The Effectiveness of the Teens Reaching Youth 4-H Model in a Childhood Nutrition and Physical Activity Education Program

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THE EFFECTIVENESS OF THE TEENS REACHING YOUTH 4-H MODEL
IN A CHILDHOOD NUTRITION AND PHYSICAL ACTIVITY
EDUCATION PROGRAM

by

Kristen Rae Stokes Strong

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Nutrition, Dietetics and Food Sciences

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UTAH STATE UNIVERSITY
Logan, Utah

2009
ABSTRACT

The Effectiveness of the Teens Reaching Youth 4-H Model in a Childhood Nutrition and Physical Activity Education Program

by

Kristen Rae Strong, Master of Science
Utah State University, 2009

Major Professor: Dr. Nedra K. Christensen
Department: Nutrition, Dietetics and Food Sciences

Childhood obesity rates are on the rise. There are detrimental physical and psychological health effects associated with childhood obesity. Society needs proven methods of delivering nutrition and physical activity education to children. The Teens Reaching Youth (TRY) 4-H model has been shown to be effective at delivering curriculum in a variety of topics. To assess the effectiveness of the TRY 4-H model at delivering nutrition and physical activity education to youth, grades third through sixth. The program’s objectives were to increase youth participants’ nutritional knowledge, improve youth participants’ eating and fitness habits, and improve leadership and life skills of the teens involved in the TRY 4-H program. We compared three groups of youth grades third through sixth in Northern Utah. We looked at the youth’s nutrition knowledge and food preferences as well as their parents/guardians’ behaviors. Then two of the groups participated in a nutrition and physical activity education program. One group was taught by TRY 4-H teams and the other group was taught by adult volunteers.
from the community. After participating in the program, the youth’s nutrition knowledge and food preferences and their parents/guardians’ behaviors were re-assessed. The control group was unavailable for re-assessment due to limited access. Teen leadership was assessed using a teen leadership and life skills assessment tool. At baseline, the three samples had no statistical differences. The TRY 4-H treatment and Adult Volunteer treatment were found to produce statistically similar nutrition knowledge outcomes. Parents/guardians reported improvements in youth participant nutrition and physical activity habits. Teen members of the TRY teams experienced an increase in leadership and life skills. Teens from the TRY 4-H program are as effective as adult volunteers at teaching younger youth about nutrition. This education delivery method should be utilized in additional communities to aid in the fight against childhood obesity.
ACKNOWLEDGMENTS

I would like to thank Nedra K. Christensen PhD, RD for acting as my major professor. Your countless hours of assistance made the project possible. I would also like to thank Ann M. Berghout Austin PhD and Tamara S. Vitale MS, RD for participating on my committee.

I give special thanks to my family, friends, and most especially my husband, Bradley Strong, for their encouragement, moral support, patience, and willingness to help. It has been an adventure and it was great to have you along for the ride. I could not have done it without all of you.

Kristen Rae Stokes Strong
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CHAPTER 1
GENERAL BACKGROUND AND INTRODUCTION

Abstract

This chapter covers three topics. Section one provides an in-depth look at Childhood Obesity, including: 1) the childhood obesity epidemic, 2) the physical and psychological effects of childhood obesity, 3) factors contributing to childhood obesity, and 4) current efforts to solve the problem. The second section introduces the Teens Reaching Youth (TRY) 4-H Model, which is the education model used and evaluated in the study. The third section discusses methods for effective program evaluation.

Childhood Obesity

Childhood obesity has been referred to as “one of the most pressing health issues of our time” (1). Obesity has devastating effects on children; it is frequently accompanied by co-morbidities of type 2 diabetes, hypertension, certain cancers, and cardiovascular disease. In addition to negative effects on physical health, childhood obesity plays a role in diminished psychological health, and has negative social implications (2). This section will discuss childhood obesity in four parts: 1) the childhood obesity epidemic, 2) the physical and psychological effects of childhood obesity, 3) factors contributing to childhood obesity, and 4) current efforts to solve the problem.
Childhood Obesity Epidemic

Childhood obesity affects the entire world. Traditionally, developed countries have observed the highest prevalence of childhood obesity, but developing countries have also observed an increase in prevalence. In 1998, the World Health Organization reported that Iran was ranked in the top seven countries for childhood obesity prevalence; and in Saudi Arabia approximately 17% of children between the age of six and 18 were obese (3).

