PREVENTION OF CHILDHOOD OBESITY AMONG LOW-INCOME PRESCHOOL-AGED CHILDREN

by

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ABSTRACT

Prevention of Childhood Obesity among Low-Income Preschool-Aged Children

by

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To determine the effects of a targeted curriculum and dual program involvement on childhood overweight status among low-income preschool children, a nutrition curriculum was developed. Three Special Supplemental Food Program for Women Infants and Children (WIC) clinics participated in the study: the control clinic, a clinic which received the targeted curriculum, and a third clinic which received the targeted curriculum and referred participant families to the Expanded Food and Nutrition Education Program (EFNEP). Participants were followed for six months. Data collected included anthropometrics, dietary intake, and parental behaviors.

Results showed a decrease in body-mass index percentile, slight improvements in dietary intakes, and increased prevalence of healthy parental behaviors for all three clinics. Overall no significant differences between clinics were noted. Surveys indicated a positive impact of the curriculum in meeting desired objectives and a positive change on parents’ self-efficacy.

(89 pages)
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LIST OF SYMBOLS, NOTATION, DEFINITIONS

ANOVA – Analysis of Variance
BMI – Body Mass Index
BMI-for-age %ile – Body Mass Index for age percentile
CDC – Center for Disease Control
EFNEP – Expanded Food and Nutrition Education Program
i.e. – for example
IRB – institutional review board
n – sample size
NHANES – National Health and Nutrition Examination Survey
p – observed significance value
RDA – recommended dietary allowance
SD – standard deviation of mean
Sig. – significance
SPSS – Statistical Products and Service Solutions
t-test – statistical term

UT – Utah
vs. – versus
WIC – Supplemental Nutrition Program for Low-Income Women, Infants and Children
% – percent
%ile – percentile
> – greater than
< – less than
± – plus or minus
CHAPTER I

INTRODUCTION

Because there are strong links between obesity and cardiovascular health, the Utah Department of Health, Cardiovascular Program funded a research grant specifically for a study that would target childhood obesity prevention. The grant further requested that the study interventions be based upon best practices as derived from the literature on the successful intervention methods dealing with childhood obesity. The study interventions were to be designed based upon a theory of behavior change. Extensive literature reviews of childhood obesity and the social cognitive theory were conducted for this purpose and are found in chapters II and IV. The research studies outlined in chapters III and V utilize the lessons learned from the literature reviews to implement the social cognitive theory in helping prevent childhood obesity through instruction within the Special Supplemental Food Program for Women, Infants and Children (WIC) and the Expanded Food and Nutrition Education Program (EFNEP).
Overview of the Problem, Prevalence, and Definitions

The United States is experiencing significant increases in overweight and obesity which cuts across all ages, gender, racial and ethnic groups. These increases are becoming a significant public health problem within the United States and throughout the world (1-2). The cost of treating obesity-related diseases exceeds the cost of tobacco and alcohol related diseases combined (3). Second only to tobacco use, obesity and overweight status is the leading avoidable cause of illness and death in the U.S. It has been speculated that obesity may pass tobacco as the leading cause of preventable morbidity and mortality in the near future (1). Currently, around 300,000 deaths a year are associated with adult obesity and overweight. In the year 2000, total and indirect costs amounted to $117 billion, including more than $50 billion in avoidable medical costs (4). The detrimental effect of obesity on adult health is clearly demonstrated in the literature. In addition, obesity is now considered the most prevalent nutritional disease among children and adolescents (5). Many organizations nationwide are taking action to fight and prevent obesity and overweight. Targeting prevention interventions towards the Nation’s children and their parents may prove to be most effective and beneficial in preventing childhood overweight and possibly even adult obesity (5-12).

The prevalence of overweight among children has increased dramatically. The Surgeon General reports that over the past two decades, the percentage of children who...
are overweight nearly doubled, and the percentage of adolescents who are overweight has almost tripled (1). It is currently estimated that 13% of children 6-11 years and 14% of adolescents 12-19 years are overweight (1,6-7). This, in comparison with the results from the NHANES III shows a 2-3 percentage point increase. Previous data showed approximately 11% of children aged 6-17 were overweight (6-7).

Current estimations for the total prevalence of childhood overweight range from 13-33%, depending on the source of the data and the definition used (1,6-10,13-18). The prevalence statistics vary even further among different sociodemographic sub-groups. One reason for the discrepancy results from differences in defining childhood overweight and obesity. In the year 2000, the CDC issued new gender and age specific BMI-for-age growth charts for children ages 2-20. Based on these new growth charts, childhood "overweight" is defined as BMI-for-age greater than the 95th percentile. Children between the 85th and 95th percentiles are defined as "at risk of overweight" (1,7). These definitions are now used by many hospitals, clinics and organizations including the Supplemental Foods Program for Women, Infants and Children (WIC) (13). The American Academy of Pediatrics also uses these definitions of overweight status (19). Currently there is no official distinction between overweight and obesity among children as there is with adults. The terms "childhood obesity" and "childhood overweight" thus continue to be used interchangeably throughout the literature. In spite of the definitions made by the CDC, prevalence of childhood overweight and obesity is often referenced by other definitions. For example, one literature review reports childhood obesity ranges from 22-33%, defined by a BMI-for-age greater than the 85th percentile (10). Another reference reported based on the NHANES III (1988-1994) that 11.1% of U.S. children
were obese (BMI-for age ≥95th percentile) and 14.3% were overweight (≥85th, BMI-for age percentile and < 95th BMI-for age percentile) with a total of 25.4% prevalence of obesity and overweight in children (14). Regardless of which method is used to classify overweight or obesity, studies consistently report a high prevalence of childhood obesity and overweight with dramatically increasing rates over time. In addition it is consistently reported that a higher prevalence of childhood overweight and obesity is among low-income children and African-, Native-, and Latino-American children (1,6,10,13-18, 20).

The prevalence of childhood overweight among children in Utah is also increasing. According to the Pediatric Nutrition Surveillance, which monitors children <5 years who participate in the WIC program, among the nation’s children aged 2-5 years, 12.9% are overweight and 15.1% are at risk of becoming overweight. Utah’s children are currently below this national average with 7.3% overweight and 11.9% at risk of overweight. In spite of being below the national average, between 1991 and 2001, there was a nearly 2-percentage point increase in the prevalence of overweight children in Utah aged 2-5 years (13).

**Effects on Health**

The increasing prevalence of childhood overweight status is concerning. Obesity in adults is clearly shown to be detrimental to health. More research is indicating that childhood overweight is associated with the development of unfavorable health outcomes in childhood as well. There are many medical diseases that were once regarded as “adult” problems that are now being found among children. There is an alarming increase in the rate of type 2 diabetes, high blood pressure, and high blood cholesterol
levels (1-2,6-8,10,17-22). Mental health is also at risk largely due to the social stigmatization often imposed upon obese children (19).

Persistence of overweight into adulthood may be the greatest risk for overweight children. Progression of overweight into adulthood increases with age (5,8,17,22). The greatest risk of adult obesity is among those children who have a higher degree of adiposity and who are older (6). A child who is overweight will not necessarily become an overweight adult, but an overweight infant is more likely to become an overweight preschool child. An overweight preschool child will likely become an overweight school-aged child. This child in turn is more likely to become an overweight adolescent, who then is likely to remain obese as an adult (17). One study reports approximately 33% of obese preschool children, 50% of obese school age children and a startling 80% of obese adolescents become obese adults (21). Overall the risk of becoming an overweight adult is 2 to 6.5 times higher for overweight children in comparison to non-overweight children (6). In addition, adults who were obese as children have a greater morbidity and mortality regardless of their adult weight (23). Thus effective treatment and prevention of obesity must start during childhood.

Need for Effective Timing for Prevention

How and when to intervene, to prevent childhood overweight and obesity, is a challenging question. In 2000 the Surgeon General issued a “Call to Action to Prevent and Decrease Overweight and Obesity” (1). This has prompted many community and public health agencies to become more involved in treatment and prevention of obesity in adults and children. But very little is available to show how best this should be done,
particularly in prevention of childhood obesity (24). Many public health nutrition programs, including the WIC and EFNEP programs have been given mandates to direct education efforts to prevent childhood obesity. The FIT WIC programs are an example of such efforts (25). The resulting conclusion of a prevalence study within the New York WIC program was that interventions to address childhood overweight should be culturally specific and target very young children (26). However, in spite of increased focus on prevention and treatment by public health agencies, few evaluative studies have been conducted to indicate the best way to reduce the prevalence of childhood obesity.

How and when to best intervene in preventing childhood obesity is a challenging question public health agencies need answered. Studies have identified several critical periods for the development of childhood overweight. These periods include gestation, early infancy, the period of preschool age - which is termed the “adiposity rebound” (ages 3-6 years), and puberty (6,8,10,20). It appears that intervening prior to age 9 or 10 is essential for the prevention of childhood obesity. Interventions beginning prior to the adiposity rebound may be even more promising (6). Breastfeeding has been linked extensively with preventing childhood obesity. Efforts to increase breastfeeding rates and duration during infancy may prove beneficial (27).

Prevention is the key to addressing the epidemic of childhood overweight and obesity. Once a child has become overweight, treatment is more difficult and the condition often becomes a lifelong problem (9,17). Prevention of weight gain is easier, less costly, and more effective than treating obesity after it is fully developed (6). Therefore, prevention is the most effective treatment. Interventions with younger children may be more effective than with older children because they have had less time
to develop poor eating and exercise habits, and parents have a greater influence over their lifestyles (17).

Causes of Childhood Obesity

In order to know how to prevent childhood overweight and obesity a look at the causes of this problem is necessary. Childhood overweight is a result of complex, multifactorial genetic and environmental influences. Even the genetic and environmental factors are difficult to separate. For example, a major risk factor for childhood obesity is parental obesity (6,18,20-21,26). A child has an 80% chance of becoming obese when both parents are obese and a 40% chance when only one parent is obese. When neither parent is obese, chances of childhood obesity are reduced to 7% (18). In spite of the role genetics play, it is apparent that environmental and lifestyle factors have a significant impact in the dramatic increases in childhood overweight and obesity. In a recent review of childhood obesity, Strauss stated, "only changes in the environmental and social factors can explain the doubling of severe childhood obesity over the past 30 years. Current environmental factors and trends are placing all children at risk for obesity" (18).

Studies from a variety of disciplines indicate that childhood overweight and obesity are not caused by one thing; rather they result from the interplay of multiple factors: genetic, physiological, psychologic, sociocultural, and environmental factors. Digging deeper within these factors, several key topics emerge in the literature. These include genetics, parental obesity, socioeconomic status, family dynamics and parenting skills, diet, physical activity, sedentary activity, and behavioral factors (2,5-6,9-10,18-
While the extent that each of these individual factors play is controversial, it is clear that interventions need to target these causes to prevent childhood obesity.

**Successful Interventions**

Successful interventions target factors that can be changed, combine both a diet and activity focus, provide skill development, and promote behavioral change in a way that is effective and appropriate for the target audience (2,5,9-10,18,20,31,33,35-36,44-48). A multi-disciplinary approach is necessary in light of the multifactorial causes of obesity (49). Successful interventions also use a family approach or involve the parents in the education process, particularly when younger children are involved (2,9-12,18,20,29,31,47-48,50-54). Prevention programs should have a health-centered, rather than a weight-centered approach focusing on all aspects of total health (54). “Research suggests that safe and effective childhood obesity treatment and prevention programs focus on positive lifestyle changes for the whole family, creating an environment in which the child can be physically active, eat to satiety, and grow into his or her weight” (54: 2).

In a review article highlighting research in childhood obesity from 1990-1999, the authors reported a significant lack of research targeting the treatment and prevention of obesity in children (22). In a recent policy statement from the American Academy of Pediatrics regarding childhood obesity also stated “too few studies on prevention have been performed” (19). More research is needed with a focus on prevention, in addition to, and perhaps more important than, research exploring the causes and prevalence of childhood obesity.
Parental Influence

Childhood obesity is a family problem, not just the child’s problem. Parents must be an integral part of the treatment or prevention program. Parents have a significant influence on children. Parents not only provide the child’s genetic make-up, but also serve as role models for health related behaviors. Parents can be either a positive or negative role model - on a wide variety of health behaviors. For example, it is the parent who buys the food, prepares the food, and provides access to activities while setting limits on sedentary activities like TV viewing.

Childhood food preferences and eating patterns are modeled by parents’ eating habits and food beliefs (6,9,18-20,28-29,48,50-54). Children are more likely to try new foods if they see their parents eating the food. Similarly, if parents tend to eat and enjoy high-fat foods, their children develop similar eating patterns (19). Children show increased preferences for high-fat foods, as young as 3-5 years of age, when their parents are obese (19). Parents tend to have foods that they like and eat in their homes, and with repeated opportunities to eat these foods, young children will include many of them in their diet. This is also true for studies specifically targeting fruit and vegetable intake. Actual fruit and vegetable intake among children is highly related to how accessible fruits and vegetables are within a child’s home and to how often fruits and vegetables are offered for food (28). For better or worse, food preferences developed in childhood remain fairly constant into adulthood (6,20,29,50).

There are similar connections with physical activity levels as well. A physically active lifestyle established in childhood may persist into adulthood (33). Parents are role
models of physical activity, with the possibility of their example being positive or
negative depending on the attitudes and actions the parents express in regards to physical
activity. Children with physically active parents are more likely to be physically active
themselves (33-34).

