	0	1	5	21

of 0.14 indicated that there was not a significant difference in knowledge scores between participants of the two different class methods. Additionally, a within subject p-value of 0.39 indicated that there was also no significant differences in knowledge scores between the participants of either class method.

Table 14: Nutrition Knowledge Paired t-Test

		n	Mean*	SD	p-value
Knowledge Score	PRE	28	13.2	1.83	0.009
	POST	28	14.9	1.81	

*Scored out of 18

Table 15: Nutrition Knowledge ANOVA

							Within Subject			Between Subject		
		Method	n	Mean*	SD	DF	MS	F	p-value	MS	F	p-value
Knowledge Score	PRE	Group	10	12.8	1.40	1	1.34	0.78	0.39	10.67	2.27	0.14
		SoftChalk	18	13.4	2.03							
	POST	Group	10	14.1	1.37							
		SoftChalk	18	15.3	1.91							

*Scored out of 18

Discussion

This study utilized a simple method to help prevent childhood obesity through SNAP-Ed parent nutrition education which taught healthy lifestyle behaviors and encouraged the whole family to make small changes together, creating a successful environment. The SNAP-Ed nutrition curriculum included the topics such as: overcoming barriers to family mealtime, introducing new foods to children, physical activity recommendations, food safety, meal planning, quick meals, fruits and vegetables, and whole grains.

The average reported parent BMI significantly improved from pre- to post-intervention. The ability for the series of nutrition education to significantly improve parent BMI over a short 3 to 4 month period of time indicates that lessons had a powerful effect on participating parents and are capable of changing lifestyle behaviors. Additionally, family-based obesity intervention studies have shown that parent weight change is correlated to child weight change.[11] Therefore, it can be implied that improved parent BMI likely lead to a positive weight change in their children.

Although only 2 of the 5 behavior categories and 11 of the 20 individual behaviors significantly improved, response frequencies and effect sizes indicated that the parent nutrition lessons had an impact on family lifestyle behaviors. According to the Cohen d, the parent nutrition lessons had a moderate- to large-effect on changing 4 of the 5 behavior categories. The Cohen d for the individual behaviors showed the parent nutrition lessons had a moderate- to large-effect on changing 14 of the reported behaviors and a small effect on changing 3 of the reported behaviors. The ability for 4 hours of intervention to have such a large and significant impact on parent weight and family lifestyle behaviors denotes that the parent nutrition lessons have great potential. Further research and follow-up studies may prove the parent nutrition lessons to be a successful intervention for childhood obesity prevention.

The parent nutrition lessons appeared to have the greatest impact on physical activity, meal planning, food safety, and healthy eating behaviors. Prior to the intervention, the participating parents reported to almost always practice family mealtime behaviors. Therefore, it is likely that if this study were to be conducted in a population

that practiced poor family mealtime behaviors a larger effect and more significant change would result.

Parent knowledge significantly increased from pre- to post-test. The parent nutrition lessons gave parents the information needed to make healthy lifestyle behavior changes. The lessons taught parents how to use the knowledge obtained to make changes in their home. From the data, it is clear that the lessons were effective at both increasing nutrition knowledge and changing family lifestyle behaviors.

A study that compared actual intake of 3,300 children and adolescents to the nutrition recommendations set by the United States Department of Agriculture (USDA) found that approximately 50% of children's total energy intake came from discretionary fat and sugar consumption.[5] Additionally, *The 2010 Dietary Guidelines for Americans* reported that several cross sectional surveys on children in the United States have found inadequate dietary fiber intake secondary to a low fruit, vegetable, and whole grain intake.[1, 12] There is clear evidence that the frequency of family mealtime is positively associated with increased consumption of fruits, vegetables, and whole grains.[6] Family mealtime during childhood teaches and encourages lifelong healthy food habits, which can aid in the prevention of obesity. The knowledge parents received in the parent nutrition lessons concerning how to introduce new foods to their children and how to incorporate whole foods into family mealtime likely had an impact on improving healthy eating behaviors. The parent nutrition lessons gave parents the tools needed to make family mealtime a positive and successful environment for teaching children healthy eating habits. Healthy eating behaviors will continue to improve if family mealtime and home prepared meals remain a consistent priority in the home.

It is recognized that parent involvement shapes a child's perceptions and behaviors towards food and physical activity, and thus plays a vital role in childhood obesity prevention.[8] Therefore, if the changes in physical activity, BMI, and dietary habits are sustained by the participating parents it will positively shape their child's attitude and future lifestyle behaviors.

It was anticipated that the use of two different class methods would be a limitation to this study. Although the same lesson plans were used for both methods, there was potential that one method was more effective than the other. However, upon analysis it was found that overall there was not a significant difference in reported behavior changes between the participants of the two methods. This finding indicates that the series of parent nutrition lessons has potential to have a far-reaching effect on changing family lifestyle behaviors because lessons do not need to be attended in-person. Online lessons are cost effective and can be easily accessed and readily viewed.

This study has provided a SNAP-Ed program model that has been implemented and is capable of being repeated at various locations. The results of this study are exploratory, but can provide valuable information for further research. Analysis of study results suggests that the series of SNAP-Ed nutrition education may be effective in the prevention of childhood obesity.

There were many limitations to this study. First, behavior determinants and anthropometrics were measured by self report. Therefore, they were subject to memory, comprehension, and reporting error. Second, the biggest challenge was parent time constraints. This in turn affected recruitment, retention and ultimately the sample size. Three rounds of data collection were required to obtain a sufficient sample size. A larger

sample size would provide greater reliability and validity. Third, due to preschool enrollment periods this intervention took place over a short period of time. Each round of data collection was 3 to 4 months long due to enrollment periods of recruited facilities. Therefore, the sustainability of the outcomes measured is unknown. Lastly, the demographics of the participants lacked diversity. Participants were of the same race and ethnicity. Additionally, the majority of the participants were either pursuing higher education or highly educated and in the workforce. However, despite the education level of the participants, half of the participants qualified for government food assistance. The lack of diversity decreases the generalizability of the data.

Implications for Research

Participation in SNAP-Ed parent nutrition education was effective in increasing the occurrence of family mealtime and frequency of home preparing meals, increasing physical activity among parents, decreasing parent BMI, and increasing parent nutrition knowledge. Despite the positive outcomes demonstrated, additional research in this area is warranted. Future research should aim to resolve and reduce the limitations reported. It may be beneficial to follow participants for a longer period to determine sustainability of outcomes.

Statement of Potential Conflict of Interest

This research was in collaboration with USDA Food Nutrition Services SNAP-Ed through Utah State University Extension. The opinions expressed are those of the

authors and do not necessarily represent the views or recommendations of their respective affiliates.

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CHAPTER 3

EFFECTS OF PARENT NUTRITION EDUCATION ON WHOLE FOOD CONSUMPTION

Abstract

The purpose of this study was to determine the effectiveness of parent nutrition education on increasing whole food consumption and to implement an Extension service program that was effective in the prevention of childhood obesity. Twenty-eight individuals participated in the series of nutrition education, 14 of which had children involved in a preschool nutrition study. A pre- and post- food frequency for both the child and the parent were obtained. Children had significant changes in fruit and vegetable consumption. Parents had significant change in fruit consumption. Results suggest that parent nutrition education is effective at increasing fruit and vegetable intake in children.

Introduction

Overweight and obesity among young children has increased over the last few years. The 2010 Dietary Guidelines reported that 32% of children between the ages of 2 and 19 years are overweight or obese, with 17% of children being obese (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). Until recently, co-morbidities such as hypertension, type 2 diabetes, and dyslipidemia were typically only seen in the adult population (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). Due to the detrimental health

consequences associated with obesity, decreasing the prevalence is a high priority for government officials and health care providers (Polhamus, Dalenius, Mackintosh, Smith, & Grummer-Strawn, 2011).

Childhood obesity prevention programs should utilize behavior modification techniques to promote lifelong lifestyle changes (Rhee, DeLago, Arscott-Mills, Mehta, & Davis, 2005). Lifestyle modification encourages increased caloric expenditure while decreasing caloric intake (Lok, Chan, Sea, & Woo, 2010). Decreased caloric intake is best achieved by increasing fiber-rich consumption of whole grains, fruits, and vegetables (Birch, 1998).

A study that compared actual intakes of 3,300 children and adolescents to the nutrition recommendations set by the United States Department of Agriculture (USDA) found that children do not consume enough fruits, vegetables, and grains. Additionally, approximately 50% of their total energy intake came from discretionary fat and sugar consumption (Birch, 1998). Similarly, *The 2010 Dietary Guidelines for Americans* reported that several cross sectional surveys on children in the United States has found inadequate dietary fiber intake (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010). Low fiber intake is associated with low fruit, vegetable, and whole grain consumption (U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2010; U.S. Department of Agriculture and U.S. Department of Health and Human Services, 2005).

Children are inclined to accept foods that are sweet and salty. In addition, children are also predisposed to food neophobia, or fear of new foods. As a result, children's

diets generally lack variety and are deficient in fruits and vegetables. Children need to learn to overcome food neophobia and become ate ease with trying new foods in order to increase the variety and quality of their diet (Birch, 1998). Research has shown that it can take 8 to 12 exposures to a new food before a child will develop a preference and consume that food item (Carruth, Ziegler, Gordan, & Barr, 2004). Therefore, children will develop food preferences if a variety of wholesome foods are continually available and offered to them.