In the United States, prevalence of childhood obesity is on the rise (3-5). In the 1960s about five percent of children were obese, by 2005 it was estimated that 25% of U.S. children were overweight and 11% were obese (3-5). Boys are more likely to be at an unhealthy weight than their female counterparts of similar age and background (3-5). A positive association between age and overweight has also been observed (3-5). In the past 30 years the average weight of first graders has increased by 4.9%, the average weight of third graders has increased by 16.8%, and the average weight of fifth graders has increased by 14% (3-5).

Utah has not been exempt from the childhood obesity epidemic. In 2006 the Utah Department of Health surveyed Utah elementary students, grades first through sixth (5). They observed that approximately one in four, or 22.5%, of Utah elementary students were overweight. Just like national trends, boys in Utah are more likely to be overweight than girls. A similar trend was also seen in the relationship between age and weight status, it was observed that as students’ age increased, the likelihood of being at an unhealthy weight also increased. Given the current trends, it is projected that 30.3% of Utah elementary school students will be at an unhealthy weight in 2016 (5).
Physical and Psychological Effects of Childhood Obesity

Childhood obesity has long lasting effects on a child’s physical and psychological health. It is estimated that 70% of obese adolescents become obese adults (3).

Childhood overweight and obesity have been shown to have negative effects on health-related quality of life (QOL) in both clinical and community-based samples (6,7). The World Health Organization has defined health-related QOL to include physical, mental, and social wellbeing (8). It is measured using the PedsQL 4.0, which is a 23 item questionnaire validated for use with children between the age of two and 18 years, with a point value range of zero to 100. A score of 100 indicates the highest quality of health-related life.

Clinical samples have indicated that “severely obese children and adolescents have lower health-related QOL than children and adolescents who are healthy and similar QOL as those diagnosed as having cancer” (6). A community based sample found that obese children consistently had the lowest scores on the PedsQL 4.0 (7). As body mass index (BMI) increased the QOL score decreased. The decline became most apparent just above the mean BMI. For the child self-reported total PedsQL, children with a normal weight averaged 83.1, overweight children averaged 79.3, and obese children averaged 74. These results were statistically significant with a p-value <.001. Note that obese children had a more marked decline. A decline in quality of life has been associated with decreased physical and social functioning for obese children.
Physical Health

There are few organ systems which are not negatively impacted by childhood obesity. Obesity-related diseases historically affecting adults have been observed in overweight and obese children. Physical effects of childhood obesity include decreased cardiovascular health (atherosclerosis, hypertension, and hyperlipidemia) (3,5); glucose intolerance and diabetes are also a major co-morbidity (9,10). As a result of excess weight, children may also experience sleep-associated breathing disorders, asthma, iron deficiency anemia, non-alcoholic fatty liver disease, systemic inflammation, and orthopedic problems (5). Obese females have experienced early onset of puberty and menarche, both of which have been associated with breast cancer (3,11).

Cardiovascular health is often diminished in obese children. In fact, children as young as five years have shown signs of cardiovascular disease (3). Pathological studies have found atherosclerotic lesions in children and young adults at autopsy occurring after an unexpected death (12). This presence of atherosclerotic lesions was positively associated with BMI along with other common risk factors, including hyperlipidemia, hypertension, and cigarette smoking (12).

Glucose intolerance and non-insulin-dependent diabetes mellitus (NIDDM) have traditionally been problems of adulthood. They are now affecting overweight and obese children at alarming rates. A study published in the New England Journal of Medicine assessed glucose tolerance in obese children (4-10 years) and obese adolescents (11-18 years) (10). They detected impaired glucose tolerance in 25% of the obese children and 21% of the obese adolescents. They also found that 4% of the obese adolescents had silent type 2 diabetes. Prevalence of impaired glucose tolerance among obese children
and adolescents is not affected by ethnic background. Another problem often associated with impaired glucose tolerance is elevated triglycerides. The study observed that adolescents with impaired glucose tolerance had elevated fasting triglyceride levels compared to their normal glycemic counterparts (150 vs. 115 mg/dL).