Given the significant role modeling between parent and child, it is apparent that
interventions that involve the parents are key to preventing childhood overweight. Some
research shows that parental involvement is beneficial for long-term success for child
obesity interventions (12,47,51-54). It has been recommended that childhood overweight
prevention programs need to focus on increasing general parenting skills rather than the
child’s weight or growth (52). Parents need to learn how to provide their children with
healthy, nutritious meals that are low in fat, and high in fruits and vegetables. These
meals should be eaten together as a family as often as possible. Parents need to learn
how to promote physical activity in their children and to set limits on TV watching. Even
more important, parents need to learn how to be positive role models for their children by
making changes in their own health behaviors. Notice the majority of the previous
statements used the word “how.” To accomplish this, interventions should emphasize the
skills necessary to promote behavior change.

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CHAPTER III

UTAH WIC/EFNEP CHILDHOOD OBESITY INTERVENTION STUDY

Abstract

Objective: To determine the effects of a targeted curriculum and dual program involvement on childhood overweight status among low-income preschool children, three Special Supplemental Food Program for Women Infants and Children (WIC) clinics were recruited to implement a series of participatory classes.

Methods: Curriculum was developed and reviewed for content by two Extension Specialists, four registered dietitians working at the three WIC clinics, two registered dietitians at the state WIC office, and one registered dietitian working at a local pediatric hospital. To determine the effectiveness of the curriculum, one clinic, where traditional educational methods were used, served as the control. Another clinic received the targeted curriculum, developed to motivate parents to make behavior changes on key behaviors necessary in preventing childhood overweight. The last clinic received the targeted curriculum and was referred to the Expanded Food and Nutrition Education Program (EFNEP) in addition. WIC children were followed for a 6-month time period with data collected for anthropometrics, dietary intake, and parental behaviors.

Results: Results showed an overall decrease in body-mass index for age percentile among participants, slight improvements in dietary intakes of beneficial food groups and nutrients, and an increased prevalence of parents reporting positive healthy behaviors for all three groups. Overall no significant differences between clinics were noted. Even though the WIC program has the potential to impact their clients, continued research and
strategy need to be explored to determine how WIC can be most effective in preventing and treating childhood overweight status.

Introduction

The United States is experiencing significant increases in overweight and obesity which cuts across all ages, gender, racial, and ethnic groups. These increases are becoming a significant public health problem (1). The increase in the prevalence of childhood obesity is currently of pandemic proportions: “occurring over a wide geographical area and affecting an exceptionally high proportion of the population” (2). Prevention of obesity is an important public health goal (1,3-4). Childhood is a key time to begin prevention efforts (5-10). The Surgeon General reports that over the past two decades, the percentage of children who are overweight nearly doubled, and the percentage of adolescents who are overweight has almost tripled (1). It is currently estimated that 13% of children 6-11 years and 14% of adolescents 12-19 years are overweight (1,4-5). Current estimations for the total prevalence of childhood overweight range from 13-33%, depending on the source of the data and the definition used (1,4-8,11-14).

How and when to intervene, to prevent childhood overweight and obesity, is a challenging question. In 2000 the Surgeon General issued a “Call to Action to Prevent and Decrease Overweight and Obesity” (1). This has prompted many community and public health agencies to become more involved in treatment and prevention of obesity in adults and children. But very little is available to show how best this should be done, particularly in prevention of childhood obesity (15). Many public health nutrition
programs, including the Special Supplemental Food Program for Women, Infants and Children (WIC) and the Expanded Food and Nutrition Education Program (EFNEP), have been given mandates to direct education efforts to prevent childhood obesity. On June 30, 2004, the Child Nutrition and WIC Reauthorization Act (S. 2507) was signed into law (16). This bill will encourage changes within many of the nation’s Child Nutrition Programs towards improved nutrition education practices and increased promotion of healthy food choices and physical activity. Both the WIC and EFNEP programs will be involved in these changes.

The WIC program has been said to have potential to improve the prevalence of obesity in low-income children. Nationwide nearly half of all infants and a quarter of 1-to 4-year olds are served by WIC at some time (17-18). An average of 3.67 million children aged 1 to 4 years participate in WIC each month (17). Because of the access to children, WIC has potential of great influence in the area of childhood obesity prevention and treatment. Yet, it is unclear what strategies WIC should adopt to help prevent obesity.

The WIC program started in 1974 when congress authorized the program to eliminate nutritional inadequacies of the most vulnerable in the US population (18-20). Pregnant, breastfeeding, or postpartum women, infants, and children up to the age of 5 years old are eligible to receive monthly food vouchers if they meet specific nutritional risk factors and have a family income below 185% of the poverty level. Foods provided contain nutrients often lacking in diets of low-income families (i.e. protein, vitamin A, vitamin C, calcium and iron). In addition to the food vouchers, WIC participants are entitled to receive nutrition education and referrals to other health and family agencies.
Overall, WIC has shown positive effects on birth weight, anemia, and growth of infants and children (18-19). In addition, WIC participants have been shown to increase their intake of the primary nutrients targeted by the WIC program. There are some studies that also show decreased intakes of dietary fat and added sugars (18-20).

Although food security remains a concern for low-income populations, obesity is now a far greater nutritional problem facing children enrolled in WIC. The program is evaluating whether its traditional strategies in food supplementation and nutrition counseling are the most appropriate for preventing the problem of obesity in young children (21). The nutritional counseling sessions that WIC participants receive about the problem of obesity in their children may be failing to increase awareness and change (21). “Most health care professionals see that to address obesity, their program needs to move beyond its traditional framework for nutritional counseling. However, neither the time allowed for nutrition counseling in the program nor the content of that counseling appear adequate to address the problem of childhood obesity” (21).

Currently there are many limitations the WIC program encounters in delivering effective nutrition education. At the time of this study, Utah WIC participants attended the WIC clinic every two months to attend a class or to recertify on the program. So there is a two-month time interval between any nutrition education efforts- either individual or group. Because of busy clinic schedules, WIC classes are limited in time to 15 minutes. The time WIC participants spend with the nutritionist during certification periods for one-on-one nutrition counseling is also limited to approximately 15 minutes. Therefore, WIC parents receive a total of about one hour of nutrition education in a six-month period. Due to high participation rates, many WIC clinics within the Utah
program are changing to three-month vouchering visits, decreasing the contact time with a WIC participant even further. This arouses the question as to just how effective can nutrition education in the WIC setting be in prevention of childhood and adult obesity?

One possible avenue to increase the effectiveness of the WIC program is through its referral system. WIC has the potential to refer participants to other nutrition education programs that would augment the education that WIC alone can provide. Referrals to EFNEP may be one such positive possibility.

The Expanded Food and Nutrition Education Program is a federally funded program administered through Cooperative Extension designed to improve the nutritional welfare of low-income families (22). Peer-educators teach participants in their homes or in small groups nutritional lessons that focus on the Food Guide Pyramid and the Dietary Guidelines for Americans. In addition, lessons are provided on food resource management, food safety, and food preparation. Hands-on food experiences are highly encouraged as part of the program (23). Research has shown that EFNEP participants manage their food resources better. Participants more often plan meals ahead of time, compare prices when shopping, and report running out of food less often than non-participants (24). In addition to improving food practices and nutrient intakes, participants of EFNEP also spend less money on food overall (23-24).

Both the WIC and EFNEP programs target the parent (most often the mother) as the main agent of change. The programs’ main goals are to motivate the targeted parent to make changes that will benefit the entire family. In light of increased childhood obesity, the use of parents as the agent of change has promise. Childhood obesity is a family problem, not just the child’s problem. Parents must be an integral part of the
treatment or prevention program. Parents have a significant influence on children. The environment of the family can affect a child’s weight through the family’s food preferences as well as eating and activity patterns. Parents play five roles when it comes to a child’s weight, eating, and physical activity: provider, protector, enforcer, role model, and advocate (24). Parents can have either a positive or negative impact in each of these roles. Parents do recognize their influence on their children’s feeding and activity practices, but they also list several challenges posed by their culture, environment, and community on their ability to promote healthful eating habits for their children (25). In response, parents need to be given the tools to enable and motivate them to teach their children healthy habits.

Purpose of the Study

The main problem this study addresses is to aid in answering the question of how public health agencies can best help in decreasing the incidence of childhood obesity. To do this, an intervention program was designed within the WIC and EFNEP programs targeting low-income children ages 2-5 years. The purpose of this study was to determine the effects of a targeted curriculum and dual program involvement on the prevalence of childhood overweight. The research sample consisted of preschool aged children in a WIC setting. Three dependent variables were assessed. They were: changes in body-mass index for age percentile (BMI-for age %ile), changes in food frequency intake, and parental behavior change. It was hypothesized that the combination of a targeted curriculum and dual program involvement would have a greater impact on childhood overweight prevention than the traditional WIC involvement
alone. It was also hypothesized that the targeted curriculum would produce greater results than the traditional curriculum in prevention of childhood overweight and related subcategories.

**Methods**

*Study design*

Three WIC clinics in the same WIC district were selected for the study. The specific WIC district area was selected based on the strength of the program and leadership, as well as for demographic reasons. One clinic (A) served as the control, where the traditional curriculum was unaltered. A targeted curriculum was developed and implemented at the remaining two clinics (B & C). One of these clinics (C) also referred families in the study to the local EFNEP program.

*Participants*

Children ages 2-4.9 years were selected during their WIC certification period. Parents at all three clinics completed a food frequency questionnaire as part of the standard Utah WIC paperwork. The food frequency used was a self-administered form, which had yet to be validated by the state WIC office. The children were weighed and measured according to WIC guidelines. The child’s height and weight were entered into the Utah WIC database. The database assigned height, weight, and BMI-for age percentiles, according to the CDC definitions (4). Weight related risk factors were auto-assigned to the children according to their BMI-for age %ile, with those greater or equal to the 85th percentile being at risk for overweight (risk factor 114 in Utah) and those greater or equal to the 95th percentile being overweight (risk factor 113 in Utah).
Children with either risk factor 113 or 114, at all three clinics, were followed in this study.

**Intervention**

Parents at all three clinics received nutrition counseling during the certification from the nutritionist or other certified professional, as part of the standard WIC program. The two intervention clinics (B & C) were encouraged to include a goal setting component with parents who had one or more children with the risk factors for overweight or at-risk for overweight defined as per the standards of the WIC program. Parents at these two intervention clinics also completed a consent form and behavior checklist at the certification period. One intervention clinic (C) also referred the parent’s name and phone number to a local EFNEP teacher.

The ENFEP teachers contacted referrals and offered participation in the EFNEP program. Standard EFNEP lessons were provided on a one-on-one basis in the parent’s home. No changes were made to the curriculum for the EFNEP program; however, teachers were encouraged to focus on food management skills and promote physical activity for the family.

Parents at each WIC clinic returned about every two months to receive their next set of food vouchers, and attend class. During a 6-month period, most study participants would have attended two classes. In some instances, the parent would need to certify another child, attend a follow-up appointment or attend a different class from the research study curriculum. The control clinic (A) used the traditional curriculum for the classes. The two intervention clinics (B&C) used the targeted curriculum.
The targeted curriculum consisted of six lessons each targeting specific key topics deemed important in the prevention of childhood obesity (1: Providing Healthy Foods for Your Family, 2: Parenting Thru Food and Activity, 3: Kid’s Need to Be Active, 4: 5 A Day- It’s In Your Hands, 5: Make Family Time an Active Time, and 6: Make Time for Family Meals). The classes were targeted towards parents as the agent of change. The classes were taught throughout a one-year period, for two-month intervals. The classes replaced the general classes from the traditional curriculum. Parents of study participants as well as other parents attended the classes. Thus the classes were targeted to WIC parents in general - not just to those with overweight children. Due to clinic flow needs; the classes had a time restraint of around 15 minutes. Because of the two-month time interval between classes, sequential classes were not an option. Each class had to stand on its own, without relying on information from previous classes.

The targeted curriculum was developed based on the social cognitive theory. Self-efficacy change in particular was the goal of the class design. Key topics important for parent education were identified. The key topics were based from the literature on the possible causes of childhood obesity that have potential to be changed. These key topics were developed into the six classes. Various teaching methods were used; particularly those that encouraged self-efficacy change as outlined in chapter V.

Follow-Up

After 6 months, the participants returned for their recertification periods. Again, a food frequency questionnaire was completed at all three clinics. Height and weight measurements were taken again and entered into the Utah WIC database. At the two
intervention clinics (B&C), the parents completed another behavior checklist. The control clinic (A) was instructed to administer the behavior checklist to all parents with a child determined to be overweight or at risk for overweight. However, due to a communication error, this was not accomplished. Therefore, the behavior checklist was given on a one-time basis randomly to parents during class time.

Statistics

Gender, primary language, classes attended, height, weight, and BMI-for age percentiles were all obtained using the Utah WIC database. For the two intervention clinics (B&C), height, weight, and BMI-for age %ile were obtained at the initial certification date and then follow up values from the recertification date for study participants. For the control clinic (A), these anthropometric values were gathered retrospectively, with a 6-month time interval. The food frequency questionnaires were scored for food groups (bread, vegetable, fruit, dairy, meat) and key nutrients (vitamin A, vitamin c, iron) according to Utah WIC guidelines used at the time. The behavior checklists were scored according to a Likert scale.