The majority of childhood obesity interventions conducted to this point have had short term success and have occurred in schools with older children (Golley, Hendrie, Slater, & Corsini, 2010; Anzman, Rollins, & Birch, 2010). Eating behaviors are learned at an early age, and therefore, preventative efforts during early childhood may have life-long success in preventing obesity (Anzman et al., 2010). Additionally, previous studies have shown that interventions that involved parents were more effective. Parents largely determine what foods are offered to their children and the atmosphere where feeding takes place (Galloway, Fiorito, Francis, & Birch, 2006). There is a strong correlation between parental food preferences and their child's food preferences, particularly with fruits and vegetables. Young children learn their attitudes towards food and their eating habits by watching the eating habits and food preferences of their parents. Therefore, parents play a significant role in childhood obesity prevention, as they play a key role in establishing healthy eating behaviors in their children (Stang & Loth, 2011). Obesity prevention efforts need to be implemented in a wide range of settings, including the home, to have long-term success and sustainability (Golley et al., 2010).

This study was conducted to evaluate the effectiveness of a series of Supplemental Nutrition Assistance Program-Education (SNAP-Ed) parent nutrition education on increasing the fruit, vegetable, and whole grain consumption of the family. The goal of SNAP–Ed "is to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current Dietary Guidelines for Americans and MyPlate." SNAP-Ed focuses on 1) health promotion and 2) primary prevention of chronic disease by establishing healthy eating and physical activity habits. The USDA Food and Nutrition Service encourages each State to focus their SNAP-Ed efforts on behavior modifications such as: consuming a balanced diet by following MyPlate and *Dietary Guidelines for Americans*, increasing physical activity and decreasing sedentary habits, and maintaining an appropriate calorie balance for age (U.S. Department of Agriculture, 2012). Increased consumption of whole foods will help prevent childhood obesity by increasing variety in their diet and decreasing caloric intake. Unlike the majority of obesity prevention studies to this point, the intervention was solely given to parents with young children aged infant to five years. Twenty-eight parents completed their participation in this study, 14 of which had 3-5 year-old children who were involved in a study where they received hands-on nutrition education and food exposures in their preschool classroom.

Hypotheses and Objectives

The objectives of this study were 1) To assess the effectiveness of a series of SNAP-Ed parent nutrition education focused on family mealtime and whole food consumption (i.e. fruits, vegetables, and whole grains) and determine if the effects seen

are greater when interventions are applied in a wide range of settings (i.e. parent nutrition lessons in conjunction with preschooler nutrition education) and 2) Implement a SNAP-Ed Extension Service program that was effective in the prevention of childhood obesity and could be repeated at various locations. It was hypothesized that: 1) The series of SNAP-Ed parent nutrition education workshops would lead to a greater consumption of whole foods and prevent childhood obesity and 2) Families who had children participating in the nutrition lessons and food exposures in their preschool class in conjunction with the parent nutrition education workshops would have a greater increase in whole food consumption compared to families who only received the parent nutrition education workshops.

Methods

Subjects

The series of nutrition education was developed for parents of young children between the ages of infant to 5 years. A total of 308 parents were recruited from Dolores Dore Early Care and Education (DDE Center), Best Friends Child Development Center (Best Friends CDC), and Up to 3 Early Intervention. Fifty-two parents completed a pre-evaluation form. In order to be included in this study, participants were required to participate in at least three of the nutrition lessons and completed the pre/post evaluations. There were a total of 28 participants in this study. All three of these programs were located in Logan, Utah.

Fourteen of the 28 participants had 3-5 year-old children at the DDE Center and Best Friends CDC who were involved in a preschool nutrition study; two to three times a week the children received hands on nutrition education on a whole food and then received a snack that contained the whole food discussed.

Education Curriculum

A committee of seven professionals who work for Utah State University collaborated to determine lesson topics and reviewed the curriculum developed by SNAP-Ed and a registered dietitian. The series of nutrition education consisted of four nutrition lessons including: Family Mealtime and Overcoming the Barriers of Family Mealtime; Feeding Preschoolers: Introduction to New Foods; Meal Planning, Shopping, and Quick Meal Ideas; Incorporating Whole Foods into Family Mealtime. Whole food topics discussed in each lesson are shown in Table 16.

Participants could participate in lessons using two different methods: lesson plan for a live group class or recorded PowerPoint presentations. The same curriculum was used to develop both methods. The use of a software program called SoftChalk® made the PowerPoint presentations visually attractive and engaged the learner through interactive activities and quizzes. SoftChalk® made the lessons available to view on a computer using either a Digital Video Disc (DVD) or online.

Table 16: Lesson Titles and Whole Food Topics Discussed

Lesson Title	Whole Food Topics Discuss
Family Mealtime and Overcoming the Barriers to Family Mealtime	– Definition of family mealtime – Benefits of family mealtime (i.e. greater whole food consumption) – Mealtime conversations (i.e. how does the whole food item look, smell, feel, and taste?) – Overcoming barriers to family mealtime – Involving your children in family mealtime preparation
Feeding Preschoolers: Introduction to New Foods	– Tips to develop healthy eating habits in preschoolers – Techniques that will make feeding preschoolers a success – How to introduce new foods to preschoolers
Meal Planning, Shopping and Quick Meal Ideas	– Using MyPlate guidelines to plan a balanced meal – Healthy breakfast and snack options – Basic components of a food label – Quick and healthful meal ideas – Grocery shopping tips (i.e. healthy and whole food items tend to be located on the store's parameter)
Incorporating Whole Foods into Family Mealtime	– Nutritional benefits of fruits, vegetables, and whole grains – Overcoming the barriers of incorporating fruits, vegetables, and whole grains into family mealtime – Food safety practices with fruits and vegetables – Proper storage of fruits and vegetables – Increasing fruit, vegetable, and whole grain consumption at family mealtime and snacks – Whole grains vs. enriched grains vs. refined grains – Fiber – Identifying whole grains with a nutrition label and ingredient list

Evaluation Methods

- Food Frequency (FFQ)

  Participants completed 2 FFQs prior to the series of the lessons, and then once again after the lessons were completed. One FFQ reported the usual intake of their child in the previous month and the other FFQ reported their (the parent) usual intake over the previous month. The FFQ measured the usual intake of: fruits, vegetables, meats, beans, eggs, dairy, whole grains, refined grains, and discretionary calories. The FFQ divided the fruit and vegetable into 5 color categories: red, orange/yellow, green, blue/purple, and white. Participants reported usual intake of each food item using the following frequency scale: never or less than 1 a week, 1-3 per week, 4-6 per week, 1 per day, 2-3 per day, 4-5 per day, and 6 per day. This study used the intake data from fruit, vegetable, whole grain, and refined grains. See Appendix H for FFQ.

Statistical Analyses

The analysis was conducted using IBM SPSS (version 20, SPSS Inc., Chicago, IL, 2011). Paired t-tests were conducted using pre- and post- FFQs from both the parents and the children. The t-tests examined the significant changes in dietary consumption in both the children and the adults, and compared the dietary consumption of the parents to their children. Additionally, Analysis of Variances (ANOVA) were conducted to account for any differences between groups (between the three rounds of participants and child participation in the preschool nutrition study). Statistical significance was defined to be $p< 0.05$.

Results

Parent nutrition lessons focused on increasing fruit, vegetable, and whole grain consumption. Daily average consumption of fruit, vegetables, whole grains, and refined grains were determined for both the children and parents. Daily average fruit and vegetable consumption was found by taking the daily average consumption for each color sub-group. The daily average intake for each color sub-group were then added together to get a total daily intake. Paired t-tests were then performed between child pre-and post-FFQ and between parent pre- and post-FFQ. See Table 17 for child paired t-test results and Table 18 for parent paired t-test results. Independent sample t-tests were also conducted between child and parent pre-tests child and parent post-tests to determine significant differences in consumption. See results in Table 19.

Table 17: Child Whole Food Paired t-Tests

		n	Mean*	SD	d	p-value
Fruit	PRE	28	2.4	1.59	0.41	0.02
	POST	28	3.0	1.78		
Vegetable	PRE	28	1.9	1.20	0.63	0.007
	POST	28	2.7	1.99		
Whole Grains	PRE	28	1.9	1.33	0.11	0.86
	POST	28	1.7	1.15		
Refined Grains	PRE	28	1.5	1.21	0.05	0.004
	POST	28	1.5	1.32		

*Average serving per day

Table 18: Parent Whole Food Paired t-Tests

		n	Mean*	SD	d	p-value
Fruit	PRE	28	1.9	1.11		
	POST	28	2.6	1.34	0.60	0.00
Vegetable	PRE	28	2.6	2.02		
	POST	28	2.9	1.75	0.18	0.22
Whole Grains	PRE	28	1.4	0.80		
	POST	28	1.7	1.27	0.31	0.28
Refined Grains	PRE	28	1.2	1.01		
	POST	28	1.2	2.44	0.00	0.810

*Average serving per day

Table 19: Child and Parent Whole Food Comparisons

			PRE-TEST				POST-TEST			
		n	Mean*	SD	r	p-value	Mean*	SD	r	p-value
Fruit	Child	28	2.4	1.59			3.0	1.78		
	Parent	28	1.9	1.11	0.71	<0.001	2.6	1.34	0.74	<0.001
Vegetable	Child	28	1.9	1.20			2.7	1.99		
	Parent	28	2.5	2.02	0.72	<0.001	2.9	1.75	0.84	<0.001
Whole Grains	Child	28	1.9	1.33			1.7	1.15		
	Parent	28	1.4	0.80	0.39	0.04	1.7	1.27	0.59	0.001
Refined Grains	Child	28	1.5	1.21			1.5	1.32		
	Parent	28	1.2	1.15	0.32	0.10	1.2	1.01	0.67	<0.001

*Average serving per day

Results suggested that the parent nutrition lessons had a greater impact on the fruit and vegetable consumption of the children compared to their parents. The child FFQ t-test indicated that daily fruit, vegetable and refined grain consumption significantly changed from pre-test to post-test. Upon pre-test, children had an average fruit consumption of 2.37 servings per day and vegetable consumption of 1.89 per day. After completion of lessons, children had a significant change ($p=0.02$) in fruit consumption, consuming 3.02 servings per day. Children also had a significant change ($p=0.007$) in vegetable consumption, consuming on average 2.65 per day. Children had a small significant ($p=0.004$) increase in refined grain consumption from pre- to post-test.