Impaired glucose tolerance is a precursor for type 2 diabetes mellitus, previously called non-insulin-dependent diabetes mellitus (NIDDM). Prior to 1992, type 2 diabetes made up approximately 4% of newly diagnosed cases of diabetes in children birth-19 years. By 1994 type 2 diabetes rose to 16% of all newly diagnosed cases of diabetes and 33% of the newly diagnosed children aged 10 to 19 years of age (9). In the Greater Cincinnati area the incidence of adolescent type 2 diabetes increased tenfold from 1982 to 1994, going from 0.7/100,000 to 7.2/100,000 per year (9). In 1994 the average age of adolescents newly diagnosed with type 2 diabetes was 13.8 years with an average BMI of 37.7 (9). This increased incidence in the Greater Cincinnati area mirrors national trends in adolescent obesity and type 2 diabetes (9).

It is unknown what affect type 2 diabetes or cardiovascular disease will have on the lifespan of a child. It is anticipated that similar to adults, these diseases will lead to shortened life spans, how short is yet to be known.

Psychological Health and Social Implications

In addition to serious physical health consequences, childhood obesity plays a role in psychological well being and often has negative social implications. Obese children are more likely to be depressed, have low self-esteem associated with low body image, increased rate of anxiety disorders, and report difficulties in school (3,5). Perhaps more
alarming are the negative social implications and the effects they have on obese children. Obese children often have fewer friends, experience social isolation, and report teasing about weight from peers and family. One alarming affect is that obese children are more likely to contemplate and attempt suicide as a direct result of being teased about weight (11,13,14).

In a study of 4,746 adolescents investigating the effects of weight based teasing in adolescents, weight-based teasing was widespread; 30% of girls and 24.7% of boys reported being teased about weight by peers (13). Family teasing was also prevalent; 28.7% of girls and 16.1% of boys reported being teased about their weight by a family member. Sadly, 14.6% of girls and 9.6% of boys reported being teased about their weight by both peers and family members. Weight-based teasing has been associated with low body satisfaction, low self-esteem, and high depressive symptoms. Regardless of gender, race, ethnicity, and actual weight; weight-based teasing has been associated with increased contemplation of and attempted suicide in adolescents. The study observed that more than half of the adolescent girls teased by both peers and family reported suicide contemplation, compared to 24.7% of those not teased; almost one quarter of them reported attempting suicide; while 8.5% of their female non-teased counterparts reported having attempted suicide. Adolescent boys were also affected by weight-based teasing. Teasing about weight from family with or without peer teasing made a boy three times more likely to attempt suicide than non-teased boys. Adolescents who experienced weight-based teasing were 1.39 to 2.35 times more likely to have emotional health problems than those not teased. Interestingly, weight status alone was not associated with low self-esteem, suicidal ideation or attempts when teasing wasn’t
present. While being at an unhealthy weight has been documented with adverse psychological health, findings from this study indicate that teasing about body weight could be the major contributing factor; weight-based teasing was consistently associated with low body satisfaction, low self-esteem, high depressive symptoms, and contemplating and attempting suicide.

Overweight and obese children often times are less preferred as friends (11). One study used social networking maps to investigate the social implications of being an overweight adolescent (14). Participating students were asked to list their five best male and five best female friends. Normal-weight student participants had more friends and were more likely to be involved in social networks compared to the overweight students. The chance of an overweight student being listed as a friend was significantly less than the likelihood of a normal-weight student being listed as a friend. It was also observed that friends of overweight peers, regardless of their weight status, were less popular and were less likely to be listed as friends themselves. Perhaps most sad was the observation that students listed as best friends by overweight students were less likely to reciprocate the nomination than those listed as best friends by normal-weight students (14).

It has been observed that “few problems in childhood have as significant an impact on emotional development as being overweight (14)”. Negative social implications of childhood obesity are a reality. Stigmatization, discrimination, and bias by peers, teachers, and sometimes parents are well-documented (11).
Factors Contributing to Childhood Obesity

There is much discussion and debate about what causes childhood obesity. It is well agreed upon that obesity occurs when energy intake exceeds energy expenditure (3). Lacking data is part of the challenge. The National Health and Nutrition Examination Survey (NHANES) is the only major data set that has tracked the changes in children’s lives during the obesity epidemic (15). Possible contributing factors include environmental, lifestyle preferences, and cultural environment (3).