Frequencies as well as pre / post t-tests were conducted for the anthropometric, food frequency and behavior checklist variables. Univariate analyses of variance (ANOVAs) were conducted with repeated measures over time with clinic and gender as factors for the anthropometrics data and food frequency scores. A 2-way ANOVA was conducted with the behavior checklist data with clinic and gender as factors (no time effect). As this data was ordinal in nature, Wilcoxon nonparametric tests were also conducted. All statistics were computed using SPSS.
Results

In total, 269 participants were identified at the beginning of the study. The control group totaled 60 participants. Within the two intervention clinics (B&C), of the total 209 participants identified, 63 were lost to follow up due to aging out of the WIC program (at age 5), relocation, missed appointments, or for other reasons. An additional 25 participants within clinics B& C had no follow-up food frequency questionnaire and 102 had no follow-up behavior checklist available for study.

The effectiveness of the local EFNEP program was a significant hindrance to this research project. When the project was in the creation stages, the local area had not had an active EFNEP program in several years. Therefore, it was hoped that the project would encourage the revitalization of the program. However, due to a very slow hiring and training process, no EFNEP teacher was available initially for the project. A teacher was resourced from a neighboring county for the project. This teacher was limited in availability to provide contacts one day a week. About half way through the project, a teacher was hired and trained for the local EFNEP program; however, this teacher did not prove to be very effective in the position. The intervention clinic C referred 111 participant families on to the local EFNEP program; of these referrals, only 17 received contact from an EFNEP teacher, with only six completing enough lessons to graduate from the program. Statistical analysis showed no significant difference between the 17 participants who had EFNEP contact and the remaining participants in all statistical measures. Therefore, only minimal distinction is made with these participants in any of the results tables; rather, these participants are most often included with all other participants within clinic C.
Significant change occurred in all anthropometric measures taken from the six-month interval, according to the paired t-test (Table 1). The ANOVA showed significance in anthropometrics with respect to the time alone for the three clinics. However, no significant overall differences were noted between the three clinics, time, and gender.

The decrease in BMI-for age %ile is encouraging in spite of the lack of difference in the control and intervention clinics (Table 2). At the end of the intervention period, only 32% of the participants were classified as overweight, compared to 41% previously. In addition, 34% of the participants were no longer considered overweight or at risk for overweight at the end of the intervention period.

The food frequency questionnaire results are listed in Table 3 and 4. The reference levels used by the Utah WIC program to interpret the food frequency scores are listed. The values listed by parents vary greatly, as evidenced by the large standard deviations for each mean value. This leads to some question in the accuracy of the scores given by the parents in reflecting the actual intake patterns of their children. Neither the paired t-tests comparing pre and post participants nor the ANOVA comparing the differences between the three clinics with respect to time and gender were able to provide statistical significance in the before and after intervention food frequency scores. However, the average scores reflect that each food group or nutrient showed some change, all in positive directions. It is also worth noting that there was nearly a significant increase in the intake of vegetables and iron as evidenced by the t-test comparing pre and post data, when significance equals p<.05. The before and after averages, from the food frequency scores, also reflect low intakes of vegetables, vitamin
Table 1. Change in mean and standard deviations in anthropometric values in WIC or WIC + EFNEP participants at the beginning and end of a 6-month education program.

<table>
<thead>
<tr>
<th></th>
<th>Time 1:</th>
<th>Time 2:</th>
<th>Sig: paired t-test&lt;sup&gt;ab&lt;/sup&gt;</th>
<th>Sig: ANOVA&lt;sup&gt;ac&lt;/sup&gt;</th>
<th>Sig: ANOVA&lt;sup&gt;ad&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Height percentile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>46.5 ± 28.3</td>
<td>51.7 ± 27.7</td>
<td>.000</td>
<td>.000</td>
<td>.938</td>
</tr>
<tr>
<td>Clinic A</td>
<td>49.6 ± 29.6</td>
<td>54.8 ± 29.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic B</td>
<td>48.3 ± 30.8</td>
<td>48.7 ± 28.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic C</td>
<td>50.7 ± 28.4</td>
<td>51.2 ± 28.6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic C + EFNEP</td>
<td>50.0 ± 26.9</td>
<td>52.7 ± 16.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Weight percentile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>78.6 ± 19.3</td>
<td>76.2 ± 20.6</td>
<td>.001</td>
<td>.018</td>
<td>.686</td>
</tr>
<tr>
<td>Clinic A</td>
<td>80.3 ± 18.6</td>
<td>76.0 ± 21.1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic B</td>
<td>78.1 ± 20.4</td>
<td>73.1 ± 22.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic C</td>
<td>81.3 ± 18.5</td>
<td>78.1 ± 21.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic C + EFNEP</td>
<td>81.4 ± 14.4</td>
<td>78.7 ± 10.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>BMI percentile</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>92.4 ± 6.1</td>
<td>86.6 ± 13.5</td>
<td>.000</td>
<td>.000</td>
<td>.830</td>
</tr>
<tr>
<td>Clinic A</td>
<td>92.1 ± 8.2</td>
<td>84.5 ± 14.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic B</td>
<td>92.8 ± 5.5</td>
<td>86.1 ± 15.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic C</td>
<td>93.8 ± 4.7</td>
<td>89.0 ± 11.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clinic C + EFNEP</td>
<td>92.9 ± 5.9</td>
<td>87.5 ± 6.4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> n=205  
<sup>b</sup> t-test of pre and post data  
<sup>c</sup> ANOVA factor 1: time alone  
<sup>d</sup> ANOVA factor 1: time*clinic*gender
Table 2. Comparison of mean and standard deviations for body-mass index percentile values in WIC or WIC + EFNEP participants at the beginning and end of a 6-month education program along with the change in percentage of participant values subdivided by degree of overweight status.

<table>
<thead>
<tr>
<th></th>
<th>Time 1:</th>
<th>Time 2:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body-Mass Index</td>
<td>92.9 ± 5.9</td>
<td>86.6 ± 13.5</td>
</tr>
<tr>
<td>Percentile*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not at risk for</td>
<td>0.0 %</td>
<td>34.0 %</td>
</tr>
<tr>
<td>Overweight a</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At risk for</td>
<td>58.3 %</td>
<td>33.5 %</td>
</tr>
<tr>
<td>Overweight b</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight c</td>
<td>41.7 %</td>
<td>32.5 %</td>
</tr>
</tbody>
</table>

* n=205  

a Not at risk for Overweight = <85 percentile  
b At risk for Overweight = 85-94.9 percentile  
c Overweight = ≥95 percentile

A, and iron. Fruit and vitamin C are well met; however, it should be noted that juice was included in these categories. Subjectively, it was noted that many parents listed high amounts of juice on the food frequencies.

The pre and post behavior checklists completed by the parents in the two intervention clinics were evaluated by the paired t-test comparing pre and post data and the 2-way ANOVA with clinic and gender as factors. The results are found in Table 5. Because the behavior checklist data were ordinal in nature, Wilcoxon nonparametric tests were run as well. These produced identical results to the 2-way ANOVA in significance, and thus are not included in the results tables. The paired t-test showed significant improvement among the two intervention clinics on four behaviors: increased thinking
Table 3. Change in participant food frequency questionnaire results as completed by a parent or caregiver.

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Reference</th>
<th>Time 1: Mean ± SD</th>
<th>Time 2: Mean ± SD</th>
<th>Sig: paired t-test</th>
<th>Sig: ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread</td>
<td>42 = 6 servings/day 77=11 servings/day</td>
<td>44.8 ± 22.0</td>
<td>46.7 ± 21.0</td>
<td>.580</td>
<td>.276</td>
</tr>
<tr>
<td>Vegetable</td>
<td>21 = 3 servings/day 38 = 5 servings/day</td>
<td>14.4 ± 10.2</td>
<td>16.6 ± 16.9</td>
<td>.064</td>
<td>.405</td>
</tr>
<tr>
<td>Fruit</td>
<td>14 = 2 servings/day 21 = 3 servings/day</td>
<td>22.4 ± 13.5</td>
<td>17.2 ± 15.8</td>
<td>.281</td>
<td>.995</td>
</tr>
<tr>
<td>Dairy</td>
<td>21 = 2 servings/day 28 = 3 servings/day</td>
<td>25.9 ± 13.9</td>
<td>27.5 ± 14.7</td>
<td>.325</td>
<td>.064</td>
</tr>
<tr>
<td>Meat/Protein</td>
<td>31 = 2 servings/day 47 = servings/day</td>
<td>33.6 ± 17.5</td>
<td>36.2 ± 26.6</td>
<td>.210</td>
<td>.128</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>7 = RDA</td>
<td>15.5 ± 12.3</td>
<td>17.2 ± 12.4</td>
<td>.275</td>
<td>.154</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>7 = RDA</td>
<td>6.6 ± 7.4</td>
<td>6.5 ± 6.8</td>
<td>.614</td>
<td>.542</td>
</tr>
<tr>
<td>Iron</td>
<td>21 = RDA</td>
<td>18.4 ± 11.1</td>
<td>20.4 ± 11.4</td>
<td>.064</td>
<td>.364</td>
</tr>
</tbody>
</table>

a n=205  
b t-test of pre and post data  
c ANOVA factor 1: time*clinic*gender
Table 4. Percentage of participants meeting target recommendations set by the Food Guide Pyramid or RDA, according to a food frequency questionnaire completed by a parent or caregiver. (n=205)

<table>
<thead>
<tr>
<th>Food Group</th>
<th>Reference</th>
<th>% Below Reference Time 1 vs. Time 2</th>
<th>% Met Reference Time 1 vs. Time 2</th>
<th>% Above Reference Time 1 vs. Time 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bread</td>
<td>42 = 6 servings/day 77 = 11 servings/day</td>
<td>51.1 vs. 44.2</td>
<td>42.1 vs. 47.0</td>
<td>6.8 vs. 8.8</td>
</tr>
<tr>
<td>Vegetable</td>
<td>21 = 3 servings/day 38 = 5 servings/day</td>
<td>77.0 vs. 74.0</td>
<td>19.2 vs. 20.5</td>
<td>3.8 vs. 5.5</td>
</tr>
<tr>
<td>Fruit</td>
<td>14 = 2 servings/day 21 = 3 servings/day</td>
<td>25.5 vs. 21.5</td>
<td>30.2 vs. 29.9</td>
<td>44.3 vs. 48.6</td>
</tr>
<tr>
<td>Dairy</td>
<td>21 = 2 servings/day 28 = 3 servings/day</td>
<td>40.4 vs. 33.1</td>
<td>20.0 vs. 22.1</td>
<td>39.6 vs. 44.8</td>
</tr>
<tr>
<td>Meat/Protein</td>
<td>31 = 2 servings/day 47 = 3 servings/day</td>
<td>51.5 vs. 47.5</td>
<td>30.2 vs. 34.8</td>
<td>18.3 vs. 17.7</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>7 = RDA</td>
<td>17.9 vs. 12.2</td>
<td>82.1 vs. 87.8</td>
<td>n/a</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>7 = RDA</td>
<td>69.4 vs. 72.4</td>
<td>30.6 vs. 27.6</td>
<td>n/a</td>
</tr>
<tr>
<td>Iron</td>
<td>21 = RDA</td>
<td>69.4 vs. 60.2</td>
<td>30.6 vs. 39.8</td>
<td>n/a</td>
</tr>
</tbody>
</table>
Table 5.  Frequency of behaviors as reported by parents of children participating in WIC and WIC + EFNEP. *

<table>
<thead>
<tr>
<th>Question</th>
<th>Clinic A Mean</th>
<th>Clinic A Time 1 Mean</th>
<th>Clinic B &amp; C Mean</th>
<th>Clinic B &amp; C Time 2 Mean</th>
<th>Sig. paired t-test</th>
<th>Sig. 2-way ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you plan meals a day or more ahead of time?</td>
<td>3.57</td>
<td>3.64</td>
<td>3.83</td>
<td>.123</td>
<td>.003</td>
<td>.301</td>
</tr>
<tr>
<td>2. When deciding what to feed your family, how often do you think about healthy food choices?</td>
<td>4.26</td>
<td>4.05</td>
<td>4.33</td>
<td>.006</td>
<td>.301</td>
<td>.968</td>
</tr>
<tr>
<td>3. How often do you use the “Nutrition Facts” on the food label to make food choices?</td>
<td>2.95</td>
<td>2.98</td>
<td>3.27</td>
<td>.162</td>
<td>.968</td>
<td>.315</td>
</tr>
<tr>
<td>4. How often do you eat meals together as a family?</td>
<td>4.43</td>
<td>4.27</td>
<td>4.53</td>
<td>.027</td>
<td>.315</td>
<td></td>
</tr>
<tr>
<td>5. How often do your children eat something in the morning (breakfast) within 2 hours of waking up?</td>
<td>4.7</td>
<td>4.35</td>
<td>4.46</td>
<td>.843</td>
<td>.664</td>
<td></td>
</tr>
<tr>
<td>6. How often do you ask your children to clean their plate or finish eating a particular food?</td>
<td>2.95</td>
<td>2.95</td>
<td>2.97</td>
<td>.114</td>
<td>.071</td>
<td></td>
</tr>
<tr>
<td>7. How often do you offer food as a reward for your children's behavior?</td>
<td>2.23</td>
<td>2.33</td>
<td>2.58</td>
<td>.193</td>
<td>.529</td>
<td></td>
</tr>
<tr>
<td>8. How often does your family eat while watching TV?</td>
<td>2.10</td>
<td>2.40</td>
<td>2.19</td>
<td>.005</td>
<td>.291</td>
<td></td>
</tr>
<tr>
<td>9. How often do you get 30 minutes of physical activity a day?</td>
<td>3.25</td>
<td>2.47</td>
<td>2.70</td>
<td>.560</td>
<td>.030</td>
<td></td>
</tr>
<tr>
<td>10. How often do your children get 1 hour or more of physical activity a day?</td>
<td>3.83</td>
<td>3.03</td>
<td>3.40</td>
<td>.055</td>
<td>.654</td>
<td></td>
</tr>
<tr>
<td>11. How many hours per day do your children spend watching TV or videos?</td>
<td>2.16</td>
<td>2.64</td>
<td>2.32</td>
<td>.007</td>
<td>.688</td>
<td></td>
</tr>
</tbody>
</table>

* Questions 1-8 based on 1-5 Lykert scale with 1 = don’t do, 2 = seldom, 3 = sometimes, 4 = most of the time, and 5 = almost always.
Question 9 and 10 in days a week
Question 11 in hours a day.

a = t-test of pre and post data
b = factors = clinic and gender
about healthy food choices, increased eating meals together, decreased eating with TV, and decreased TV/video time. There was also a nearly significant increase in the children’s activity. The ANOVA showed the two intervention clinics were statistically different in how often they planned meals and parental activity. Clinic C had higher scores on these than did clinic B. The statistical results for the two intervention clinics (B & C) are listed beside the average score from the one-time behavior checklists randomly completed by parents at the control clinic (A). Because of the lack of a true control, only subjective conclusions can be determined between the means from clinic A in comparison to clinics B & C.