Upon pre-test, children consumed on average 1.46 servings of refined grains per day, however at post-test they consumed on average 1.52 servings.

The adult FFQ t-test results revealed only significant changes in fruit consumption. Parents had significantly lower fruit intake upon pre-test than the children, with an average consumption of 1.89 servings per day. Upon post-test, parent fruit consumption significantly ($p=0.001$) increased to 2.56 servings per day. Despite the significant increase in adult fruit consumption, the parents had a significantly lower fruit consumption compared to their children. See graph of fruit consumption in Figure 1. Parents had a significantly higher vegetable consumption at pre-test compared to their children with an average intake of 2.55 servings per day. Upon post-test, average parent vegetable consumption was 2.92 servings per day, which was not a significant change. Despite an insignificant change in vegetable consumption among parents, parent vegetable intake remained significantly higher than child vegetable consumption. See graph of vegetable consumption in Figure 2. There were no significant changes in whole grain intake in both the children and parents.

Data was collected in three different rounds throughout the year. It was acknowledged that whole food consumption may differ throughout the year due to food seasonality, availability, and accessibility. In order to account for possible differences in food consumption between the three different data collection groups, an analysis of variance (ANOVA) was conducted for both child and parent FFQs. See Table 20 for child FFQ ANOVA results and Table 21 for parent FFQ ANOVA results. The p-values

indicated that there were no significant differences in child or parent food frequencies among the three data collection groups.

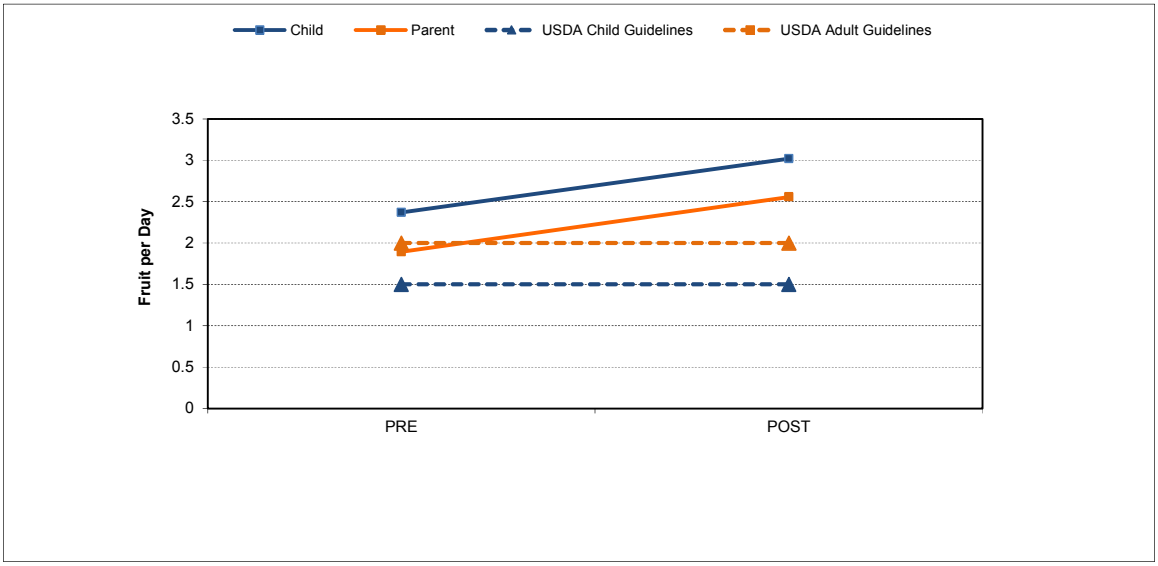

Figure 1: Fruit Consumption Graph

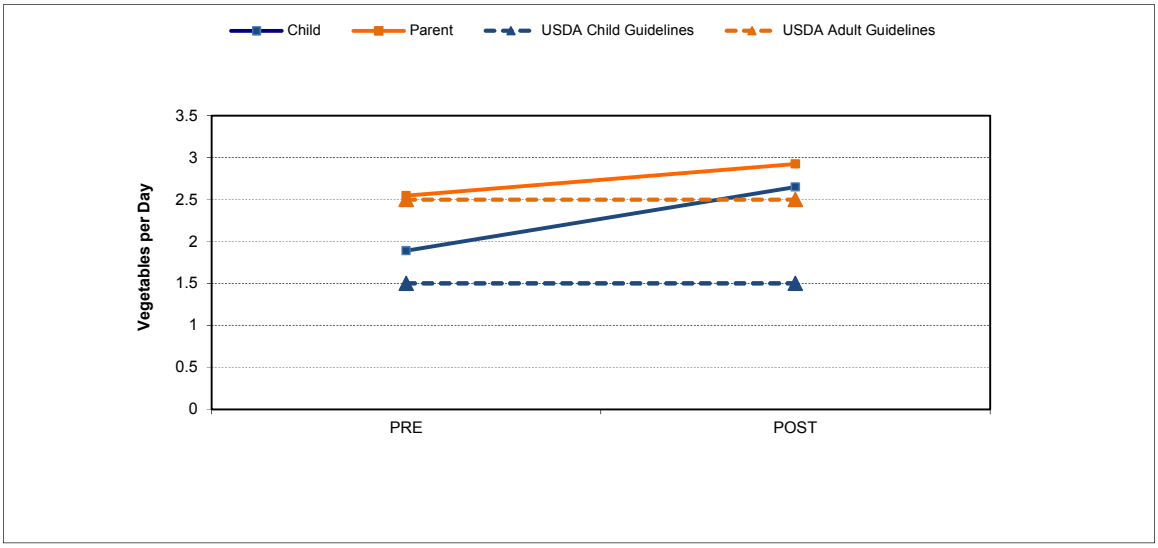

Figure 2: Vegetable Consumption Graph

It was hypothesized that families who had children participating in the nutrition lessons and food exposures in their preschool class in conjunction with the parent nutrition education workshops would have a greater increase in whole food consumption compared to families who only received the parent nutrition education workshops. The hypothesis was tested by conducting an ANOVA with the child FFQ between those who participated in the preschool nutrition study and those who did not. See results for preschool study ANOVA in Table 22. The p-values rejected the hypothesis as there were no significant differences in fruit, vegetable, whole grain, or refined grain consumption between the children.

Table 20: Child Whole Food ANOVA by Group

								Between Subject	
		Group*	n	Mean**	SD	DF	MS	F	p-value
		1	11	2.8	1.73				
		2	9	2.0	1.35				
	PRE	3	8	2.2	1.68				
		1	11	2.6	1.61				
		2	9	2.8	1.03				
Fruit	POST	3	8	3.8	1.51	2	1.87	0.44	0.65
		1	11	2.5	0.98				
		2	9	1.0	0.68				
	PRE	3	8	2.1	1.45				
		1	11	2.9	1.91				
		2	9	2.0	1.36				
Vegetable	POST	3	8	3.0	2.69	2	7.52	2.09	0.15
		1	11	1.7	0.93				
		2	9	1.6	0.82				
	PRE	3	8	2.4	2.09				
		1	11	1.9	1.25				
		2	9	1.9	0.93				
Whole Grains	POST	3	8	1.4	1.28	2	0.11	0.07	0.95
		1	11	1.5	0.95				
		2	9	1.0	0.68				
	PRE	3	8	2.0	1.81				
		1	11	1.3	1.10				
		2	9	1.4	1.14				
Refined Grains	POST	3	8	1.5	1.81	2	2.60	1.07	0.36

* 1= DDE Center, 2= Best Friends CDC, 3= Up to 3 **Average serving per day

Table 21: Parent Whole Food ANOVA by Group

							Between Subject		
		Group*	n	Mean**	SD	DF	MS	F	p-value
		1	11	1.9	0.86				
		2	9	1.7	0.80				
	PRE	3	8	2.1	1.69				
		1	11	2.8	0.67				
		2	9	2.3	0.87				
Fruit	POST	3	8	2.6	1.40	2	0.77	0.31	0.74
		1	11	3.5	2.71				
		2	9	1.6	0.37				
	PRE	3	8	2.3	1.59				
		1	11	2.8	1.50				
		2	9	2.5	1.12				
Vegetable	POST	3	8	3.6	2.53	2	6.86	1.61	0.22
		1	11	1.3	0.56				
		2	9	1.4	0.72				
	PRE	3	8	1.6	1.16				
		1	11	1.7	0.99				
		2	9	1.5	1.15				
Whole Grains	POST	3	8	1.8	1.81	2	0.37	0.26	0.78
		1	11	1.5	1.02				
		2	9	0.8	0.54				
	PRE	3	8	1.4	1.69				
		1	11	1.4	0.76				
		2	9	0.8	0.56				
Refined Grains	POST	3	8	1.5	1.57	2	2.44	2.17	0.14

* 1= DDE Center, 2= Best Friends CDC, 3= Up to 3 **Average serving per day

Table 22: Child Whole Food ANOVA by Preschool Study

		Preschool Study*	n	Mean**	SD	DF	MS	Between Subject F	p-value
	PRE	1	14	2.2	1.73				
		2	14	2.5	1.49				
	POST	1	14	3.4	2.04				
Fruit		2	14	2.6	1.43	1	1.14	0.27	0.61
	PRE	1	14	1.8	1.37				
		2	14	2.0	1.05				
	POST	1	14	2.9	2.36				
Vegetables		2	14	2.4	1.59	1	0.29	0.07	0.79
	PRE	1	14	1.9	1.75				
		2	14	1.8	0.80				
	POST	1	14	2.1	1.43				
Whole Grains		2	14	1.4	0.66	1	1.94	1.32	0.26
	PRE	1	14	1.7	1.45				
		2	14	1.2	0.92				
	POST	1	14	1.9	1.69				
Refined Grains		2	14	1.2	0.69	1	4.90	2.08	0.16

* 0= No child participation in preschool study, 1= Child participation in preschool study
** Average serving per day

Discussion

This study utilized a simple method to prevent childhood obesity through SNAP-Ed parent nutrition education which taught healthy lifestyle behaviors and encouraged the whole family to make small changes together, creating a successful environment. The SNAP-Ed nutrition curriculum focused on incorporating fruits, vegetables, and whole grains into mealtime.