Experts agree that weight gain results from an imbalance between energy input and output. One review suggested that a two percent imbalance of energy may lead to obesity. For children two percent would be equivalent to approximately 30 extra calories or 15 extra minutes of inactivity daily (16). Dietary trends, foods available at school, television, reduced physical education at school, and increased homework loads are just a few cultural trends contributing to obesity (16), and will be discussed in the following paragraphs.

The tendency for obesity in humans has existed for a long time. The recent epidemic is indicative of the central role environmental and cultural factors play. One factor that plays a large role in dietary habits is food cost (3). Some foods have become relatively more affordable, while other foods have become relatively more expensive (3). One researcher observed that from 1982 to 2002 fresh fruits and vegetables became relatively more expensive, while sugars, sweets, fats and oils became relatively cheaper. Soft drinks became the relatively cheapest food. This is based on a consumer price index using 1982 as the baseline (index = 100). In 2002 the consumer price index increased to 180. This means that 1982 to 2002, on average, the cost of goods had increased by 80%.
Fresh fruits and vegetables had a price index of 258, which means their price had increased by 158%. Soft drinks had an index of 126, which means the cost had risen only 26% from 1982 to 2002. This means soft drinks became relatively cheaper, while fruits and vegetables became relatively more expensive over time (17). Children who drink one regular carbonated drink a day have an average 10% more total energy intake than non-consumers (18).

The USDA estimates that between 1970 and 1997, carbonated drink consumption increased by 118% per capita and milk beverage consumption decreased by 23% (3). The Continuing Survey of Food Intakes by Individuals (CSFII) 1989-91, 1994-96, and 1998 and the Nationwide Food Consumption Survey 1977-78 are used to follow trends in food consumption. A comparison of data from these surveys indicate that there are two major trends in dietary habits of youth, 1) intake of starchy snacks—chips, crackers, popcorn, and pretzels—tripled from 1977 to 1998 and 2) soft drink consumption doubled during the same time period (17). The table below outlines intake trends measured by the CSFII (Table 1).

<table>
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<th>Table 1. CSFII food trends</th>
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<tr>
<td></td>
</tr>
<tr>
<td>1977-78</td>
</tr>
<tr>
<td>Girls</td>
</tr>
<tr>
<td>Boys</td>
</tr>
<tr>
<td>1989-91</td>
</tr>
<tr>
<td>Girls</td>
</tr>
<tr>
<td>Boys</td>
</tr>
<tr>
<td>Girls</td>
</tr>
<tr>
<td>Boys</td>
</tr>
</tbody>
</table>
Another dietary trend that has affected caloric intake is food being eaten away from the home (17). In 1970 the average American spent one third of their food dollars on food away from home; in 1980 39%, in 1990 45%, and in 2001 47%. It has been documented that foods prepared at home are more nutrient dense and contain less fats and sugars than foods eaten away from home (17). The USDA estimated that if food eaten away from home had the same nutrition content and quality as food prepared at home, in 1995 the average American would have consumed 197 fewer calories daily and only 31.5% of their calories would have come from fat. In 1995 the average American consumed 33.6% of their calories from fat (17). These dietary trends may have been affected by the affordability of food.

Schools can serve as a controlled environment that encourages or discourages healthy habits. According to the school health profiles, a system that surveys school health programs, Utah middle and high schools are ranked number one (out of 36 participating states) in the nation for providing students with access to chocolate candy, salty non low-fat snacks, soda pop, and fruit drinks that are not 100% juice (19). Conversely, Utah has the lowest percent of schools limiting access to “junk food” during school lunch. The table below outlines student access to foods from vending machines, the school store, or snack bar (Table 2).
Table 2. Percent of schools offering students access to foods.