As part of the EFNEP program, participants complete entry and exit evaluations on their 24-hour food intake and a behavioral checklist. It is the primary homemaker who participates in these evaluations. Even though the data from the EFNEP program are not comparable, the information does show the benefit of the EFNEP program in general for the participants. Data of 16 homemakers participating in EFNEP who received lessons from one of the teachers involved in this study are presented. Due to database limitations, the results are for all 16 participants the teacher contacted within this study’s 6-month time frame. It was not feasible to separate just those participants whose children were involved in this study. The data were computed by use of the USDA ERS program. In Table 6, a comparison of EFNEP participants’ nutritional intake based upon entry and exit 24-hour recalls are presented. This shows that the EFNEP participants had an increased intake of fruits and vegetables and a slightly increased intake of calcium-rich dairy foods. Participants had a decreased overall calorie intake as
Table 6. Means and Standard Deviations of Nutrition Intake based upon Entry and Exit 24-hour Recalls of 16 EFNEP homemakers receiving lessons from one teacher during a 6-month time span.

<table>
<thead>
<tr>
<th>Unit Measured</th>
<th>Food Group or Nutrient</th>
<th>Entry: Mean ± SD</th>
<th>Exit: Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Servings</td>
<td>Breads &amp; Cereals</td>
<td>6.5 ± 3.7</td>
<td>5.1 ± 1.9</td>
</tr>
<tr>
<td>(Food Guide Pyramid)</td>
<td>Vegetables</td>
<td>2.4 ± 1.9</td>
<td>2.5 ± 1.2</td>
</tr>
<tr>
<td></td>
<td>Fruits</td>
<td>1.3 ± 1.4</td>
<td>2.3 ± 2.1</td>
</tr>
<tr>
<td></td>
<td>Calcium/Dairy</td>
<td>1.5 ± 1.8</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td>Meats &amp; Alternatives</td>
<td>1.3 ± .09</td>
<td>1.6 ± .09</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>18.0 ± 9.6</td>
<td>15.8 ± 9.6</td>
</tr>
<tr>
<td>Calories</td>
<td>Calorie Intake</td>
<td>1893.2 ± 632.9</td>
<td>1734.8 ± 448.7</td>
</tr>
<tr>
<td>Percentage of Calories</td>
<td>Carbohydrates</td>
<td>47.7 ± 12.1</td>
<td>51.3 ± 8.2</td>
</tr>
<tr>
<td></td>
<td>Fat</td>
<td>36.4 ±10.3</td>
<td>32.2 ± 6.5</td>
</tr>
<tr>
<td></td>
<td>Protein</td>
<td>15.9 ± 4.2</td>
<td>16.4 ± 4.0</td>
</tr>
<tr>
<td>Grams</td>
<td>Fiber</td>
<td>11.9 ± 5.7</td>
<td>12.3 ± 5.6</td>
</tr>
<tr>
<td>Percentage of RDA met</td>
<td>Iron</td>
<td>.84%</td>
<td>.82%</td>
</tr>
<tr>
<td></td>
<td>Calcium</td>
<td>.71%</td>
<td>.81%</td>
</tr>
<tr>
<td></td>
<td>Vitamin A</td>
<td>.70%</td>
<td>.72%</td>
</tr>
<tr>
<td></td>
<td>Vitamin C</td>
<td>.80%</td>
<td>.89%</td>
</tr>
<tr>
<td></td>
<td>Vitamin B6</td>
<td>.80%</td>
<td>.75%</td>
</tr>
</tbody>
</table>

well as a decreased percentage of their calories from fat. Intakes of fiber, calcium, vitamin A, and vitamin C were also higher at the exit point.

Positive results were found among the behavioral checklist items as well. Among food resource management practices (i.e. plans meals, compares prices, does not run out of food, or uses grocery lists), 94% of homemakers showed improvement in one or more practices. Among nutrition practices (i.e. plans meals, makes healthy food choices, prepares foods without salt, reads nutrition labels, or has children eat breakfast) 87% of homemakers showed improvement in one or more nutrition practices.
**Discussion**

Parents not only provide the child’s genetic make-up, but also serve as role models for health related behaviors. Parents can be either a positive or negative role model - on a wide variety of health behaviors. For example, it is the parent who buys the food, prepares the food, and provides access to activities while setting limits on sedentary activities like TV viewing.

Childhood food preferences and eating patterns are modeled by parents’ eating habits and food beliefs (5,7,10,14,26-31). There is no evidence that children have an innate, unlearned preference for high-fat or calorie-dense foods (7). Children are more likely to try new foods if they see their parents eating the food. Similarly, if parents tend to eat and enjoy high-fat foods, their children develop similar eating patterns (10). Children show increased preferences for high-fat foods, as young as 3-5 years of age, when their parents are obese (10). Parents tend to have foods that they like and eat in their homes, and with repeated opportunities to eat such foods, young children will include many of them in their diet. This is true also for fruit and vegetable intake. Children’s accessibility and exposure to fruits and vegetables are important in determining actual fruit and vegetable intake among children (26). For better or worse, food preferences developed in childhood remain fairly constant into adulthood (5,10,27,29). Research is also indicating that while parents may be aware of their family history with nutrition related problems (i.e. cardiovascular disease), they are not teaching their children to make the appropriate nutrition choices (i.e. lower fat intake) to decrease their risk for developing these problems themselves (32).
There are similar connections with physical activity levels as well. A physically active lifestyle established in childhood may persist into adulthood (33). Parents are role models of physical activity, for better or for worse. Children with physically active parents are more likely to be physically active themselves (33-34).

Given the significant role modeling between parent and child, it is apparent that interventions that involve the parents are key in preventing childhood overweight. Some research shows that parental involvement is beneficial for long-term success for child obesity interventions (30-31,35-37). Childhood overweight prevention programs need to focus on increasing general parenting skills rather than the child’s weight or growth (31). Within the current US environment that largely encourages poor food choices, large portion sizes and inactivity, there is much parents can do to prevent their children from becoming overweight (38-39). Parents need to learn how to provide their children with healthy, nutritious meals that are low in fat and added sugars (32, 36-40). Parents need to know how to encourage their children to eat a diet high in whole grains, fruits and vegetables, and low-fat dairy products (37-42). Parents need to encourage moderation rather than over-consumption (37-40,42). Meals should be eaten together as a family as often as possible (37). Parents need to learn how to promote physical activity in their children (37-39,42,43-44). Parents of young children often believe their children are spontaneously active enough for their needs. Some research indicates that this may be incorrect thinking on the part of parents suggesting that encouraging even young preschoolers to be more active is necessary (44). Parents need to learn how to set limits on TV watching and other sedentary activities (37,45). Parents also need to become involved in their community by promoting changes to improve the environmental
influence on the health habits of their children (37-38). Of most importance, parents need to learn how to be positive role models for their children, hopefully thru changes in their own health behaviors (37,39). Notice that the majority of the previous statements involve the word “how.” To accomplish this, interventions should emphasize the skills necessary to promote behavior change.

This research study attempted to promote positive change in the prevalence of childhood overweight among low-income preschool-aged children, with parents as the sole agent of change. Over the 6-month time interval between the certification and recertification the BMI-for age %ile significantly decreased for all three clinics. The lack of a between clinic significance indicates that the decrease in BMI-for age %ile was not a direct result of the interventions provided in this study, but rather some other factor. Between 2 and 6 years of age, the growth chart shows a nadir where BMI-for age %ile decreases and then afterwards slowly increases (4). The point where a child’s BMI-for age %ile increase after this nadir is referred to as the adiposity rebound. Research has suggested that early rebound of the BMI-for age %ile is associated with an increased risk of high BMI status in adulthood (14,46-47). As the participants in this study all were between the ages of 2 and 5 years of age, it is likely that the decrease in BMI-for age %ile found among the participants is reflecting the normal decrease in BMI-for age %ile for this age group. The decrease in the BMI-for age %ile of the participants is encouraging in light of childhood overweight prevention. It is not determinable from the data in this study whether the degree in reduction of BMI-for age %ile is enough to prevent or decrease the degree of childhood overweight long-term.
The food frequencies self administered by the parents of their child's intake showed great variance in the amounts of each food item reported from child to child. This likely reflects the inaccuracies of food frequencies in general in determining actual dietary intake and the limitations of parents' ability to self-report their child's actual intake (48-52). One author indicates that food frequency questionnaires overestimated energy intake by 40%, indicating the degree of error such methods may have as well as the need to adapt questionnaires for children and parents (47). WIC professionals and the clients largely disliked the particular food frequency questionnaire that was used by the Utah WIC clinics at this time themselves because of the complexity of the questionnaire and the inaccurate reflection of what the child actually ate. It is possible that this particular food frequency had more inaccuracies in reflecting dietary intake than other food frequency methods, especially for the low-income, low-education population that WIC services. In spite of the variance in the food frequency evaluations, the means for all food groups and key nutrients did improve slightly, perhaps indicating a slight positive effect of the WIC program in general over time. The means for the food groups and key nutrients did indicate low intakes of vegetables, vitamin A, and iron among the participants. This is consistent with other research on the dietary practices of young children on the WIC program (19-20).

Many behaviors associated with increased risk for childhood overweight had significant improvement within the intervention clinics. These included: increased thinking about healthy food choices, increased eating meals together, decreased eating with TV, and decreased TV/video time. There was also a nearly significant increase in the children's activity. The intervention clinic C had statistically higher scores on the
behavior checklist in comparison with the intervention clinic B, with the most significant difference noted in the behaviors of planning meals and parental physical activity. The clinic C site location is closer to a university and, therefore, serves many clients with a higher educational background (current university students). This may explain the difference in the scores between the two intervention clinics. Another possible explanation may be from a positive effect from the EFNEP referrals. While statistically this is not shown, the behaviors with greatest difference and change are also behaviors highly addressed by the EFNEP program, namely meal planning and increasing healthy behaviors in diet and physical activity. The information from Table 6 highlighted that the EFNEP program does have a positive impact on dietary intake, in general, as well as positive influences on food resource management and nutrition practices among homemakers who participate in the program.

The possibility that the participant’s parents who completed the behavioral checklists may have temporarily altered their behavior in response to what is called the Hawthorne Effect (53-45). This is described as the human tendency to alter their individual behaviors and/or performance because they are aware that it is being studied – and thereby accounting for the improvement in the outcome variable (53-55).

The lack of a similar control for the behavior checklist results is a significant limitation in this study. Subjectively, the mean one-time checklist scores appear to be similar to the mean scores for the intervention clinics. As a result of the difference in the data collection, true comparisons cannot be made between the control clinic and the intervention clinics for this aspect of the study.
The overall problem this study hoped to address was to help answer how public health agencies can best decrease the incidence of childhood obesity. Several limiting factors prevented a more positive outcome. This study served as a pilot study to determine the effect of a targeted curriculum and dual program involvement via referral to the EFNEP program on the prevention of childhood overweight prevalence among preschool children participating on WIC. Based upon the results from this study, the intent was to determine changes needed to successfully implement the program within other WIC clinics throughout the state. Using a multi-step format for program development, which was requested by the funding group for this project, this research project is one phase of a much larger program development goal (56). This research serves as a vital step in the implementation process of a program targeting childhood overweight prevention in the WIC setting. There is still much that needs to be done to assure that the program is as effective as possible.

Due to the small number of participants that were contacted by the EFNEP program, the hypothesis of a greater impact with dual program involvement was not noted. It is possible that with an improved referral system and skilled teachers in place, a greater number of participants would participate in the EFNEP program, and the impact of the dual program involvement could be further explored.

The effect of the targeted curriculum in comparison to the traditional curriculum had some significant differences, but overall a lack of between clinic differences was noted with the ANOVA results. It is possible that the short time frame of the study impaired the ability to see significant changes in the child’s BMI-for age %ile status. Perhaps there is a more long-term effect that was unable to be noted. It is also possible
that the traditional curriculum is equally effective in motivating change to healthy behaviors among WIC parents.

Another very realistic explanation is that the WIC program in general has a limited effectiveness in motivating behavior change among their participants due to the multiple limitations the program faces in delivering effective nutrition education. These limitations include: multiple time restraints, the length of time between WIC contacts and the significant life stressors that low-income mothers face causing them to depend upon WIC for food security benefit more than a nutrition education benefit. While the WIC program has the potential to impact their clients, continued research and strategy needs to be explored to determine how WIC can be most effective in preventing and treating childhood overweight status.