It is recommended by USDA that children between the ages of 2-8 years consume 1 to 1 ½ cups of fruit and 1 to 1 ½ cups of vegetables, with 1 ½ to 2 ½ ounce equivalents of whole grains each day (Lok, 2010). However, most children's diets are high in fat and refined sugar and are not meeting this recommendation (Birch, 1998). It has become

clear that in order for child obesity trends to be reversed, healthy eating habits need to be established during childhood.

It was evident that the parent nutrition education resulted in a greater change in child fruit and vegetable consumption compared to the parents. It appeared that the change in fruit, vegetable, and grain consumption among the parents was rather insignificant. The results of this study were consistent with the findings of prior research concerning the significant correlation between parent and child food preferences (Stang, 2011). Prior to the intervention, parents had a significantly higher vegetable consumption compared to their children. Post-intervention, it was found that parent vegetable consumption did not significantly change, however child vegetable consumption significantly changed. Upon-post-test, children's vegetable consumption was near the vegetable consumption of the parents. Additionally, prior to the intervention, children had significantly higher fruit consumption compared to the parents. Upon post-test, both the children and the parents had a significant increase in fruit consumption. Therefore, the fruit consumption for the children and the parents paralleled one another. It is clear, that if food is introduced in an appropriate manner, dietary consumption of children will mimic that of their parents. As part of the lessons, parents were taught the appropriate way to introduce new foods to their children and techniques that can be used with a picky eater. The knowledge and techniques gained during these lessons likely impacted the significant changes in child fruit and vegetable consumption.

On average, the reported fruit and vegetable intake for the participants of this study and their children met the USDA guidelines upon pre-test. Despite this, child fruit

and vegetable consumption significantly improved upon post-test. Therefore, it is likely that the parent nutrition lessons will have even a greater impact on families who do not meet the USDA guidelines for fruit and vegetable consumption.

Change in whole grain consumption was insignificant for both the parents and children. However, unlike fruits and vegetables, whole grains were only discussed in depth in the last lesson. This left little, if any, time for families to make changes discussed in the class before completing the post-evaluation. Therefore, it is possible that whole grain consumption improved after the post-test was administered. This may also provide explanation for the small significant increase in refined grain consumption among children.

Contrary to our predicted hypothesis, there was no significant difference in whole food consumption between children involved in the preschool study and those who were not. Children involved in the preschool study received education on a whole food 2 to 3 times a week. The education given included a snack comprising of the whole food discussed. However, the children are only exposed to the whole food one time. As it takes 8 to 12 food exposures to develop a food preference, 1 exposure to the food item is not enough to significantly change dietary habits (Carruth, 2004).

This study has provided a program model that has been implemented and is capable of being repeated at various locations. Analysis of study results suggests that the series of SNAP-Ed nutrition education may be effective in the prevention of childhood obesity. Although the results of this study are exploratory, they can provide valuable information for further research.

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CHAPTER 4

CONCLUSION

Overweight and obesity among children has reached epidemic proportions.[1] *The 2010 Dietary Guidelines for Americans* estimated that 32% of children between the ages of 2 and 19 years are overweight or obese, with 17% of children being obese. Until recently, chronic diseases associated with obesity such as hypertension, type 2 diabetes, and hyperlipidemia were only seen in the adult population.[2] Not only will being overweight or obese during childhood increase the duration that an individual will have to live with the co-morbidities associated with obesity by one or two decades, it will also increase their risk of obtaining many adult diseases. Due to these detrimental health consequences associated with obesity, there is a call for preventative efforts.[3]

The increase in obesity prevalence is too rapid to be explained by a genetic shift. Rather, it is largely due to lifestyle behavior changes that have caused an imbalance of energy.[4] During early childhood, adaptability is high and genetic potential can be adjusted depending on environmental factors.[5] Childhood obesity intervention programs utilize behavior modification techniques.[6] Lifestyle modification emphasizes long term lifestyle and behavior change and encourages increased caloric expenditure with decreased caloric intake.[7] Placing an emphasis on the consumption of whole grains, vegetables, and fruits is a key factor in decreasing energy-dense food intake.[1] Previous research has shown that parent involvement in behavior modification programs has a larger impact than those with little or no parent involvement.[6] In addition to decreased caloric intake, emphasis should also be placed on physical activity. *The 2008 Physical Activity Guidelines for Americans*[8] recommends that children and adolescents participate

in at least one hour of physical activity daily. Physical activity should be either moderate or vigorous intensity.[8] In addition, The American Academy of Pediatrics recommends that children two years of age or older should spend no more than 2 hours a day watching television or participating in other forms of entertainment media.[9] The goal of Supplemental Nutrition Assistance Program-Education (SNAP–Ed) "is to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current Dietary Guidelines for Americans and MyPlate." SNAP-Ed focuses on 1) health promotion and 2) primary prevention of chronic disease by establishing healthy eating and physical activity habits. The USDA Food and Nutrition Service encourages each state to focus their SNAP-Ed efforts on behavior modifications such as: consuming a balanced diet by following MyPlate and *Dietary Guidelines for Americans*, increasing physical activity and decreasing sedentary habits, and maintaining an appropriate calorie balance for age.[10]

To date, little research and obesity prevention interventions have been conducted in early development settings. Most obesity prevention interventions have only had short term success and have been conducted solely in schools with older children.[5, 11] This study demonstrated a childhood obesity prevention intervention that involved parents with young children aged infant through 5 years. Parents were taught about family mealtime, feeding preschoolers, introducing new foods, meal planning, grocery shopping techniques, quick meal ideas, and incorporating fruits, vegetables, and whole grains into mealtime via a series of SNAP-Ed nutrition education. Three hundred and eight parents were recruited from Dolores Dore Early Care and Education Center, Best Friends Child Development Center, and Up to 3 Early Intervention. Fifty-two of recruited parents

completed the pre-evaluation and 28 parents completed the pre- and post-evaluations and the series of nutrition education classes. Fourteen of the participating parents had 3-5 year old children participating in a preschool nutrition study where they received nutrition education and food introductions.

After completion of parent nutrition lessons, children had a significant change in reported fruit ($p=0.02$), vegetable ($p=0.007$), and refined grain ($p=0.004$) consumption. Parents had a significant change in reported fruit ($p=0.001$) consumption. There was not a significant difference in reported whole food consumption between children who participated in the preschool nutrition study and those who did not. Additionally, there were no significant differences in reported whole food consumption between data collection groups. Parent knowledge scores significantly improved pre-test to post-test. There was not a significant difference in knowledge score between the participants of the 2 different class methods. The average parent body mass index (BMI) decreased significantly ($p<0.001$) pre- to post-test from 26.8 to 26.6. The analysis of the behavior checklist indicated that the parent nutrition education had a moderate to large effect on the following behavior categories: meal planning ($d=1.26$), food safety ($d=0.74$), healthy eating ($d=1.05$), and physical activity ($d=0.63$). Additionally, the food safety and physical activity behavior categories significantly improved from pre- to post-test. The response frequencies for the behavior checklist showed an improved response for all behavior categories and individual behaviors, with the exception of refrigerating meat and dairy within 2 hours of shopping. The ANOVA revealed that overall there was not a significant difference in reported behavior changes between the participants of the 2 different class methods.

It can be concluded that the parent nutrition education has great potential in helping prevent childhood obesity. Significant changes in knowledge, behavior, parent BMI, and dietary quality of children were reported over a short 3 to 4 month period of time. Additionally, the parent nutrition education was capable of improving child fruit and vegetable consumption without providing any interventions to the children. Prior to the intervention, the average reported fruit and vegetable consumption for both parents who participated in this study and their children met the guidelines established by the United States Department of Agriculture (USDA). However, their consumption improved even greater post-intervention. It is likely that if the parent nutrition lessons were given to a population who did not meet the USDA guidelines the change in reported fruit and vegetable consumption would be even greater.