<table>
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<tr>
<th>Food Available</th>
<th>Range Among Participating States</th>
<th>Utah</th>
</tr>
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<tr>
<td>Chocolate candy</td>
<td>8.4-82.9%</td>
<td>82.9%</td>
</tr>
<tr>
<td>Salty snacks that are not low in fat</td>
<td>11-75.9%</td>
<td>75.9%</td>
</tr>
<tr>
<td>Soda pop or fruit drinks that are not 100% juice</td>
<td>25.3-86%</td>
<td>86%</td>
</tr>
<tr>
<td>Do not allow students to purchase: candy, snacks that are not low in fat, soda pop, sports drinks, fruit drinks that are not 100% juice, 2% or whole milk, during school lunch periods</td>
<td>18.7-96.1%</td>
<td>18.7%</td>
</tr>
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Physical activity, or energy output, is the second part of energy balance. Studies have shown that television viewing and playing computer games are associated with increased prevalence of obesity (3,20,21) More children are being driven to school, fewer participate in sports, and physical education has become less frequent in schools (20).

Children who watch more television have been shown to have higher skin-fold thicknesses (11). Watching television for two or more hours daily during childhood has also been reported to contribute approximately 17% of overweight cases in early adulthood (11).

It is theorized that television viewing may contribute directly to obesity by reducing energy expenditure through displacing physical activity or by increasing dietary intake through snacking during viewing or changing eating patterns caused by food advertising. Several studies have found significant associations between television viewing and youth obesity (15,22,23).
Current Efforts to Solve the Problem

It is widely agreed that prevention is the best method to combat this growing public health concern (3,24). Several programs working on childhood obesity prevention and intervention have been and are currently being conducted around the United States and throughout the world. These programs are focused on developing and implementing programs that result in increased knowledge and improved behavior which will help reduce the incidence of childhood obesity. Common behavior change methods include diets (e.g. traffic light diet), exercise sessions, and increased general lifestyle activity. Positive reinforcement of reducing sedentary behavior has been shown to be effective in increasing physical activity (11).

Researchers in Israel observed that short- and long-term benefits were experienced by subjects involved in a dietary and physical activity intervention program (24). The treatment group experienced a decrease in body weight, BMI, body fat percentage, serum total cholesterol levels, and fitness.

Results from a childhood obesity prevention study were recently published in the American Journal of Public Health (2). The study surveyed 5200 fifth grade students, their parents, and the school principals. They compared the incidence of obesity at schools with policies following recommendations from the Center for Disease Control to those without such policies. Nutrition education for students is one of the key recommendations. They collected height and weights, physical activity, and dietary intake information. They found that schools following recommendations had lower rates of obesity and overweight among students. In another study it was observed that when
dealing with already obese children, reducing sedentary behavior by encouraging play was more effective at preventing additional weight gain than food restrictions and exercise (25).

In England a group investigated ways to decrease soda consumption among junior school-aged children (seven to 11 years) (18). They used a school based education program and found that those who participated in the program, on average, consumed 0.6 fewer glasses of soda per day (average glass size = 250 ml). The control group had an average increased consumption by 0.2 glasses a day. After one year, the control group had 7.5% more overweight and obese children and the treatment group had 0.2% fewer overweight and obese children.

In conclusion, childhood obesity is one of the greatest public health concerns of our time. It has devastating physical, psychological, and social implications. It is a problem with a complex etiology that needs to be addressed on all levels.

Teens Reaching Youth

The Teens Reaching Youth (TRY) 4-H Program was implemented by North Carolina State University 4-H and Youth Development Department in 1986 (26). Its two main objectives are to help teenagers 1) increase self-esteem and feelings of belonging in their community; and 2) to assume responsibility of self and others (26). This section will discuss the purpose, define, and list the benefits of the Teens Reaching Youth 4-H Program.

Historically, community organizations have relied heavily on professionals and adult volunteers, but these resources are often limited. Teens can serve as an excellent
source of volunteers for community organizations. In 1991, the Gallup organization reported that teenagers (14-17 years) were volunteering at the same rate or higher than adults. They cited a desire to do something useful and anticipation of enjoyable work as the most common reasons teens volunteer (27). Researchers at the University of Florida found that teens are most likely to become involved in community service for the following reasons: to provide community service, attain skills and experience, and have influence by setting an example for others. They also found that teens are more likely to get involved when they feel their community views them as worthwhile and is receptive to their contributions. (28)

 Teens who become involved in their community often feel ownership of their community and have a desire for it to improve. In addition, they often become lifelong contributors to local well-being (28). Not only do these teens provide additional resources for community programs, teens who are involved have historically gained leadership and life-skills. Teens who get involved in 4-H often gain skills in public speaking, organization, time management, presiding over meetings, problem solving, teamwork, and independent thinking (29).