References


CHAPTER IV

USE OF BEHAVIOR CHANGE THEORY IN NUTRITIONAL
PROGRAM DEVELOPMENT AND THE SOCIAL
COGNITIVE THEORY: A REVIEW

Importance of Theory-based Interventions

Research is showing that increasing nutrition knowledge through informational instruction is necessary but insufficient to promote dietary change (1-4). Many people know what they should be doing, but this knowledge is not enough to motivate them to make the necessary changes in their behavior. Translating scientific knowledge and dietary guidelines into educational interventions that result in behavior change has been difficult and remains a challenge for nutrition educators (4). It has been suggested that theory-based approaches improve the effectiveness of nutrition education and interventions (2-16). A detailed review of the individual theories of behavior change is beyond the scope of this paper, but several excellent review articles are referenced (4,8-9) with the explanation that the actual theories that would apply to a nutrition intervention would depend on the overall main objective and the sub-objectives of the program. What is effective in one program may be different from another program. It is necessary to be familiar with the various behavior change theories and how to implement them effectively.

The ultimate objective of the majority of health education efforts is to create behavior change in a positive manner. But humans are complex individuals and motivating an individual or group of people to change is difficult. Humans are
instinctively social by nature. The social world in which one lives defines who and what a person may and will become. Social situations shape attitudes, ideals, norms, and behaviors. The social context teaches social class distinctions and social roles found in any human society from rich to poor, from the primitive to the technologically advanced. The social development of an adult begins at childhood through a continuum of vast learning experiences and observations in the social context. In addition, social development is one aspect of life that is continually evolving, changing, and learning either consciously or unconsciously. As social interactions shape people, they in turn shape behaviors. This creates a great opportunity for health educators to aim at molding social development into positive behavior modification. One theory that helps with this is known as the social cognitive theory.

**Social Cognitive Theory**

Social cognitive theory combines a copious array of theoretical concepts that in themselves date back much further than the first mention of this theory in publications. The precursor to the current theory was the Social Learning Theory, which was introduced and highlighted in the literature roughly between 1940-1980 (16). The ideas from social learning theory were expanded to include the ideas of positive and negative reinforcement (16-17). These ideas are still highly studied and utilized extensively in behavior research, particularly with children and within school settings.

In the 1970's, Albert Bandura began expanding the social learning theory in a different angle (16). He altered his original views to include the notion that things one learns by observation of others also influence behavior, in addition to direct experience.
He also included the construct of self-efficacy into the theory. This revised theory by Bandura is the framework of which is currently referred to as the social cognitive theory (16). This framework is currently the dominant version used in health behavior and health promotion as well as many other disciplines. Despite the name change to social cognitive theory, the theory is still frequently referred to as social learning theory in the literature and both titles are used interchangeably. The main differences of social cognitive theory include the notion that the environment can have an observed impact on behavior and the ideas that self-efficacy is a determinant in behavior as well, whereas the social learning theory does not include these concepts.

The social cognitive theory (SCT) is both an explanatory theory (describing human behavior) and a change theory (guiding intervention development). The SCT is based upon a synthesis of behaviorist, cognitivist, and social learning theories from the psychology disciplines. In SCT, human behavior is explained in terms of a three-way, dynamic, reciprocal theory where personal factors, environmental influences, and behavior continually interact (Figure 1). A basic premise of SCT is that people learn not only through their own experiences, but also by observing the actions and results of others (18), and upon reflection, people will imitate or modify their own behavior accordingly (19).

As just mentioned, the SCT synthesizes concepts and processes from cognitive, behavioristic, social, and emotional models of behavior change. As a result, it is very complex and has many key constructs (about 11). These constructs are summarized and defined in Table 6.
The key message of social cognitive theory involves the continual and reciprocal interaction of three components.

**Self-Efficacy**

A key construct of the SCT is self-efficacy. Bandura considers self-efficacy “the single most important aspect of the sense of self that determines one’s effort to change behavior” (16: 164). Self-efficacy is the self-confidence in one’s ability to successfully perform a specific type of action or behavior. Perceived self-efficacy involves individuals’ beliefs that they can control their motivation, behavior, and social environment (20). People’s beliefs in their abilities to perform certain behaviors influence: 1) individual choice of behavior and what they attempt or avoid, such as performing breast self-exam, starting an exercise program, or attempting to quit smoking; 2) the effort expended in attempting a task. People devote more energy to a task where they believe they can succeed; 3) how long they persist in the face of difficulties, as in maintaining an exercise or diet program; 4) engaging in encouraging or defeating self-statements; and 5) emotional reactions they experience, such as anxiety or depression when faced with stressful situations.
Table 7. Major constructs of the social cognitive theory with definitions and suggestions for application

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Definitions</th>
<th>Suggestions for Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environment</td>
<td>Factors physically external to the person</td>
<td>Provide opportunities and social support</td>
</tr>
<tr>
<td>Situation</td>
<td>Person's perception of the environment</td>
<td>Correct misperceptions and promote healthful norms</td>
</tr>
<tr>
<td>Behavioral Capability</td>
<td>Knowledge and skills to influence behavior</td>
<td>Provide information and skills training</td>
</tr>
<tr>
<td>Expectations</td>
<td>Beliefs about likely results of behavior</td>
<td>Model positive outcomes of healthful behavior</td>
</tr>
<tr>
<td>Expectancies</td>
<td>Values one places on an outcome or incentive</td>
<td>Present outcomes of change that have functional meaning</td>
</tr>
<tr>
<td>Self-control</td>
<td>Personal regulation of goal-directed behavior or performance</td>
<td>Provide opportunities for self-monitoring, goal setting, problem solving and self-reward</td>
</tr>
<tr>
<td>Observational Learning</td>
<td>Beliefs based on observing others like self, particularly the outcomes of their behavior and/or visible physical results</td>
<td>Point out others' experience, physical changes; identify role models of targeted behavior</td>
</tr>
<tr>
<td>Reinforcements</td>
<td>Responses to a person's behavior that increase or decrease the chances of recurrence</td>
<td>Provide incentives, rewards, praise; encourage self-reward; decrease possibility of negative responses that deter positive changes.</td>
</tr>
<tr>
<td>Self-Efficacy</td>
<td>Confidence in one's own ability to take action and persist in action with a particular behavior</td>
<td>Approach behavior in small, incremental steps; behavioral contracts, mentoring, direct and mastery skills practice, role practicing</td>
</tr>
<tr>
<td>Emotional coping responses</td>
<td>Strategies or tactics that are used by a person to deal with emotional stimuli</td>
<td>Provide training in problem solving and stress management; include opportunities to practice skills in emotionally arousing situations</td>
</tr>
<tr>
<td>Reciprocal Determinism</td>
<td>Behavior results from continuous interaction between the person, the behavior, and the environment; change is bidirectional</td>
<td>Involve the individual and relevant others; work to change the environment. Consider multiple avenues to behavior change including environmental, skill and personal change</td>
</tr>
</tbody>
</table>

Use of Social Cognitive Theory in Program Development

One researcher commented, “social cognitive theory not only illuminates the dynamics of individual behavior change but also gives direction to the design of
intervention strategies to influence behavior change” (16: 181). However, with the many constructs of this complex theory, the structure of experimental research usually permits analysis of only a few variables at a time. Therefore, Glanz and colleagues pointed out that designers of intervention strategies should first specify the desired behavioral outcome and identify the SCT variables most likely to influence changes in the specific behavior (16).

Several research studies have utilized the SCT in program development. The SCT appears to be quite popular particularly in the health promotion and nutrition education fields. Three examples of use are mentioned here, a very small sampling of the literature available on the subject of application of the SCT.

Project Northland was a community-wide program aimed at decreasing and preventing the use of alcohol among teens aged 11-15 (16). The interventions were school based, where some schools received the intervention, while others a delayed program condition (control). Interventions were conducted for four years as the class members progressed from grade to grade in the school system. During the seventh grade the intervention was titled “Amazing Alternatives!” The design of the intervention was largely based using the SCT as a framework. The results were that students in the intervention groups had significantly less alcohol use than the control groups. It appears that the application of the SCT in this program was beneficial in altering behavior in a desired way.

Another example of the use of the SCT was the “Gimme 5!” a school-based program to increase fruit and vegetable consumption (16). The pilot tests of the curriculum showed that the children did increase their fruits and vegetable intake by
taking advantage of the availability while at school, but that their intake at home had not changed. Current implementation of this curriculum is now attempting to target changes at home as well.

The SCT was used as a framework for the development of the “Fit WIC Vermont” program targeting increased physical activity among young children (21). This program was conducted in one of five states that received federal funding to address the growing incidence of childhood overweight in the United States. The program was evaluated via surveys completed by the parents involved in the study. Targeted behavior changes were influenced, evidenced by the evaluations of the surveys. Thus it appears that the theoretical framework from the SCT aided in providing the desired behavior changes.

**Strengths and Weaknesses of the Social Cognitive Theory**

Social cognitive theory is a strongly supported theory in health education and allied health research literature. Several opportunities and strengths of the theory enable it to be used widely in these fields. The theory combines ideas that were once thought of separately into an understanding of behavior and behavioral change. The constructs of the theory suggest many important avenues for new behavioral research and practice, particularly in health education. The SCT easily permits application of ideas from psychology and related fields into health education - thus providing added benefit from their insights and understanding.

The SCT and its constructs are easily understood, identified in situations, and influenced by application. This is largely why the SCT is so widely used, and among one
of the leading behavior change theories used in health education and promotion and related fields.

In contrast, because of the large number of constructs it contains, the SCT is quite complex. Therefore, researchers do not apply it to program development and design in similar ways. This largely decreases the significance of the research findings. It appears that use of the SCT is beneficial, but the results from application are quite mixed and varied as a result of the differences in application of the theory in the research. Another fault of the SCT is because of its many constructs; authors can attempt to explain almost anything by means of one or more of the constructs of the theory. This opens a question as to how falsifiable the theory is. One weakness of the SCT, akin to many other behavior change theories, is that it attempts to explain and change behavior in a rational way. Many instances occur where human behavior is not rational, thus a limit of the SCT in explaining and predicting behavior.

All behavior change theories are limited in their ability to predict behavior. Social cognitive theory has been attempted to predict a variety of health behaviors and behavioral intentions, although the model typically accounts for only small to medium proportions of variance in behavior (18). Several large intervention studies have utilized the SCT and its constructs. But overall there has been a lack of positive outcomes. This could be in part a result of inadequacies of the theory, or poor use of the theory in program design by the individual researchers.

The role of self-efficacy is typically the dominant predictor of behavior and is often the principal focus of research attention when the SCT is utilized. For example, the concept of self-efficacy has been shown to be instrumental in: coping with stress,
effecting behavior change, and recovery from illness (18). It has also been key in research showing increased exercise maintenance (22), increasing dietary fiber intake (2), and improving weight loss strategies in postpartum mothers (10). Self-efficacy is also key to teaching someone how to read (23). The central role of self-efficacy modification in positive research findings suggests that the concept of self-efficacy may be more important than the SCT, per se.

The social cognitive theory attempts to explain and provide means to change behavior on the basis that people, their behaviors and environments are constantly influencing behavior. The main constructs of the SCT are easily understood and applied. They can be applied to positively influence behavior in a program setting. As such, the SCT is highly utilized in program development, especially in health related areas. While evaluations of the use of the SCT in practice are mixed, the popularity of this theory and continual attempts to use it for behavior change objectives will hopefully in the future determine the validity and truth found in the social cognitive theory.

References


Abstract

**Objective:** To determine the effectiveness of a nutrition curriculum based upon the social cognitive theory targeting childhood overweight prevention, with parents as the agent of change.

**Methods:** Key modifiable factors were identified and classes developed to target these factors. The curriculum was implemented at two WIC clinic sites. Parents were surveyed after the completion of each class to determine the effectiveness of the curriculum meeting the desired objectives and self-efficacy change.

**Results:** The results of the surveys indicated a very positive impact of the curriculum in meeting the desired objectives. In addition, using a retrospective self-reported method, the surveys indicated a statistically significant positive change on parents' self-efficacy.

**Discussion:** It is hoped that the increase in self-efficacy will likewise have increased the likelihood that parents adopted positive changes in the behaviors correlated to these self-efficacy increases. It is thus even further hoped that the potential positive behavior changes will have a positive impact on reducing the prevalence of childhood overweight among the low-income preschool children in the WIC setting.

**Introduction**

Research is showing that increased nutrition knowledge is necessary but insufficient to promote dietary change (1-4). Many people know what they should be
doing, but this knowledge is not enough to motivate them to make the necessary changes in their behavior. Translating scientific knowledge and dietary guidelines into educational interventions that result in behavior change has been difficult and remains a challenge for nutrition educators (4). It has been suggested that theory-based approaches improve the effectiveness of nutrition education and interventions (2-16). Health behavior theories provide professionals a means where to organize implementation designs so as to be effective in reaching the goals and objectives desired. The actual theories that would apply to a nutrition intervention would depend on the overall main objective, and the sub-objectives of the program. Therefore, what is effective in one program may be different from another program. Thus, it is necessary to be familiar with the various behavior change theories and how to implement them effectively. The behavior change theories most commonly used in the nutrition discipline include: The social cognitive theory (SCT), the Health Belief Model, and the Transtheoretical Model. It should be noted, though, that none of these theories has a complete ability to predict or change behavior, and perhaps, no theory will ever be able to do so perfectly.