There were many limitations and challenges to this study. First, behavior determinants, dietary consumption, and weight were measured by self report. Therefore, they were subject to memory, comprehension, and reporting error. Studies of this nature tend to rely on self-reported data. Reporting and comprehensions can be reduced if validated evaluations are utilized. In addition, evaluations should be easy to understand and complete. Validated evaluations were used in this study. Second, the biggest challenge was parent time constraints. This in turn affected recruitment, retention and ultimately the sample size. A larger sample size would provide greater reliability and validity. From this study, it was found that there were no significant differences in reported knowledge, behavior, or dietary quality changes between the parents who participated via group classes or at home with SoftChalk®. Future studies may have a greater retention and obtain a larger sample size if parents participate using the online

SoftChalk®. A larger sample size and greater retention may also be achieved if parents have a greater understanding of the significance of their role in childhood obesity prevention. It is suspected that a larger sample size will result in lifestyle behaviors of greater statistical significance. Third, this intervention took place over a short period of time. Each round of data collection was 3 to 4 months long due to enrollment periods of recruited facilities. Therefore, the sustainability of the outcomes measured is unknown. Additionally, due to the schedule and enrollment periods of recruited facilities, the post-test was administered to group class participants immediately after the last lesson. Therefore, the post-test was not an accurate measure of changes in whole grain and refined grain consumption. Future studies should include a follow-up evaluation 3 t o 4 months post-intervention to determine the sustainability of the measured outcomes. Furthermore, the post-evaluation should be completed at least one week after the last lesson to improve the accuracy of all reported changes. Improvement in whole grain and refined grain consumption may also be obtained if they are discussed in greater detail in all the lessons, like the fruits and vegetables. Lastly, the demographics of the participants lacked diversity. Participants were of the same race and ethnicity. Additionally, the majority of the participants were either pursuing higher education or highly educated and in the workforce. A greater diversity can be obtained by recruiting parents in different geographical areas. By utilizing SoftChalk® online lessons, there is a greater ability to reach families that are more diverse. It is likely that reported changes will be more significant among a more diverse population.

Despite the positive outcomes demonstrated, additional research in this area is warranted. Future research should aim to resolve and reduce the reported limitations and

challenges. Future research should also evaluate child neophobia and parental feeding styles as research suggests these play large roles in the development of childhood obesity. Evaluating neophobia and parent feeding styles will help determine the effectiveness of SNAP-Ed parent nutrition lessons in improving neophobia, food acceptance, and parent-child feeding relationships.

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APPENDIXES

Appendix A: Recruitment Brochure
(January 2011)

FOOD $ENSE

Helping Families Make Better Food Choices

WHAT IS FOOD $ENSE?

It is a program that offers nutrition education through individual or family instruction in your own home or in small groups.

The lessons are taught by nutrition education assistants who are employed by Utah State University Extension Service. The Lessons are FREE.

CHEESY POTATO SOUP

Ingredients

4 medium diced potatoes
1 large chopped onion
1 quart water
1 teaspoon salt
¼ cup butter
3 tablespoons flour
½ cup milk
1 ½ cups shredded sharp cheese
¼ teaspoon seasoned salt
¼ teaspoon paprika
¼ teaspoon ground pepper
Chopped chives

1) Combine potatoes, onion, water, and salt in heavy saucepan. Bring to a boil, reduce heat and simmer until tender about 20 min.
2) In a heavy skillet melt butter. Add flour; cook and stir until mixture bubbles.
3) Remove from heat; stir in milk. Return to heat; cook and stir until thickened.
4) Stir mixture slowly into potatoes. Cook and stir until thick.
5) Add cheese and seasonings.
6) Serve topped with chives.
4 to 6 servings

Having problems getting your preschooler to eat?

Got a picky eater?

Do you need kid friendly recipes?

WE CAN HELP

Are you concerned that your child is eating too much? Too little?

WHAT CAN I LEARN?

- How to make eating together as a family a priority
- How to feed your preschooler
- How to introduce new foods to your picky eater
- How to plan a menu and shop from a list
- How to prepare easy, quick, and tasty meals
- How to incorporate fruits and vegetables into your family mealtime
- How to incorporate whole grains into your family mealtime
- How to be active with your family
- And lots, lots more!

HOW DO I PARTICIPATE?

Your FAMILY has been selected to participate in this study because your child attends The Delores Doré Early Care and Education Center. Research assistants will be at the Early Care and Education Center **January 11 and 13** at **8:00-9:30 AM** and **12:00-1:30 PM** to answer questions and enroll participants. *To receive more information or if unable to attend during these hours contact Kelsey Rich at kelsey.r@aggiemail.usu.edu.* Enrollment Deadline: January 17, 2010.

UtahState University
COOPERATIVE EXTENSION

Appendix B: Recruitment Brochure
(October 2011)

FOOD $ENSE

Helping Families Make Better Food Choices

WHAT IS FOOD $ENSE?

It is a program that offers nutrition education through individual or family instruction in your own home or in small groups.

The lessons are taught by nutrition education assistants who are employed by Utah State University Extension Service. The Lessons are FREE.

Kelsey Rich is a registered dietitian (nutrition expert) and is currently working on her Masters degree at Utah State University. She is conducting a study that is focused on teaching parents how to get their children to eat a variety of foods. There are a total of FOUR nutrition lessons from September thru December. Each lesson is about an hour in length. You can participate by attending group classes in the evenings (See dates and times below) OR by watching DVD lessons on a computer at home. Group lessons will be held on Utah State University's campus.

LESSON	DATE/TIME
Family Mealtime	Thursday, October 13 @ 7 PM
Introducing New Foods	Thursday, October 27 @ 7 PM
Meal Planning and Quick Meals	Thursday, November 10 @ 7 PM
Incorporating Whole Foods into Family Mealtime	Thursday, December 1 @ 7 PM

HOW DO I PARTICIPATE?

To get more information OR to sign up to participate, email Kelsey Rich at kelsey.r@aggiemail.usu.edu or call Kelsey at 801-842-7095.

Having problems getting your preschooler to eat?

Got a picky eater?

Do you need kid friendly recipes?

WE CAN HELP

Are you concerned that your child is eating too much? Too little?

WHAT CAN I LEARN?

- How to make eating together as a family a priority
- How to feed your preschooler
- How to introduce new foods to your picky eater
- How to plan a menu and shop from a list
- How to prepare easy, quick, and tasty meals
- How to incorporate fruits and vegetables into your family mealtime
- How to incorporate whole grains into your family mealtime
- How to be active with your family
- And lots, lots more!

WHAT PARENTS WHO HAVE PARTICIPATED IN THESE LESSONS HAVE SAID...

- "When I first heard about the nutrition lessons I thought I'd learn little if anything. However, I thought I'd give the lessons a try and I am so glad that I did. I've learned so much, and my family will, no doubt, be much healthier now that we plan ahead and buy much more produce than before. It is also satisfying to watch them enjoy helping out more in the kitchen."
- "These lessons have helped me know more about my child."
- "Great recipes and examples—They made it very useful to use in daily life."
- "The classes are so good! I never want to miss it!"
- "The content of these lessons are really good!"
- "I learned how to get my toddler to participate in mealtime and ways to not be short order cook."
- "I loved the lesson on feeding preschoolers—so many parents make it a battle and it doesn't need to be that way!"

UtahState University COOPERATIVE EXTENSION

Appendix C: IRB Letter of Information
(January 7, 2011)

USU Certified Exempt: 01/07/2011
Exempt Certification Expires: 01/06/2014
Protocol Number: 2820
IRB Password Protected per IRB Coordinator

UtahState University
Department of Nutrition, Dietetics, and Food Sciences
8700 Old Main Hill
Logan, UT 84322-8700
Telephone: (435) 797-2126

Full AHRPP

LETTER OF INFORMATION
Parent and Preschooler Nutrition Education and
the Influence on Family Lifestyle Behavior Changes

Introduction/Purpose The Food Sense Nutrition program with Utah State University, under the direction of - Dr. Nedra Christensen, principal investigator, along with graduate student Kelsey Rich, is conducting a research study to find out more about behavior changes that participants make after participating in a series of nutrition lessons. You have been asked to participate because you have a child attending the Dolores Dore Eccles Center for Early Care and Education.

Procedures If you agree to participate in this study, the following will happen:
1. You will be expected to attend one class per month and must attend a minimum of 4 classes to be included in the study. Classes will start January 2011 and will conclude in June 2011.
2. Your weight and height will be measured at the beginning and the end of the study.
3. You will be asked to complete a survey regarding parent/child lifestyle behaviors at the beginning of the study and once again at the end of the study.
4. You will be asked to complete a survey at the end of the study regarding your satisfaction with the services provided.

New Findings During the course of this research study, you will be informed of any significant new findings (either good or bad), such as changes in the risks or benefits resulting from participation in the program, or new alternatives to participation that might cause you to change your mind about continuing in the program. If new information is obtained that is relevant or useful to you, or if procedures and/or methods change at any time throughout this study, your consent to continue participating in this will be obtained again.

Risks The risks involved in your participation in this study are no greater than what you may experience in everyday life or in the conduct of routine physical or paper and pencil assessments..

Benefits There may or may not be any direct benefit to you from these procedures. The researchers, however, may learn more about the effectiveness of Food $ense curriculum in changing lifestyle behaviors for individuals and families. In addition you will benefit from the curriculum content, and can make comments or provide information that may improve the overall program.

Explanation and Offer to Answer Questions An employee of Utah State University Extension Service has explained this research study to you and answered your questions. If you have other questions or research-related problems, you may reach Nedra Christensen at (801) 484-9374 or Kelsey Rich at (801) 842-7095.

Voluntary Nature of Participation and Right to Withdraw Without Consequence Participation in research is entirely voluntary. You may refuse to participate or withdraw at any time without consequence. You may be withdrawn from this study without your consent by the investigator. Your decision to withdraw or participate will not affect any services you may be receiving now or may receive in the future.

UtahState University
Department of Nutrition, Dietetics, and Food Sciences
8700 Old Main Hill
Logan, UT 84322-8700
Telephone: (435) 797-2126

Full AAHEPP

LETTER OF INFORMATION
Parent and Preschooler Nutrition Education and
the Influence on Family Lifestyle Behavior Changes

Confidentiality Research records will be kept confidential, consistent with federal and state regulations. Only the investigator and Food $ense state data collectors will have access to the data which will be kept on a password-protected computer or in a locked file cabinet in a locked room. Personal identifiers will not appear on any data collection forms or in data files; an individual code will be created for each participant.