 The Teens Reaching Youth (TRY) 4-H Program is a proven teaching and leadership model (26). It helps bridge three life stages: adults, teens, and younger youth. A TRY team consists of 3-4 teenagers and an adult leader. Each TRY team receives leadership and curriculum training; TRY teams then reach out and provide education to younger youth within the community. Adults serve as leaders, who mentor and coach the teens. Teenagers are able to work with the younger youth and serve as role models. The TRY Program enables teens to contribute to their community, expand their leadership
skills, and learn subject-matter. It provides them with meaningful involvement and legitimate responsibilities. The program helps foster increased self-esteem through recognition and respect from adults, peers, and younger youth.

Adult leaders play an important role; they are able to share their knowledge and life-skills with the teens. In addition, adult leaders provide support and encouragement while reinforcing the importance of the teens and their contributions to society. The TRY Program also facilitates increased program outreach through additional volunteers. (26,30)

Teen participants from the first two years of the program in North Carolina were asked to participate in a survey. It was found that as a result of TRY Program involvement, participants had a reduction in feelings of alienation and had improved leadership skills (26). During the first five years, the TRY program involved almost 2,000 teens in North Carolina. Since that time, it has been utilized in several states with demonstrated success.

Program Evaluation

Programs aimed at improving participant behavior are implemented in a variety of community and organizational settings. Program evaluation allows implementers to measure program effectiveness and efficiency (31). This section will focus on the purpose of program evaluation, common barriers to program evaluation, core competencies of a program evaluator, and how to effectively evaluate a program. It will pay particular attention to the evaluation of community programs aimed at improving
public health. The implementation of the TRY 4-H model was evaluated using the methods outlined in this section.

**Purpose of Program Evaluation and Barriers to Program Evaluation**

Program evaluation is one of the most important parts of program implementation. We live in a results-based world. Stakeholders, who may include community leaders, investors and supervisors, want to know what the community/organization will get in return for their investment. Investment can include time, money, personnel, and other resources. They also want to know what community/organization needs are met through program implementation (31-33).

Program evaluation demonstrates and documents the connection between program implementation, participant behavior, and overall impact to the community/organization (33). In short, program evaluation determines a program’s effectiveness, efficacy and efficiency. Well documented results identify ways a program can be improved, demonstrate and document the changes made in participants/results achieved, provide feedback about benefits the community/organization received from a program, and ultimately help determine if a program is to be continued or dropped (31-33).

Communities and organizations need programs which will help individuals make changes in a cost-effective way. Richard Clark and Fred Estes state in their book, *Turning Research into Results*, “without program evaluation, we are left with wishful thinking or self-serving impressions that are often wrong and sometimes dangerous” (33). Program evaluation is necessary to get a clear and objective measurement of a program’s success. Program evaluation is avoided for different reasons, the most common being
fear, cost, time pressures and a lack of knowledge (33). Individuals may fear evaluation because it has the ability to document failure or negative results. Negative results can be personally threatening; individuals may fear if the program is not proven effective it will lose funding and disappear.

An article was published in the *Journal of the American Dietetic Association* focused on community nutrition education programs and the barriers they faced in program evaluation (34). It stated that community nutrition education program implementers faced similar barriers, including evaluation was not a priority, unrealistic planning, lack of continuity and sustained commitment to evaluation, small sample size for evaluation analysis, no control group, and lack of valid and reliable data collection tools.

Program evaluation is also avoided because individuals sometimes view it as expensive, difficult, time intensive, and cumbersome. In addition, they may lack the knowledge of how to effectively and efficiently evaluate programs (33,35). The Center for Disease Control and Prevention (CDC) has cited lack of evaluation skills as one of the major barriers to evaluation of public health initiatives (36).