The ultimate objective of the majority of health education efforts is to create behavior change in a positive manner. Humans are complex individuals and motivating an individual or group of people to change is difficult. Humans are instinctively social by nature. The social world in which one lives defines who and what a person may and will become. Social situations shape attitudes, ideals, norms, and behaviors. The social context teaches social class distinctions and social roles, found in any human society from rich to poor, from the primitive to the technologically advanced. The social development of an adult begins at childhood through a continuum of vast learning experiences and
observations in the social context. In addition, social development is one aspect of life that is continually evolving, changing, and learning either consciously or unconsciously. As social interactions shape people, they in turn shape behaviors. This creates a great opportunity for health educators to aim at molding social development into positive behavior modification. One theory that helps with this is known as the social cognitive theory.

The social cognitive theory (SCT) is both an explanatory theory (describing human behavior) and a change theory (guiding intervention development). The SCT is based upon a synthesis of behaviorist, cognitive, and social learning theories from the psychology disciplines. In SCT, human behavior is explained in terms of a three-way, dynamic, reciprocal theory where personal factors, environmental influences, and behavior continually interact (see Figure 1, p 52). A basic premise of SCT is that people learn not only through their own experiences, but also by observing the actions and results of others and upon reflection, people will imitate or modify their own behavior accordingly (16-19).

One researcher commented, “social cognitive theory not only illuminates the dynamics of individual behavior change but also gives direction to the design of intervention strategies to influence behavior change” (16: 181). However, with the many constructs of this complex theory, the structure of experimental research usually permits analysis of only a few variables at a time. Therefore, Glanz and colleagues pointed out that designers of intervention strategies should first specify the desired behavioral
outcome and identify the SCT variables most likely to influence changes in the specific behavior (16).

A key construct of the SCT is self-efficacy, which Bandura considers “the single most important aspect of the sense of self that determines one’s effort to change behavior” (19), is self-confidence in one’s ability to successfully perform a specific type of action or behavior. Perceived self-efficacy involves individuals’ beliefs that they can control their motivation, behavior, and social environment (16-20). People’s beliefs in their abilities to perform certain behaviors influence (1) their choice of behavior and what they attempt or avoid, such as performing breast self-exam, starting an exercise program or attempting to quit smoking; (2) the effort they expend in attempting a task, because people devote more energy to a task at which they believe they can succeed; (3) how long they persist in the face of difficulties, as in maintaining an exercise program or diet; (4) engaging in encouraging or defeating self-statements; and (5) emotional reactions they experience, such as anxiety or depression when faced with stressful situations.

The role of self-efficacy is typically the dominant predictor of behavior and is often the principal focus of research attention when the SCT is utilized (16-24). For example, the concept of self-efficacy has been shown to be instrumental in: coping with stress, effecting behavior change, and recovery from illness (8). It has also been key in research showing increased exercise maintenance (22), increasing dietary fiber intake (13), and improving weight loss strategies in postpartum mothers (9). Self-efficacy is also key in teaching someone how to read (23).

Motivating behavior change by increasing self-efficacy is the goal of most implementations based upon the SCT. Self-efficacy is increased as a person’s confidence
in being able to do the behavior involved is increased. Teaching methods that have been shown to increase self-efficacy include approaching the behavior in small, incremental steps, behavioral contracts, mentoring, positive role models- especially from people identified as being similar to the person being taught, direct skills practice, and role practicing (16-20).

The social cognitive theory attempts to explain and provide means to change behavior on the basis that people, their behaviors, and environments are constantly influencing behavior. The main constructs of the SCT are easily understood and applied. They can be applied to positively influence behavior in a program setting. As such, the SCT is highly utilized in program development, especially in health related areas.

**Purpose of Study**

The main problem this study addresses is to aid in answering the question of how public health agencies can best help in decreasing the incidence of childhood obesity. To do this, an intervention program was designed within the WIC and EFNEP programs targeting low-income children ages 2-5 years. The primary intervention study is found in Chapter III. As part of the intervention program, a targeted curriculum was developed. The purpose of this study was to determine the effectiveness of a targeted WIC curriculum in meeting curriculum objectives and on parental self-efficacy towards behaviors related to childhood overweight prevalence. It was hypothesized that the targeted curriculum, which was based upon the social cognitive theory, would be effective in meeting the curriculum objectives and increasing parental self-efficacy.
Methods

Curriculum development

A literature review was conducted to determine key topics deemed important in development of effective childhood obesity intervention programs. Based upon the research reviewed, key modifiable topics were identified as important to include in a curriculum targeting childhood overweight status, which are listed in Table 8.

The current EFNEP curriculum largely uses many of these topics already, so no adjustments to the EFNEP curriculum were made. With the key modifiable topics in mind, a targeted curriculum was developed for the WIC setting. The curriculum consisted of six lessons each targeting several of the key topics deemed important in the prevention of childhood obesity. The classes were targeted towards parents as the agent of change. The classes were taught throughout a one-year period, for two-month intervals. The classes replaced the general classes from the traditional curriculum. Parents of study participants as well as other parents attended the classes. Thus the classes were targeted to WIC parents in general, and not just to those with overweight children. This was deemed to be appropriate, however, because of the rapidly increasing prevalence of child and adult obesity that is placing all children at risk of becoming obese (18). Due to clinic flow needs- the classes had a time restraint of around 15 minutes. Because of the two-month time interval between classes, sequential classes were not an option. Each class had to stand on its own, without relying on information from previous classes.

The targeted curriculum was developed based on the social cognitive theory. Self-efficacy change in particular was the goal of the class design. Key topics were
Table 8. Key modifiable topics pertaining to childhood overweight - used in curriculum for Both WIC and EFNEP

<table>
<thead>
<tr>
<th>Parents Need to Provide Healthy Food Choices to Their Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Encourage whole grains and dry beans</td>
</tr>
<tr>
<td>- Encourage fruits and vegetables</td>
</tr>
<tr>
<td>- Encourage low-fat dairy products</td>
</tr>
<tr>
<td>- Limit foods with added fats and sugars</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parents Need to Be Positive Role Models for Their Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Make healthy food choices themselves</td>
</tr>
<tr>
<td>- Be physically active themselves</td>
</tr>
<tr>
<td>- Encourage family to eat together for mealtime</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parents Need to Encourage Physical Activity and Limit Sedentary Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Be physically active themselves</td>
</tr>
<tr>
<td>- Encourage children to be physically active</td>
</tr>
<tr>
<td>- Provide opportunities for physical activity</td>
</tr>
<tr>
<td>- Be physically active together as a family</td>
</tr>
</tbody>
</table>

identified important for parent education. The key topics were based from the literature on the possible causes of childhood obesity that have potential to be changed. These key topics were developed into the six classes. Various teaching methods were used; particularly those that encouraged self-efficacy change. The titles of the six classes were: Providing Healthy Foods for Your Family, Parenting Thru Food and Activity, Kid’s Need to Be Active, 5 A Day- It’s In Your Hands, Make Family Time an Active Time, and Make Time for Family Meals. The overall objective for each class was an increase in the self-efficacy of the behavior the class addressed. Additional objectives for each class were based on the class content. A listing of the objectives for each class is found in Table 9.
<table>
<thead>
<tr>
<th></th>
<th>Title: Providing Healthy Foods for Your Family</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Goal: Parents will choose and prepare healthy food options for their families</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Familiarize clients with the Food Guide Pyramid, the Dietary Guidelines for Americans and the Traffic Light Eating Plan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will identify at least one thing they can change to make their meals more healthy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Increase clients’ self-efficacy in providing healthy foods for their families</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Title: Parenting: Through Food and Activity</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Goal: Parents will be positive role models for their children for eating and activity habits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will identify at least one way to teach children healthy eating habits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will develop a list of activities to do instead of watching TV</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Increase clients’ self-efficacy in being a positive role model for their children</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Title: Kids Need to Be Active!</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Goal: Parents will encourage regular physical activity for their children</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will state at least one reason why physical activity is important for children</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will state how much physical activity is recommended for children</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Parents will identify at least one activity that their children can do</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Increase clients’ self-efficacy in being a positive role model for their children</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Title: 5 A Day: It’s in Your Hands!</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Goal: Parents will provide 5 A Day of fruits and vegetables for their families</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will identify the 5 A Day slogan and logo</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will state at least one reason why fruits and vegetables are important for health</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will state at least one way to “break down a barrier” to eating more fruits and vegetables</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Increase clients’ self-efficacy in providing plenty of fruits and vegetables for their families</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Title: Make Family Time an Active Time!</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Goal: Parents will plan a “Family Fitness Fun” day at least once a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will state how much active time is recommended for adults and children</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Parents will identify at least two activities their family can do together</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Parents will learn a new game to play with their family</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Increase clients’ self-efficacy in planning Family Fitness Fun</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Title: Make the Most of Family Mealtime</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Goal: Parents will plan a family mealtime at least 3 times a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objectives:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Clients will be able to state at least one benefit from having regular family mealtimes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Parents will identify at least one thing they can do to plan more family meals</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Parents will learn tips on making mealtimes pleasant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Increase clients’ self-efficacy in being able to have family mealtime at least 3 times a week</td>
<td></td>
</tr>
</tbody>
</table>
**Evaluation**

Class surveys were developed based on the objectives of each curriculum class. In addition, each class survey asked questions regarding whether the client learned something new from the class, was able to identify a change their family could do to be healthier, and whether the class was fun. Each survey also asked about self-efficacy change in a retrospective self-reporting method (25), asking clients to rate their confidence in doing the topic since participating in the class, and before participating in the class. See the appendix for examples of these survey forms assessing self-efficacy.

These class evaluations were distributed and completed by random class participants after the class completion. The WIC clinics where the curriculum was being used were asked to collectively have 200 class participants complete the surveys for each of the six classes, with some surveys done in Spanish as well.

The surveys were collected. Data were recorded as to whether the client surveyed met the objectives listed (yes or no), as well as the two scores for self-efficacy (since and before). Means were calculated for the objectives data. A paired t-test was conducted to determine the significance of increase in self-efficacy scores and computed by use of SPSS.

**Results**

A varied number of clients were surveyed for each class, with two classes surveying clients in Spanish. The percentage class objectives met by the clients surveyed are listed in Table 10. All objectives were met by 80% or more of clients surveyed, with the exception of Class #3, Objective #3. This was a fill in the blank question asking how
Table 10. Percentage of class objectives met by clients surveyed at the end of targeted classes*

<table>
<thead>
<tr>
<th>Class</th>
<th>Objective #1</th>
<th>Objective #2</th>
<th>Objective #3</th>
<th>Learned Something New</th>
<th>Identified a Change to be More Healthy</th>
<th>The Class Was Fun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>Y</td>
<td>90.8</td>
<td>93.4</td>
<td>86.8</td>
<td>88.2</td>
<td>92.1</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.0</td>
<td>3.9</td>
<td>0.0</td>
<td>9.2</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td>9.2</td>
<td>2.6</td>
<td>13.2</td>
<td>2.6</td>
<td>3.9</td>
</tr>
<tr>
<td>Class 2</td>
<td>Y</td>
<td>93.2</td>
<td>96.6</td>
<td>94.1</td>
<td>85.6</td>
<td>88.1</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.0</td>
<td>0.0</td>
<td>1.7</td>
<td>13.6</td>
<td>9.3</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td>6.8</td>
<td>2.5</td>
<td>4.2</td>
<td>0.8</td>
<td>2.5</td>
</tr>
<tr>
<td>Class 3</td>
<td>Y</td>
<td>89.5</td>
<td>86.8</td>
<td>54.8</td>
<td>80.7</td>
<td>88.6</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>9.7</td>
<td>2.6</td>
<td>38.6</td>
<td>7.9</td>
<td>6.1</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td>9.7</td>
<td>10.5</td>
<td>6.1</td>
<td>11.4</td>
<td>5.3</td>
</tr>
<tr>
<td>Class 4</td>
<td>Y</td>
<td>90.5</td>
<td>93.7</td>
<td>93.7</td>
<td>92.1</td>
<td>95.2</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>7.9</td>
<td>4.8</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td>9.5</td>
<td>6.3</td>
<td>6.3</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Class 5</td>
<td>Y</td>
<td>97.6</td>
<td>100.0</td>
<td>100.0</td>
<td>92.7</td>
<td>97.6</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>2.4</td>
<td>0.0</td>
<td>0.0</td>
<td>7.3</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>2.4</td>
</tr>
<tr>
<td>Class 6</td>
<td>Y</td>
<td>94.4</td>
<td>100.0</td>
<td>N/A</td>
<td>88.9</td>
<td>100.0</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0.0</td>
<td>0.0</td>
<td>N/A</td>
<td>11.1</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Blank</td>
<td>5.6</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

* Refer to appendix for survey questions
( ) = n surveyed in Spanish
Table 11. Client retrospective evaluation of confidence as a measure of self-efficacy change

<table>
<thead>
<tr>
<th>Class</th>
<th>Rank</th>
<th>Since</th>
<th>Before</th>
<th>Sig: paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td>1</td>
<td>0.0</td>
<td>1.3</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>3.9</td>
<td>26.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>40.8</td>
<td>35.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>55.3</td>
<td>31.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 2</td>
<td>1</td>
<td>0.0</td>
<td>4.2</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.8</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>6.8</td>
<td>21.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>31.4</td>
<td>29.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>99.2</td>
<td>40.7</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>blank</td>
<td>0.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Class 3</td>
<td>1</td>
<td>2.6</td>
<td>6.1</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2.6</td>
<td>3.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>16.7</td>
<td>15.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>76.3</td>
<td>27.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>98.2</td>
<td>42.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>blank</td>
<td>1.8</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td>Class 4</td>
<td>1</td>
<td>0.0</td>
<td>1.6</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0</td>
<td>12.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>11.1</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>39.7</td>
<td>28.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>49.2</td>
<td>22.2</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>blank</td>
<td>0.0</td>
<td>1.6</td>
<td></td>
</tr>
<tr>
<td>Class 5</td>
<td>1</td>
<td>0.0</td>
<td>2.4</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>7.3</td>
<td>19.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>41.5</td>
<td>34.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>51.2</td>
<td>31.7</td>
<td></td>
</tr>
<tr>
<td>Class 6</td>
<td>1</td>
<td>5.6</td>
<td>5.6</td>
<td>&lt;.001</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0</td>
<td>11.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.0</td>
<td>0.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>22.2</td>
<td>22.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>72.2</td>
<td>61.1</td>
<td></td>
</tr>
</tbody>
</table>

Values in Percentage. Rank 5 = high. () = n surveyed in Spanish
many minutes of physical activity is recommended for children. Only 54% of the clients answered correctly with 60 minutes, with the majority of those who answered incorrectly stating 30 minutes.