IRB Approval Statement The Institutional Review Board (IRB) for the protection of human participants at USU has reviewed and approved this research study. If you have any pertinent questions or concerns about your rights or think the research study may have harmed you, you may contact the IRB Administrator at (435) 797-0567 or email irb@usu.edu. If you have a concern or complaint about the research and would like to contact someone other than the research team, you may contact the IRB administrator to obtain information or to offer input.

Investigator Statement "I certify that the research study has been explained to the individual by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered."

Nedra Christensen
Principal Investigator
(801) 484-9374
nedra.christensen@usu.edu

Heidi Leblanc
Co-Principal Investigator
(435) 797-3923
heidi.leblanc@usu.edu

Kelsey Rich
Graduate Student
(801) 842-7095
kelsey.r@aggiemail.usu.edu

Appendix D: IRB Letter of Information
(January 27, 2011)

UtahState University

Department of Nutrition, Dietetics, and Food Sciences
8700 Old Main Hill
Logan, UT 84322-8700
Telephone: (435) 797-2126

IRB Certificate of Exemption: Jan. 7, 2011
Amend#1 Approved: Jan. 27, 2011
Exempt Certification Expires: 01/06/2014
Protocol Number: 2820
IRB Password Protected per IRB Administrator

LETTER OF INFORMATION

Parent and Preschooler Nutrition Education and the Influence on Family Lifestyle Behavior Changes

Introduction/Purpose The Food Sense Nutrition program with Utah State University, under the direction of - Dr. Nedra Christensen, principal investigator, along with graduate student Kelsey Rich, is conducting a research study to find out more about behavior changes that participants make after participating in a series of nutrition lessons. You have been asked to participate because you have a child attending the Dolores Dore Eccles Center for Early Care and Education.

Procedures If you agree to participate in this study, the following will happen:

1. You will be expected to attend one class per month OR watch the five nutrition lessons from home via DVD to be included in the study. They study will start January 2011 and will conclude in June 2011.
2. Your weight and height will be measured at the beginning and the end of the study.
3. You will be asked to complete a survey regarding parent/child lifestyle behaviors at the beginning of the study and once again at the end of the study.
4. You will be asked to complete a survey at the end of the study regarding your satisfaction with the services provided.

New Findings During the course of this research study, you will be informed of any significant new findings (either good or bad), such as changes in the risks or benefits resulting from participation in the program, or new alternatives to participation that might cause you to change your mind about continuing in the program. If new information is obtained that is relevant or useful to you, or if procedures and/or methods change at any time throughout this study, your consent to continue participating in this will be obtained again.

Risks The risks involved in your participation in this study are no greater than what you may experience in everyday life or in the conduct of routine physical or paper and pencil assessments..

Benefits There may or may not be any direct benefit to you from these procedures. The researchers, however, may learn more about the effectiveness of Food $ense curriculum in changing lifestyle behaviors for individuals and families. In addition you will benefit from the curriculum content, and can make comments or provide information that may improve the overall program.

Explanation and Offer to Answer Questions An employee of Utah State University Extension Service has explained this research study to you and answered your questions. If you have other questions or research-related problems, you may reach Nedra Christensen at (801) 484-9374 or Kelsey Rich at (801) 842-7095.

Voluntary Nature of Participation and Right to Withdraw Without Consequence Participation in research is entirely voluntary. You may refuse to participate or withdraw at any time without consequence. You may be withdrawn from this study without your consent by the investigator. Your decision to withdraw or participate will not affect any services you may be receiving now or may receive in the future.

Confidentiality Research records will be kept confidential, consistent with federal and state regulations. Only the investigator and Food $ense state data collectors will have access to the data which will be kept on a password-protected computer or in a locked file cabinet in a locked room. Personal identifiers will not appear on any data collection forms or in data files; an individual code will be created for each participant.

IRB Approval Statement The Institutional Review Board (IRB) for the protection of human participants at USU has reviewed and approved this research study. If you have any pertinent questions or concerns about

UtahState University

Department of Nutrition, Dietetics, and Food Sciences
8700 Old Main Hill
Logan, UT 84322-8700
Telephone: (435) 797-2126

IRB Certificate of Exemption: Jan. 7, 2011
Amend#1 Approved: Jan. 27, 2011
Exempt Certification Expires: 01/06/2014
Protocol Number: 2820
IRB Password Protected per IRB Administrator

LETTER OF INFORMATION

Parent and Preschooler Nutrition Education and the Influence on Family Lifestyle Behavior Changes

your rights or think the research study may have harmed you, you may contact the IRB Administrator at (435) 797-0567 or email irb@usu.edu. If you have a concern or complaint about the research and would like to contact someone other than the research team, you may contact the IRB administrator to obtain information or to offer input.

Investigator Statement "I certify that the research study has been explained to the individual by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered."

Nedra Christensen
Principal Investigator
(801) 484-9374
nedra.christensen@usu.edu

Heidi Leblanc
Co-Principal Investigator
(435) 797-3923
heidi.leblanc@usu.edu

Kelsey Rich
Graduate Student
(801) 842-7095
kelsey.r@aggiemail.usu.edu

Appendix E: IRB Letter of Information
(May 25, 2011)

USU Certified Exempt: 01/07/2011
Amendment #2 Approved: 05/25/2011
Exempt Certification Expires: 01/06/2014
Protocol Number: 2820
IRB Password Protected per IRB Coordinator

UtahState University

Department of Nutrition, Dietetics, and Food Sciences
8700 Old Main Hill
Logan, UT 84322-8700
Telephone: (435) 797-2126

LETTER OF INFORMATION
Parent and Preschooler Nutrition Education and
the Influence on Family Lifestyle Behavior Changes

Introduction/Purpose The Food Sense Nutrition program with Utah State University, under the direction of - Dr. Nedra Christensen, principal investigator, along with graduate student Kelsey Rich, is conducting a research study to find out more about behavior changes that participants make after participating in a series of nutrition lessons. You have been asked to participate because you have a child attending the Dolores Dore Eccles Center for Early Care and Education, Best Friends CDC, or Early Headstart.

Procedures If you agree to participate in this study, the following will happen:
1. You will be expected to attend four group nutrition lessons over a course of three months OR watch the four nutrition lessons from home via DVD to be included in the study. They study will start June 2011 and will conclude in August 2011.
2. Your weight and height will be measured at the beginning and the end of the study.
3. You will be asked to complete a survey regarding parent/child lifestyle behaviors at the beginning of the study and once again at the end of the study.
4. You will be asked to complete a survey at the end of the study regarding your satisfaction with the services provided.

New Findings During the course of this research study, you will be informed of any significant new findings (either good or bad), such as changes in the risks or benefits resulting from participation in the program, or new alternatives to participation that might cause you to change your mind about continuing in the program. If new information is obtained that is relevant or useful to you, or if procedures and/or methods change at any time throughout this study, your consent to continue participating in this will be obtained again.

Risks The risks involved in your participation in this study are no greater than what you may experience in everyday life or in the conduct of routine physical or paper and pencil assessments..

Benefits There may or may not be any direct benefit to you from these procedures. The researchers, however, may learn more about the effectiveness of Food $ense curriculum in changing lifestyle behaviors for individuals and families. In addition you will benefit from the curriculum content, and can make comments or provide information that may improve the overall program.

Explanation and Offer to Answer Questions An employee of Utah State University Extension Service has explained this research study to you and answered your questions. If you have other questions or research-related problems, you may reach Nedra Christensen at (801) 484-9374 or Kelsey Rich at (801) 842-7095.

Voluntary Nature of Participation and Right to Withdraw Without Consequence Participation in research is entirely voluntary. You may refuse to participate or withdraw at any time without consequence. You may be

Department of Nutrition, Dietetics, and Food Sciences
8700 Old Main Hill
Logan, UT 84322-8700
Telephone: (435) 797-2126

LETTER OF INFORMATION
Parent and Preschooler Nutrition Education and
the Influence on Family Lifestyle Behavior Changes

withdrawn from this study without your consent by the investigator. Your decision to withdraw or participate will not affect any services you may be receiving now or may receive in the future.

Confidentiality Research records will be kept confidential, consistent with federal and state regulations. Only the investigator and Food $ense state data collectors will have access to the data which will be kept on a password-protected computer or in a locked file cabinet in a locked room. Personal identifiers will not appear on any data collection forms or in data files; an individual code will be created for each participant.

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Nedra Christensen
Principal Investigator
(801) 484-9374
nedra.christensen@usu.edu

Heidi Leblanc
Co-Principal Investigator
(435) 797-3923
heidi.leblanc@usu.edu

Kelsey Rich
Graduate Student
(801) 842-7095
kelsey.r@aggiemail.usu.edu

Appendix F: IRB Letter of Information
(September 8, 2011)

UtahState University

Department of Nutrition, Dietetics, and Food Sciences
8700 Old Main Hill
Logan, UT 84322-8700
Telephone: (435) 797-2126

Page 1 of 2
USU IRB Certificate of Approval: Jan 7, 2011
Amend#3 Approved: 09/08/2011
Certificate Expires: 01/06/2014
Protocol #2820
IRB Password Protected per IRB Administrator

LETTER OF INFORMATION

Parent and Preschooler Nutrition Education and the Influence on Family Lifestyle Behavior Changes

Introduction/Purpose The Food Sense Nutrition program with Utah State University, under the direction of - Dr. Nedra Christensen, principal investigator, along with graduate student Kelsey Rich, is conducting a research study to find out more about behavior changes that participants make after participating in a series of nutrition lessons. You have been asked to participate because you have a child (aged infant thru five years).