**Program Evaluator Core Competencies**

Having a competent and capable program evaluator is the first important step in program evaluation (32). Program implementers need to become competent program evaluators; they need to know what and how to evaluate their programs. The evaluator is responsible to assess the impact of their program. They are also responsible to follow up on changes made, actions taken, and results achieved. As they fulfill these
responsibilities, they provide feedback about benefits received from the program’s implementation (32,33).

Many health educators do not receive training in evaluation methods during their academic training (36). Effective training includes practical, hands-on experiences which allow the students to learn by doing. In addition to evaluation skills, an effective evaluator must also possess practical skills including interpersonal, communication, and program management/administrative skills.

In 1996, William Rothwell presented basic competencies required of a program evaluator in order to complete a quality evaluation (37). These core competencies include performance gap evaluation skill, ability to evaluate results against organizational goals, standard setting skills, ability to assess impact on culture, program review skills, and feedback. Each will be discussed in the following paragraph (32,37).

**Performance gap evaluation** is the ability to measure and determine the difference between actual performance and ideal performance. The evaluator is responsible to establish measurement tools which will measure participant performance before and after program implementation. The next core competency is the ability to evaluate results against community/organizational goals. This means being able to compare the program’s observed effectiveness to its intended impact. A good evaluator has the ability to measure and compare the program’s impact to the community/organization’s objectives. **Standard setting skills** is the ability to establish parameters and develop tools capable of measuring the results. The ability to assess impact on culture indicates that the evaluator is capable of measuring changes in the community/organizational culture which result from the program. **Program review skills** means an evaluator evaluates the
program, communicates program impact, and then improves the program based on
evaluation results. *Feedback skills* are considered to be one of the most important skill
sets an evaluator can possess. The evaluator needs to be able to collect and analyze data,
and then accurately and clearly present information which demonstrates the program’s
benefits/impact (32,37).

**How to Evaluate a Program**

The Center for Disease Control and Prevention (CDC) has established a
framework for program evaluation in public health (38). It was established in an effort to
improve how public health activities are planned, managed, and evaluated. The
framework is a six-step process; 1) *Engage stakeholders*, 2) *Describe the program*, 3) *Focus the evaluation design*, 4) *Gather credible evidence*, 5) *Justify conclusions*, and 6) *Ensure use and share lessons learned*. The following paragraph will expand on these six steps.

To *engage stakeholders* means to include all individuals/organizations that have
an investment in the program. The level of involvement will be different for each
situation. It is important to ensure that the evaluation(s) will address their organization’s
objectives and concerns. Clearly defining the mission and objectives of the program can
help clarify the program’s purpose to stakeholders. *Describing the program* includes
writing a detailed outline of the program’s expected effects, activities, resources
available, and how it fits into the larger community/organization. *Evaluation design* has
a direct impact on how well the program evaluation is carried out. It is important to
select evaluation tools that are best suited to satisfy the information needs of the
stakeholders. Program evaluation design will be focused on in later paragraphs. It is important to ensure that program evaluations will collect relevant information that can be used to present a well-rounded and credible picture of the program’s impact. Comparing data gathered to agreed-upon standards provides justification for conclusions.

Community programs which aim at improving public health are of great importance to our society. A program which has been tried and shown to be effective at helping individuals change behavior needs to be shared with other communities and continued in the community of origin. This can be done by sharing results and methods. It is also important to share lessons learned from the evaluation process to help others in their quest for effective program evaluation (38).

In the 1950s Donald Kirkpatrick presented four levels of evaluation (31). Since then it has become almost universally used and is considered by many to be the most effective method of program evaluation (33). Kirkpatrick’s four levels of evaluation include: 1) Reaction, 2) Learning, 3) Behavior, and 4) Results. The remainder of this section will focus on Kirkpatrick’s four levels of evaluation (31-33).