The retrospective evaluation (25) of the clients' confidence as a measure of self-efficacy change is found in Table 11. Clients ranked their confidence in the topic addressed from 1 thru 5, with 5 being the highest. There was significant increase in the confidence level listed for “since participation” in the class in comparison with “before participation” in the class for all six classes.

Discussion

The curriculum developed, based upon the social cognitive theory, was effective at meeting all objectives. As such, the individual classes seem to have at least a short-term effect on increasing parents’ nutritional knowledge and in providing ideas and motivation for implementation of nutritional behaviors. In spite of the sub-targeted number of surveys completed, the results seem to reflect positively towards the curriculum in general. Likewise, there seems to be a similar response among the parents who completed the surveys in Spanish.

The retrospective (25) self-reported change in self-efficacy aspect of the surveys resulted in statistical significance indicating the curriculum classes were successful at increasing parents’ self-efficacy. This indicated that the use of the principles of the SCT was effective in achieving self-efficacy change. It is hoped that the increase in self-efficacy will likewise have increased the likelihood that parents adopted positive changes in the behaviors correlated to these self-efficacy increases. It is thus even further hoped
that the potential positive behavior changes will have a positive impact on reducing the prevalence of childhood overweight among the low-income preschool children in the WIC setting.

References


CHAPTER VI

GENERAL CONCLUSIONS

The main problem this study addresses is to aid in answering the question of how public health agencies can best help in decreasing the incidence of childhood obesity. To determine the effects of a targeted curriculum and dual program involvement on childhood overweight status among low-income preschool children, three Special Supplemental Food Program for Women Infants and Children (WIC) clinics were recruited to administer a series of participatory classes. An additional objective was to determine the effectiveness of a nutrition curriculum developed based upon the social cognitive theory targeting childhood overweight prevention, with parents as the agent of change.

Curriculum was developed and reviewed for content by two Extension Specialists, four registered dietitians working at the three WIC clinics, two registered dietitians at the State Health Department, and one registered dietitian working at a local pediatric hospital. Key modifiable factors in the prevention of childhood obesity were identified and classes developed to target these factors based upon constructs of the social cognitive theory. To determine the effectiveness of the curriculum, one clinic served as the control, where traditional educational methods were used. Another clinic received the targeted curriculum, developed to motivate parents to make behavior changes on key behaviors necessary in preventing childhood overweight. The last clinic received the targeted curriculum and in addition participants were referred on to the Expanded Food and Nutrition Education Program (EFNEP) in addition. WIC children were followed for a 6-
a 6-month time period with data collected for anthropometrics, dietary intake, and parental behaviors. Parents were surveyed after the completion of each class to determine the effectiveness in the curriculum meeting the desired objectives and self-efficacy change.

Results showed a decrease in BMI-for-age%ile among participants, slight improvements in dietary intakes of beneficial food groups and nutrients, and an increased prevalence of parents reporting positive healthy behaviors for all three groups. Overall, no significant differences between clinics were noted. The results of the class surveys indicated a very positive impact of the curriculum in meeting the desired objectives. In addition, using a retrospective self-reported method, the surveys indicated a statistically significant positive change on parents’ self-efficacy.

While the WIC program has the potential to impact their clients, continued research and strategy needs to be explored to determine how WIC can be most effective in preventing and treating childhood overweight status. It is hoped that the increase in self-efficacy will likewise have increased the likelihood that parents adopted positive changes in the behaviors correlated to these self-efficacy increases. It is thus even further hoped that the potential positive behavior changes will have a positive impact on reducing the prevalence of childhood overweight among the low-income preschool children in the WIC setting.
Informed Consent

Development of a Nutrition Education Curriculum by Utah State University Extension Service for Nutrition, Fun and Fitness.

Purpose: Utah State University Extension Service is conducting a study to determine the effectiveness of a series of nutrition education programs in helping the family maintain a healthy lifestyle. Participation in this study would require the child participant in the Women, Infant and Child Nutrition Program (WIC) to have a parent/guardian attend a series of education sessions on nutrition and fitness, conducted as part of the Utah State University Extension Service in cooperation with the Utah County WIC program. A blood sample from a finger stick is a requirement for participation in the WIC program, but is not a requirement for this study. Each participant's parent/guardian would be able to attend classes that will focus on lifestyle challenges (e.g. portion sizes, eating at social gatherings, recipes, and fun family physical activities).

Procedures: You understand that as the parent/guardian of a WIC participant in this project:

1) You may be asked to participate in one individual and two group education sessions outlined by the Utah County WIC Program, OR:
2) You may be asked to participate in one individual and two group education sessions focused entirely on lifestyle changes as presented by the Utah County WIC Program, OR:
3) You may be asked to participate in one individual and two group education sessions focused entirely on lifestyle changes as presented by the Utah County WIC Program, plus participate in six to ten education sessions focused on lifestyle changes presented by the Expanded Food and Nutrition Education Program (EFNEP) directed by Utah State University.
4) Your child will have height, weight, and hematocrit or hemoglobin measured as required by WIC regulations, at the first visit, and at the one year follow-up visit (height, weight and hematocrit or hemoglobin measurements are required by WIC either at the six month or yearly follow-up).
5) You will provide a written diet history of your child’s dietary intake, as required by WIC regulations.
6) You will provide a written medical history of your child, as required by WIC regulations.
7) You will be willing to have the WIC clinic people refer you to the EFNEP program.

New Findings: You will be provided with current lifestyle and nutrition information at the group classes and at individual instruction sessions. During the course of this study, you will be informed of any changes in your hematocrit. You will be referred to your private health care provider if the results of any of the laboratory tests of your hematocrit or hemoglobin reveal a lower than normal level.

Risks: The slight risk and discomfort of drawing a finger stick blood sample will be minimized by following standard clinical protocol, using a trained professional.

Unforeseeable Risks: Since this study uses the same clinic procedures in determining hematocrit or hemoglobin readings as outlined by the Utah State Health Department, there are no foreseeable risks.

Benefits: In return for your participation, you understand that you will learn skills in food portioning and the latest information about healthy lifestyles including fitness, fun and nutrition for your family. You will also have the hematocrit or hemoglobin values for your child that will be available for your preferred-designated physician or health care provider upon request. If the hematocrit or hemoglobin is 3% lower than standard, we will refer you to your personal physician along with documentation of your hematocrit and hemoglobin.
Informed Consent
Development of a Nutrition Education Curriculum by Utah State University
Extension Service for Nutrition, Fun and Fitness.

Explanation and Offer to Answer Questions: A registered dietitian employed at Utah County WIC Program will explain this study to you before you sign this consent form. Any questions relating to the procedures used in this study can be answered by Nedra Christensen (801-484-9374), or Patrice Isabella (801-538-5266), Doreen Radford (801-370-4520) or Ann Romero (435-797-3923).

Costs: There will be no cost for participating in this study.

Voluntary Nature of Participation: You are free to withdraw or decline to participate in this project at any time without consequence, which in no way jeopardizes your participation in services you would otherwise receive.

Confidentiality: All data will be kept in a locked file cabinet, in a locked room. Name to ID number will only be kept for the two year data collection period and then will be destroyed. All data will be analyzed using ID numbers and reports will use only group data. No information which could be used to identify a specific person will be released. Nedra Christensen, Pauline Williams, Doreen Radford, Ann Romero and Patrice Isabella will be the only people with access to the data.

IRB Approval Statement: The Institutional Review Boards (IRB) for the protection of human subjects at Utah State University has reviewed and approved this research project. If you have any questions about this approval please contact the IRB Office at 435-797-1821.

Copy of Consent: You have been given two copies of this Informed Consent. Please sign both copies and retain one copy for your files.

Investigator Statement: Nedra K. Christensen certifies that the research study will be explained to each individual by Utah State University Extension Personnel or Utah County WIC Program Personnel, and that each individual understands the nature and purpose, and the possible risks and benefits associated with participation in this research study. Any questions that have been raised have been answered.

Nedra K. Christensen  PhD, RD
Principal Investigator
(801) 484-9374

Signature of Subject: By signing below, I agree to participate.
Name of Parent/Guardian of Participant_________________________ Date________
Signature of Parent/Guardian Participant_________________________ Date________
Consentimiento Para Ser un Sujeto de Investigación

Desarrollo de un Programa de Estudio de Nutrición por Utah State University
Extension Service for Nutrition, Fun and Fitness

Propósito: Utah State University Extension Service (El Servicio de Extension de la Universidad de Utah State) está conduciendo un estudio para determinar la eficacia de una serie de programas educativos sobre la nutrición, para ayudar a la familia mantener un estilo de vida saludable. Participar en este estudio requerirá que el padre/guardián del niño (participante del WIC) (Programa de Nutrición para Mujeres, Niños y Infantes) asiste una serie de clases de nutrición y buena salud, las cuales serán conducidas como parte de Utah State University Extension Service junto con el programa del WIC de Utah County. Se requiere una prueba de sangre, extraída por el dedo, para participar en el programa de WIC, pero no es requerido para este estudio. El padre/guardián de cada participante podrá asistir a las clases, las cuales se enfocarán en los desafíos de la vida cotidiana (por ejemplo el tamaño de porciones, el comer en reuniones sociales, recetas, y actividades físicas y divertidas para la familia).

Procedimientos: Yo entiendo que, como el padre/guardián del niño participante del WIC en este proyecto,

1) Se me puede pedir participar en una sesión educativa individual y dos en grupo, programado por el Programa del WIC de Utah County, O:
2) Se me puede pedir participar en una sesión educativa individual y dos en grupo, las cuales se enfocarán exclusivamente en mejorar el estilo de vida, presentadas por el Programa del WIC de Utah County, O:
3) Se me puede pedir participar en una sesión educativa individual y dos en grupo, las cuales se enfocarán exclusivamente en mejorar el estilo de vida, presentadas por el Programa del WIC de Utah County, mas participar en seis a diez sesiones educativas enfocados en cambiar el estilo de vida, presentadas por Expanded Food and Nutrition Education Program (EFNEP), dirigido por Utah State University.
4) Se le va a medir a mi niño el peso, la estatura y el hematocrito o la hemoglobina, según los requisitos del programa WIC, en la primera cita, y en el chequeo a los seis meses (medidas de peso, estatura y hematocrito o hemoglobina se requieren por el WIC cada seis meses).
5) Yo proveerá una historia escrita de lo que mi niño ha comido, según las regulaciones de WIC.
6) Yo proveerá una historia médica escrita de mi niño, según las regulaciones de WIC.
7) Estaré dispuesto permitir que el personal de la clínica del WIC dé mi nombre como referencia al programa EFNEP.

Nuevos Resultados: Se le proveeré a usted información actual sobre nutrición y estilo de vida en las clases en grupo y en las sesiones individuales. Durante el transcurso del estudio, se le informará de cualquier cambio en su hematocrito o hemoglobina. Se le recomendará consultar con su médico si los resultados del examen de su hematocrito o hemoglobina muestra un nivel mas bajo del normal.

Riesgos: El pequeño riesgo e incomodidad de extraer una prueba de sangre por el dedo es mínimo por seguir el protocolo clínico normal y por hacerse por un profesional capacitado.

Riesgos imprevistos: Porque este estudio usa los mismos procedimientos en determinar los resultados de hematocrito o hemoglobina, delineados por el Utah State Health Department, no existen riesgos previstos.

Beneficios: A cambio de mi participación, entiendo que yo recibo información en cuanto a hacer porciones adecuadas de la comida y la información más reciente sobre un estilo de vida saludable, incluyendo actividad física, diversión y nutrición para mi familia. También, tendré los resultados del hematocrito o la hemoglobina de mi niño, las cuales estarán disponibles para mi médico preferido/nombrado. Si el hematocrito o la hemoglobina es mas que 3% menos que lo normal, le daremos un informe con los resultados y le recomendaremos hablar con su médico.
Fecha de creación: 11 de septiembre 2002

Consentimiento Para Ser un Sujeto de Investigación
Desarrollo de un Programa de Estudio de Nutrición por Utah State University
Extension Service for Nutrition, Fun and Fitness

Explicación y Contestación de Preguntas: A usted se le explicará el estudio por una nutricionista registrada, empleada por el Programa del WIC de Utah County, antes de firmar el consentimiento. Cualquier pregunta en cuanto a los procedimientos del estudio se pueden contestar por Nedra Christensen (801-484-9374), o Patrice Isabella (801-538-5266), Doreen Radford (801-370-4520) o Ann Romero (435-797-3923).