Procedures If you agree to participate in this study, the following will happen:

1. You will be expected to attend four group nutrition lessons over a course of three months OR watch the four nutrition lessons from home via DVD to be included in the study.
2. Your weight and height will be measured at the beginning and the end of the study.
3. You will be asked to complete a survey regarding parent/child lifestyle behaviors at the beginning of the study and once again at the end of the study.
4. You will be asked to complete a survey at the end of the study regarding your satisfaction with the services provided.

New Findings During the course of this research study, you will be informed of any significant new findings (either good or bad), such as changes in the risks or benefits resulting from participation in the program, or new alternatives to participation that might cause you to change your mind about continuing in the program. If new information is obtained that is relevant or useful to you, or if procedures and/or methods change at any time throughout this study, your consent to continue participating in this will be obtained again.

Risks There is minimal risk in participating in this study.

Benefits There may or may not be any direct benefit to you from these procedures. The researchers, however, may learn more about the effectiveness of Food $ense curriculum in changing lifestyle behaviors for individuals and families. In addition you will benefit from the curriculum content, and can make comments or provide information that may improve the overall program.

Explanation and Offer to Answer Questions An employee of Utah State University Extension Service has explained this research study to you and answered your questions. If you have other questions or research-related problems, you may reach Nedra Christensen at (801) 484-9374 or Kelsey Rich at (801) 842-7095.

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8700 Old Main Hill
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LETTER OF INFORMATION

Parent and Preschooler Nutrition Education and the Influence on Family Lifestyle Behavior Changes

contact someone other than the research team, you may contact the IRB administrator to obtain information or to offer input.

Investigator Statement "I certify that the research study has been explained to the individual by me or my research staff, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered."

Nedra Christensen
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(801) 484-9374
nedra.christensen@usu.edu

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kelsey.r@aggiemail.usu.edu

Print Form

NEA Name_____

County_____

Food $ense Behavior Checklist

Instructions: Please complete form after completion of four or more Food $ense classes. Fill in the circles completely with a pen. If you make a mistake mark an ✕ and then fill in the correct circle. When required to fill in a blank, please write legibly.

Please write your first and last initials on the line and then fill in the corresponding circled letter:

First letter of first name_____ Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ Ⓖ Ⓗ Ⓘ Ⓙ Ⓚ Ⓛ Ⓜ Ⓝ Ⓞ Ⓟ Ⓠ Ⓡ Ⓢ Ⓣ Ⓤ Ⓥ Ⓦ Ⓧ Ⓨ Ⓩ

First letter of last name_____ Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ Ⓖ Ⓗ Ⓘ Ⓙ Ⓚ Ⓛ Ⓜ Ⓝ Ⓞ Ⓟ Ⓠ Ⓡ Ⓢ Ⓣ Ⓤ Ⓥ Ⓦ Ⓧ Ⓨ Ⓩ

Please write the month and day on which you were born, then fill in the corresponding circled number.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Month _____	Ⓙ	Ⓕ	Ⓜ	Ⓐ	Ⓜ	Ⓙ	Ⓙ	Ⓐ	Ⓢ	Ⓞ	Ⓝ	Ⓓ

Day _____ ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

_____ ⓪ ① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

If your birthday is on the first please fill in the ⓪ on the top row and the ① on the bottom row. If your birthday is 10th or higher, please fill in the first number on the top row. For example, for the 10th fill in the ① on the top row and the ⓪ on the bottom row.

Survey of Classes Completed:

What was your favcrite lesson?

What did you like about the class?

What Would you change about the class?

FOR NEA ONLY

Target Audience (if target audience is ③ attach documentation.

① ② ③

Number of lessons taught – fill in the last circle ⓪ for 10 or more.

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⓪

Food $ense Behavior Checklist

Directions: Please reflect back before you participated in Food Sense. Rate your behaviors on the left. Now that you have completed a series for Food Sense the behaviors you plan to do. **Please write legibly, fill in number circle completely.**

Food $ense Rating Scale
① Never
② Seldom
③ Sometimes
④ Usually
⑤ Always

	Prior to Food $ense I...						Now I will					
1	○	○	○	○	○	Plan meals ahead of time	○	○	○	○	○	
2	○	○	○	○	○	Compare prices before buying food	○	○	○	○	○	
3	○	○	○	○	○	Have enough food to last through the end of the month	○	○	○	○	○	
4	○	○	○	○	○	Shop with a grocery list	○	○	○	○	○	
5	○	○	○	○	○	Refrigerate meat and dairy within two hours of shopping	○	○	○	○	○	
6	○	○	○	○	○	Thaw frozen foods in the refrigerator.	○	○	○	○	○	
7	○	○	○	○	○	Make food purchases based on healthy choices	○	○	○	○	○	
8	○	○	○	○	○	Prepare foods without adding salt	○	○	○	○	○	
9	○	○	○	○	○	Read Nutrition Facts Labels before purchasing	○	○	○	○	○	
10	○	○	○	○	○	Children in household eat something within 2 hours of waking	○	○	○	○	○	
11	○	○	○	○	○	Wash hands before food preparation or eating	○	○	○	○	○	
12	○	○	○	○	○	Prepare raw foods separately from other foods	○	○	○	○	○	
13	○	○	○	○	○	Choose to be physically active, at least 30 minutes 5 days a week	○	○	○	○	○	
14	○	○	○	○	○	Choose to walk, take the stairs, or be active in other ways	○	○	○	○	○	
15	○	○	○	○	○	Prepare meals at home at least 3 times a week	○	○	○	○	○	
16	○	○	○	○	○	Eat meals together as a family at least 3 times a week	○	○	○	○	○	
17	○	○	○	○	○	Eat at least 3 servings of vegetables a day	○	○	○	○	○	
18	○	○	○	○	○	Eat at least 2 servings of fruits a day	○	○	○	○	○	
19	○	○	○	○	○	Eat at least 2 servings of dairy a day	○	○	○	○	○	
20	○	○	○	○	○	Replace saturated and trans-fats with heart healthy fat.	○	○	○	○	○	

Appendix H: Food Frequency Questionnaire

Food $ense Food Frequency Questionnaire-2010

Before ○
After ○

Participant Initials _____
Participant B Day Month _____
Participant B-Day Date _____

NEA Name/County _____

Instructions: Please complete this form at the beginning of taking the Food $ense Class series and after you have participated in at least four lessons. Please report about how often you usually ate the following in the **previous month.** If you did not eat a certain food at all during the specified period, please fill in the bubble that corresponds to the **"never"** category. Please do not leave any item blank. The response choices are listed below:

FRUIT (includes juices, fresh, canned, frozen or dried)	Never or less than 1 a week	1-3 per week	4-6 per week	1 per day	2-3 per day	4-5 per day	6 per day
Red: cherries; cranberries; pink grapefruit; pomegranates; raspberries; apples; grapes; strawberries; watermelon	0	0	0	0	0	0	0
Orange/Yellow: apricots; cantaloupe; grapefruit; lemons; mangos; nectarines; oranges; papayas; peaches; pineapple; tangerines; yellow apples	0	0	0	0	0	0	0
Green: avocados; green apples; grapes; honeydew; kiwi; limes	0	0	0	0	0	0	0
Blue/Purple: blackberries; blueberries; elderberries; black currants; plums; prunes; grapes; raisins	0	0	0	0	0	0	0
White: bananas; pears	0	0	0	0	0	0	0

VEGETABLES (includes juices, fresh, canned, frozen or dried)	Never or less than 1 a week	1-3 per week	4-6 per week	1 per day	2-3 per day	4-5 per day	6 per day
Red: beets; red lettuce; red onions; red peppers; red potatoes; rhubarb; tomatoes; salsa	0	0	0	0	0	0	0
Orange/Yellow: carrots; corn; pumpkin; sweet potatoes (yams); rutabagas; winter squash (acorn, banana, butternut, spaghetti, etc); yams; yellow peppers	0	0	0	0	0	0	0
Green: asparagus; beans; broccoli; brussels sprouts; cabbage; celery; green peppers; winter greens (including collard, kale, mustard, and turnips); cucumbers; lettuce; okra; peas; spinach; swiss chard; zucchini	0	0	0	0	0	0	0

Food Frequency Questionnaire—Page 2

Before ○
After ○

Participant Initials _____
Participant B Day Month _____
Participant B-Day date _____

NEA Name/County _____

	Never or less than 1 per week	1-3 per week	4-6 per week	1 per day	2-3 per day	4-5 per day	6 per day
Blue/Purple							
eggplant; purple potatoes; purple asparagus; purple cabbage; purple peppers	0	0	0	0	0	0	0
White							
cauliflower, corn; garlic; jicama; kohlrabi; mushrooms; onions; potatoes; radishes; shallots; turnips	0	0	0	0	0	0	0
Meats, Beans and Proteins							
Eggs							
whole; egg whites; egg beaters	0	0	0	0	0	0	0
Beans							
black; kidney; lentils; red pinto; white; dried peas	0	0	0	0	0	0	0
Beef							
hamburger; jerky; roast; steak	0	0	0	0	0	0	0
Pork							
bacon; chops; loin; roast	0	0	0	0	0	0	0
Poultry							
fried; with skin or without skin; baked; grilled	0	0	0	0	0	0	0
Fish/Seafood							
clams; fish; lobster; mussels; shrimp; scallops	0	0	0	0	0	0	0
Other Meats							
hot dogs; lunch meats	0	0	0	0	0	0	0
Out of all the meats—how many times a week do you select lean cuts?	0	0	0	0	0	0	0

	Never or less than 1 per week	1-3 per week	4-6 per week	1 per day	2-3 per day	4-5 per day	6 per day
DAIRY							
milk (skim, 1%, 2%, or whole); creamer; frozen yogurt; ice cream; cheese (by itself or part of a meal)	0	0	0	0	0	0	0
Out of the dairy you eat in a week, how many times do you select a low or non-fat choice?	0	0	0	0	0	0	0

Food Frequency Questionnaire—Page 3

Before ○
After ○

Participant Initials _____
Participant B Day Month _____
Participant B-Day date _____

NEA Name/County _____

	Never or less than 1 per week	1-3 per week	4-6 per week	1 per day	2-3 per day	4-5 per day	6 per day
GRAINS							
Whole Grains							
bread; bulgur; cereals; crackers; kasha; oatmeal; pancakes or waffles; pasta; popcorn; rice; wheat berries; quinoa	0	0	0	0	0	0	0
Refined Grains							
bread; cereal; couscous; crackers; pancakes or waffles; pasta; pretzels; rice	0	0	0	0	0	0	0
DISCRETIONARY CALORIES	Never or less than 1 per week	1-3 per week	4-6 per week	1 per day	2-3 per day	4-5 per day	6 per day
sugary drinks such as regular sodas, hawaiian punch; kool-aid or other similarly sweetened fruit flavored drinks	0	0	0	0	0	0	0
beer; wine; liquor	0	0	0	0	0	0	0
sweets such as candy bars; other candy; desserts; brownies; cake; pie; cookies	0	0	0	0	0	0	0
oils such as olive oil; canola oil;	0	0	0	0	0	0	0
other fats such as butter; margarine; mayonnaise; salad dressing and other oils	0	0	0	0	0	0	0
fatty foods such as potato chips; fries; donuts	0	0	0	0	0	0	0

Appendix I: Nutrition Knowledge Survey

Loving Your Family, Feeding Their Future **-Knowledge Survey -** FOOD $ENSE

Participant Initials: _____ Birth Month (MM) ____ Birth Date (DD) ____ Pre-test ____ Post-test ____

Instructions:

1. Read the following questions and select the best answer.

Family Mealtime

1. The following are ways to make mealtime a family ritual, except:
- A. Leave discipline for a later time—Talk about fun and happy things
- B. Force children to try new foods at the dinner table
- C. Do not watch TV during meals
- D. Be flexible about the time of family meals.

2. Frequent and happy mealtimes lead to:
- A. Children who do not participate in as much risky behavior
- B. Better nutrition
- C. Children with fewer eating disorders
- D. All of the Above

3. Which of the following is NOT a good way to make mealtime better?
- A. Include at least one of your child's favorite foods at every meal
- B. Keep portion sizes the same for all family members
- C. Involve children in meal preparation
- D. Plan meals ahead

Feeding Pre-Schoolers

4. Young children need healthy snacks because:
- A. They have small stomachs and cannot eat a lot at each meal
- B. Their appetite changes from day to day
- C. They are growing and need proper nutrition to grow
- D. All of the above

5. Which statement is not true:
- A. It is normal for children to reject foods they have never had before
- B. Foods that your child does not like should never be offered again
- C. New foods should be offered at the beginning of a meal when the child is most hungry
- D. New foods should be served with a food item the child likes

6. What can parents do to cope with picky eaters?
- A. Prepare a different meal for your picky child
- B. Let the child choose produce and other healthy foods at the store
- C. Don't offer the child choices
- D. Don't allow the child to leave the table until they have eaten everything on his or her plate

Meal Planning

7. Which of the following will help you the most to stay within your budget?
- A. Planning menus
- B. Buying prepared foods
- C. Shopping frequently
- D. Shopping without a list

8. When grocery shopping, what should you avoid?
- A. Unit pricing
- B. Shopping when hungry
- C. Label reading
- D. Buying produce in season

9. Which of the following is important to follow when planning meals?
- A. Children (ages 2-8) should consume 2 cups of low-fat milk or dairy products each day
- B. At least half of the grains eaten each day should be whole grains
- C. 1/4 of the food on your plate should be fruits and vegetables
- D. Both A and B

Fruit/Vegetables	**10.** How many cups of fruit should the average adult consume each day? A. 1 cup B. 2 cups C. 3 cups D. 3.5 cups
	11. A benefit(s) to consuming fruits and vegetables is_____. A. They make you feel full longer B. They fight chronic disease C. They are nutrient dense and not very calorie dense. D. All of the above
	12. How many cups of vegetables should the average adult consume each day? A. 1.5 B. 2 C. 2.5 D. 3
Whole Grains	**13.** All the following are recommendations for fiber, except: A. Slowly increase fiber intake over 2 weeks B. Drink plenty of liquids C. Consume 15 grams per day D. Obtain fiber from a variety of sources (i.e. whole grains, fruits, and vegetables)
	14. Which of the following are good sources of fiber? A. Whole grains B. Legumes C. Fruits and vegetables D. All of the above
	15. Which of the following counts as a one ounce serving of grain? A. 3 cups popcorn B. 1 cup cooked rice C. 1 bagel D. ½ cup ready-to-eat cereal
Physical Activity	**16.** U.S. children ages 2-18 on average spend ____ hours watching TV per day A. 2 ½ to 4 B. 3 ½ to 4 C. 6 to 8 D. 8 ½ to 12
	17. *The U.S. Dietary Guidelines* recommend that children and adolescents engage in _____ minutes of physical activity on most, preferably all, the days of the week. A. 45 B. 60 C. 30 D. 40
	18. Physical activity should be at least moderate intensity. Which of the following activities are included in this category? A. Gardening/yardwork B. Dancing C. Bicycling D. All of the Above

NEA USE ONLY

NEA(s): _____ **COUNTY**_____

Funding in support of the Food Sense Nutrition Education Program is provided by USDA-CSREES and USDA Food Nutrition Services in cooperation with the Utah Food Stamp Program, Department of Workforce Services

Food Sense Class Participant Form

NEA Name KELSEY

County CACHE

Instructions: Please complete this form for every class you participate in. Fill in the circles completely with a pen. If you make a mistake make an X, and then fill in the correct circle. If there are blank spaces, please write legibly.

Please write your first and last initials on the line, and then fill in the corresponding circled letter.

First letter of first name_____ Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ Ⓖ Ⓗ Ⓘ Ⓙ Ⓚ Ⓛ Ⓜ Ⓝ Ⓞ Ⓟ Ⓠ Ⓡ Ⓢ Ⓣ Ⓤ Ⓥ Ⓦ Ⓧ Ⓨ Ⓩ

Last letter of last name_____ Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ Ⓕ Ⓖ Ⓗ Ⓘ Ⓙ Ⓚ Ⓛ Ⓜ Ⓝ Ⓞ Ⓟ Ⓠ Ⓡ Ⓢ Ⓣ Ⓤ Ⓥ Ⓦ Ⓧ Ⓨ Ⓩ

Age:

- ○ Less than 5 years
- ○ 5-17 years
- ○ 18-59 years
- ○ 60 years or older

Please write month and day on which you were born, and then fill in the corresponding circled number(s). If your birthday is on the 10th or higher, please fill in the first number on the top row. For example, for the 10th fill in the ① on the first row and the example, ⓪ bottom row. You **must** circle a number in each row.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Month_____	Ⓙ	Ⓕ	Ⓜ	Ⓐ	Ⓜ	Ⓙ	Ⓙ	Ⓐ	Ⓢ	Ⓞ	Ⓝ	Ⓓ

Day _____	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨
	⓪	①	②	③	④	⑤	⑥	⑦	⑧	⑨

Gender:

- ○ Female
- ○ Male

Race:

Fill in the circle that corresponds to your race

- ○ American Indian or Alaskan Native
- ○ Asian
- ○ Black or African American
- ○ Native Hawaiian or other Pacific Islander
- ○ White

If you claim additional race circle below

- ○ American Indian or Alaskan Native
- ○ Asian
- ○ Black or African American
- ○ Native Hawaiian or other Pacific Islander
- ○ White

Ethnicity: (regardless of your race do you consider yourself to be of Hispanic origin or Latino descent?)

- ○ Yes
- ○ No

Instructions: Fill in the circle that best describes the overall class in each of the four categories.	None	Little	Some	Average	Quite a bit
1. Overall usefulness of lessons	①	②	③	④	⑤
2. Overall effectiveness of presentation	①	②	③	④	⑤
3. Overall Quality of Session	①	②	③	④	⑤
4. Overall knowledge gained	①	②	③	④	⑤

Food $ense is a federally funded program. Please complete the questions below stating if you qualify for the following assistance. Please review the income chart below to help you answer the question	Yes	No
Do you currently Receive Food Stamps	○	○
Do you currently qualify for Food Stamps	○	○
Do you currently qualify for other assistance	○	○

Family Size	Income @130% of Poverty		Income @185% of Poverty	
	Annual	Monthly	Annual	Monthly
1	$14,079.00	$1,173.25	$20,035.50	$1,669.63
2	$18,941.00	$1,578.42	$26,954.50	$2,246.21
3	$23,803.00	$1,983.36	$33,873.50	$2,822.79
4	$28,665.00	$2,388.75	$40,792.50	$3,399.38
5	$36,127.00	$2,793.92	$47,711.50	$3,975.96
6	$38,389.00	$3,199.08	$54,630.50	$4,552.54
7	$43,251.00	$3,604.25	$61,549.50	$5,129.13
8	$48,113.00	$4,009.42	$68,468.50	$5,705.71
For family units of more than 8 members add $3,740. 00 for each member				

How Can Food $ense Improve

_____

_____

Additional Comments:

To be filled in by Nutrition Education Assistant

Lesson Taught

- ○ Family Time and Overcoming Barriers
- ○ Feeding Preschoolers: Introduction to New Foods
- ○ Meal Planning and Quick Meals
- ○ Incorporating Fruits and Vegetables into family meals
- ○ _____
- ○ _____
- ○ _____