Costo: No hay un costo por participar en el estudio.

Participación Voluntaria: Entiendo que se me permite apartarme del proyecto en cualquier momento sin consecuencias. Esto no perjudica mi participación en otros servicios si los recibiría de otros modos.

Carácter Confidencial: Los datos se mantendrán en un armario dentro de un cuarto, los dos estarán bajo llave. Los nombres y números de identificación se guardarán durante el período de dos años durante el cual se coleccionarán los datos. Luego se van a destruir. Los datos se analizarán usando los números de identificación y los reportajes solamente utilizarán los datos agregados. Ninguna información se dará a saber si puede identificar a una persona. Nedra Christensen, Pauline Williams, Doreen Radford, Ann Romero y Patrice Isabella son las únicas personas con acceso a los datos.

Declaración de Aprobación: El Institutional Review Boards (IRB) el cual se encarga de proteger los sujetos humanos en Utah State University ha revisado y aprobado este estudio. Si tiene alguna pregunta en cuanto a la aprobación, favor de llamar a la oficina IRB a 435-797-1821.

Copia de Consentimiento: Se me han dado dos copias del Consentimiento para ser un sujeto de investigación. Debo firmar ambas copias y retener una copia para mis registros.

Declaración del Investigador: Certifico que se le ha explicado el estudio al individuo, por mí o por el personal del Extension Service de Utah State University o del Programa del WIC de Utah County, y que el individuo entiende la índole y el propósito, los riesgos y beneficios potenciales asociados con participación en este estudio. Cualquier pregunta que haya surgido ha sido contestada.

Nedra K. Christensen PhD, RD
Investigador Principal
(801) 484-9374

Firma del Participante: Por firmar abajo, indico que estoy de acuerdo participar.
Nombre del Participante________________________ Fecha_______
Firma del Participante________________________ Fecha_______

Group ID#: __________________________
This survey asks about the meals and snacks you provide for your family. As you read each statement, think about past. This is not a test. There are not any wrong answers. Please fill out each section completely.
If you do not have children, just answer the questions for yourself.

<table>
<thead>
<tr>
<th>Name:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group ID#:</td>
<td>Clinic Site:</td>
</tr>
</tbody>
</table>

For these questions, think about how you usually do things. Please put a check in the box that best answers each question.

<table>
<thead>
<tr>
<th>Question</th>
<th>Don’t Do</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Most of the time</th>
<th>Almost Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) How often do you plan meals a day or more ahead of time?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) When deciding what to feed your family, how often do you think about healthy food choices?</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(3) How often do you use the “Nutrition Facts” on the food label to make food choices?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(4) How often do you eat meals together as a family?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(5) How often do your children eat something in the morning (breakfast) within 2 hours of waking up?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(6) How often do you ask your children to clean their plate or finish eating a particular food?</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>(7) How often do you offer food as a reward for your children’s behavior?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) How often does your family eat while watching TV?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

For these questions, think about how you usually do things. Please put a check in the box that best answers each question.

<table>
<thead>
<tr>
<th>Question</th>
<th>Less than 1 time a week</th>
<th>1 time a week</th>
<th>2 times a week</th>
<th>3 times a week</th>
<th>4 times a week</th>
<th>5 or more times a week</th>
</tr>
</thead>
<tbody>
<tr>
<td>(9) How often do you get 30 minutes of physical activity a day? (Include planned exercise like walking. Also include taking the stairs, running with your kids, cleaning, gardening and other activities)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) How often do your children get 1 hour or more of physical activity a day?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(11) How many hours per day do your children spend sitting or watching TV or video tapes? (on a typical day)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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EXTENSION
Utah State UNIVERSITY
Esta encuesta pregunta por las comidas y meriendas que usted provee a su familia. Al leer cada pregunta, piense en lo recién pasado. No es un examen. No hay respuestas incorrectas. Favor de contestar cada sección completamente. Si no tiene niños, conteste para sí misma.

**Por estas preguntas, piense en lo que usted hace normalmente. Favor de marcar la cajita que describa mejor lo que usted hace.**

<table>
<thead>
<tr>
<th>Pregunta</th>
<th>Nunca</th>
<th>Rara vez</th>
<th>A veces</th>
<th>La mayoría de las veces</th>
<th>Casi siempre</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) ¿Cada cuándo planea usted el menú, con un día o más de antemano?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(2) ¿Con qué frecuencia piensa en escoger comidas saludables cuando está decidiendo que servirá a su familia?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(3) ¿Cada cuándo usa usted los “Datos de Nutrición” (Nutrition Facts) en la etiqueta de los alimentos para ayudarle tomar decisiones en cuanto a la comida?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(4) ¿Cada cuándo comen juntos, como la familia entera?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(5) ¿Cada cuándo comen sus niños algo (desayuno) dentro de dos horas después de despertarse?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(6) ¿Cada cuándo pide usted a los niños comerselo todo en el plato o terminar algún alimento específico?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(7) ¿Cada cuándo se ofrece comida como un premio por el comportamiento de sus niños?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(8) ¿Cada cuándo come su familia mientras mira televisión?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Por estas preguntas, piense en lo que usted hace normalmente. Favor de hacer una marca en la cajita que indica mejor lo que Usted hace.**

<table>
<thead>
<tr>
<th>Pregunta</th>
<th>Menos de una vez a la semana</th>
<th>1 vez a la semana</th>
<th>2 veces a la semana</th>
<th>3 veces a la semana</th>
<th>4 veces a la semana</th>
<th>5 o más veces a la semana</th>
</tr>
</thead>
<tbody>
<tr>
<td>(9) ¿Cada cuándo hace 30 minutos de actividad física?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Se incluye ejercicio programado como caminar. También, se incluye subir una escalera, correr con sus niños, limpiar, cultivar un jardín y otras actividades.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(10) ¿Cada cuándo hacen sus niños 1 hora o más de actividad física?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(11) ¿Cuántas horas por día pasan sus niños sentados o mirando la televisión o videos? (en un día típico)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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80

Utah State University
Class Evaluation

1. Since participating in this class, how confident are you that you can provide healthy foods for your family?
   1 2 3 4 5
   low high

2. Before attending this class, how confident were you in providing healthy foods for your family?
   1 2 3 4 5
   low high

3. Why is providing healthy foods for your family important?

4. Match up the following with the correct description to the right:

   ______ Food Guide Pyramid
   a. Divides foods into 3 groups according to how healthy they are

   ______ Dietary Guidelines for Americans
   b. Food groups are arranged into a shape to show how much is needed of each food group a day.

   ______ Traffic Light Eating Plan
   c. Ten things your family can do to be more healthy.

5. What is one thing you can change to make your meals and snacks more healthy?

6. Did you learn something new from the class? Y N

7. Were you able to identify a change you or your family can make to be more healthy? Y N

8. Was the class fun? Y N

9. What changes to the class would you recommend?

Group ID# ___________________________ Date ___________________________
**Evaluación de la Clase**

1. Ya que ha participado en la clase, cuanta confianza tiene en su capacidad para proveer alimentos sanos a su familia?
   
   1  2  3  4  5   
   bajo    alto

2. Antes de participar en la clase, cuánta confianza tenía en su capacidad para proveer alimentos sanos a su familia?

   1  2  3  4  5   
   bajo    alto

3. ¿Porque es importante proveer alimentos sanos para su familia?

4. ¿Cuál frase mejor describe cada guía?

   ____ La Guía de Alimentación en Pirámide
   
   a. Los alimentos están separados en tres grupos según su contenido nutricional

   ____ Las Pautas Nutricionales para Norteamericanos
   
   b. La forma de la guía le ayuda saber cuanto uno debe comer de cada grupo cada día

   ____ La Guía de Alimentación en Semáforo
   
   c. Diez cosas que su familia puede hacer para ser más saludable.

5. Anote un cambio que usted puede hacer para tener comidas y meriendas más sanas.

6. ¿Aprendió usted algo nuevo en la clase hoy?  Sí  No

7. ¿Pensó en algún cambio que usted o su familia puede hacer para ser más saludable?  Sí  No

8. ¿Fue divertida la clase?  Sí  No

9. ¿Recomienda algún cambio a la clase?  ¿Qué?
Class Evaluation

1. Since participating in this class:
   How confident are you that you can teach your children healthy eating and activity habits?
   
   1 2 3 4 5
   low high

2. Before attending this class:
   How confident were you that you could teach your children healthy eating and activity habits?
   
   1 2 3 4 5
   low high

3. What is one thing you can do to teach your children healthy eating habits?

4. What is one thing your children can do instead of watching TV?

5. Fill in the blank:
   It is recommended that children watch _____ hour(s) of TV or less each day.

6. Did you learn something new from the class? Y N

7. Were you able to identify a change you or your family can make to be more healthy? Y N

8. Was the class fun? Y N

9. What changes to the class would you recommend?
ENSEÑAR A LOS NIÑOS A TRAVES DE LA COMIDA Y LA ACTIVIDAD

Evaluación de la Clase

1. Ya que ha participado en la clase:
   ¿Se siente con la seguridad para enseñar a sus hijos a comer saludable y hábitos de actividad?
   
   1  2  3  4  5
   (bajo)  (alto)

2. Antes de participar en la clase:
   ¿Se sentía seguro que podía enseñar a sus hijos a comer saludable y hábitos de actividad?
   
   1  2  3  4  5
   (bajo)  (alto)

3. ¿Qué pueden hacer para enseñar buenos hábitos de alimentación a sus hijos?

4. ¿Qué puede hacer Ud. para limitar el tiempo que sus hijos pasan mirando televisión?

5. Llene el espacio:
   Se recomienda que los niños vean ______ horas de televisión o menos cada día.

6. ¿Aprendió usted algo nuevo en la clase hoy?
   Si  No

7. ¿Pensó en algún cambio que usted o su familia puede hacer para ser más saludable?
   Si  No

8. ¿Fue divertida la clase?
   Si  No

9. ¿Recomienda algún cambio a la clase? ¿Qué?
Class Evaluation

1. Since participating in this class: How confident are you that you can encourage your children to be physically active each day?
   
   1 2 3 4 5
   low high

2. Before attending this class: How confident were you that you could encourage your children to be physically active each day?
   
   1 2 3 4 5
   low high

3. Why is it important that children are physically active?

4. What is one activity that your children can do to be more physically active?

5. Fill in the blank: It is recommended that children get _________ minutes of physical activity each day.

6. Did you learn something new from the class? Y N

7. Were you able to identify a change you or your family can make to be more healthy? Y N

8. Was the class fun? Y N

9. What changes to the class would you recommend?
Evaluación de la Clase

1. Después de participar en esta clase:
   ¿Está segura que puede alentar a sus hijos estar activos físicamente todos los días?
   
   no segura  1  2  3  4  5  muy segura

2. Antes de asistir a la clase:
   ¿Estaba segura que podría alentar a hijos estar activos físicamente todos los días?
   
   no segura  1  2  3  4  5  muy segura

3. ¿Por qué es importante que un niño sea activo?

4. ¿Qué es una cosa que sus hijos pueden hacer para ser más activos?

5. Escriba la respuesta en el espacio:
   Se recomienda que los niños hagan una actividad física por ______ minutos de cada día.

6. ¿Aprendió algo nuevo en la clase hoy?
   Sí   No

7. ¿Identificó algún cambio que su familia puede hacer para ser más sanos?
   Sí   No

8. ¿Disfrutó a la clase?
   Sí   No

9. ¿Cómo cambiaría a la clase?
5 A Day-- It's In Your He

Class Evaluation

1. Since participating in this class:
   How confident are you that you can provide 5 A Day of fruits and vegetables to your family?
   
   1 2 3 4 5
   low       high

2. Before attending this class:
   How confident were you that you could provide 5 A Day of fruits and vegetables to your family?
   
   1 2 3 4 5
   low       high

3. What is 5 A Day?

4. What is one reason why fruits and vegetables are good for health?

5. What is one thing you or your family can do to eat more fruits and vegetables?

6. Did you learn something new from the class? Y N

7. Were you able to identify a change you or your family can make to be more healthy? Y N

8. Was the class fun? Y N

9. What changes to the class would you recommend?
Evaluación de la Clase

1. Después participar en la clase:
   ¿Está segura que puede proporcionar 5 Por Día de frutas y vegetales a su familia? 1 2 3 4 5
   no segura   muy segura

2. Antes asistir a la clase:
   ¿Estaba segura que podría proporcionar 5 Por Día de frutas y vegetales a su familia?
   1 2 3 4 5
   no segura   muy segura

3. ¿Qué quiere decir 5 Por Día?

4. ¿Qué es una razón las frutas y vegetales son importantes para la salud?

5. ¿Qué es una cosa que su familia puede hacer para comer más frutas y verduras?

6. ¿Aprendió algo nuevo en la clase?  Sí  No

7. ¿Identificó un cambio que Ud. o su familia puede efectuar para ser más saludable?
   Sí  No

8. ¿Era divertida la clase?  Sí  No

9. ¿Cuáles cambios recomienda usted para la clase?
Class Evaluation

1. Since participating in this class:
   How confident are you that you can plan active family activities for your family?
   1 2 3 4 5
   low high

2. Before attending this class:
   How confident were you that you plan active family activities for your family?
   1 2 3 4 5
   low high

3. How much active time is recommended for children? How much for adults?

4. What is one reason why families benefit from being active together?

5. Name two things your family can do together to be more active?

6. Did you learn something new from the class? Y N

7. Were you able to identify a change you or your family can make to be more healthy? Y N

8. Was the class fun? Y N

9. What changes to the class would you recommend?