The first level of evaluation is Reaction: How people react to the program or customer satisfaction (31-33). The reaction of program participants has the ability to affect future funding and participation from additional participants. It also plays a role in the outcome of the other three levels of evaluation. It has been shown that program participants’ reaction has a direct impact on learning attitudes, which directly affect learning outcomes. A positive reaction does not guarantee learning, but a negative reaction will almost always have a negative impact on learning outcomes. The reaction level has the ability to make or break a program (31).
Program participant reaction can be measured with a satisfaction survey. Ask a few open-ended questions which will discern whether participants like and value the program. Positive reaction indicates that participants like the program and are willing to participate. It does not guarantee that the program will actually lead them to make changes that support the community/organizational goals (33).

The second level of evaluation is Learning: How much did program participants learn as a result of program participation (31-33)? In order to truly measure knowledge gained as a result of program participation, the evaluation tool must be based on the program’s expected learning outcomes/objectives. The best way of assessing learning is to have participants apply what they have learned or have them explain how to do it. Having participants apply the knowledge is a better gauge of their ability to use the knowledge obtained (32,33).

The most common assessment tools used are reaction forms and memory tests. These are often used because of ease of administration. Memory tests are able to assess learning, but are not able to measure learning in its fullest sense. The utilization of a reaction form that asks participants to retrospectively assess how much they learned is a common mistake made in measuring learning. This type of form does not assess actual knowledge gained, but how much the participant feels they learned from the program. It can inaccurately skew learning outcomes in either direction (33).

The third evaluation level is Behavior: How much did participant behavior change as a direct result of program participation (31-33). Behavior change happens when knowledge gain transfers to action. Problems may arise if the program teaches information that does not apply to the participants. There are four parts to optimal
evaluation on the behavior level. First, obtain responses from all, or a sample of, program participants, and others who are affected because the participant took part in the program. Second, use a control group of similar individuals who did not participate in the program. Third, repeat the evaluation over time. This will measure the endurance of the behavior change. Fourth, try to find examples that reflect the application of skills/knowledge gained from the program. In the assessment, ask for examples of how participants have been able to apply the knowledge and skills learned in the program. Success stories can serve as concrete examples of the program’s effectiveness and illustrate the program’s value (33).

It is important to note that there are factors which affect the likelihood of behavior change. Behavior change is affected by: 1) desire to change, 2) knowledge of what and how to change, 3) climate, and 4) reward for change (31). The program is capable of providing knowledge, and can influence desire, climate, and reward. Desire to change comes from within; the program can help inspire individuals to change. A participant’s climate is affected by their support group. A climate can be preventing, discouraging, neutral, encouraging, or requiring. A program can positively affect a participant’s support group by including them in the program. Help program participants recognize the rewards of behavior change. Rewards for behavior change may include satisfaction, recognition, monetary rewards, etc. (31).

The fourth and final level of evaluation is Results. Did the program 1) achieve the goals it set out to accomplish? and 2) how much did the community/organization improve because of the program (31-33)? Results measure how well the program was able to meet its objectives, and evaluates the overall effect of the program on the
community/organization. The results often help determine whether the program is worth continuing (31-33).

By utilizing the four levels of evaluation, it is possible to have positive and negative results. It is important to measure on all four levels whenever possible. By doing so, positive results can balance and/or outweigh negative results observed on other levels. Evaluation provides evidence to support the value of a program. When done correctly, evaluation provides reliable and valid information about the community/organization before implementation of the program, the effectiveness of the program at helping individuals change, and the overall impact the program has on the community/organization (33).

References


CHAPTER 2
THE EFFECTS OF THE TEENS REACHING YOUTH 4-H MODEL
IN A CHILDHOOD NUTRITION AND PHYSICAL ACTIVITY
EDUCATION PROGRAM

Abstract

Childhood obesity rates are on the rise. There are detrimental physical and psychological health effects associated with childhood obesity. Society needs proven methods of delivering nutrition and physical activity education to children. The Teens Reaching Youth (TRY) 4-H model has been shown to be effective at delivering curriculum in a variety of topics. To assess the effectiveness of the TRY 4-H model at delivering nutrition and physical activity education to youth, grades third through sixth. The program’s objectives were to increase youth participants’ nutritional knowledge, improve youth participants’ eating and fitness habits, and improve leadership and life skills of the teens involved in the TRY 4-H program. We compared three groups of youth grades third through sixth in Northern Utah. We looked at the youth’s nutrition knowledge and food preferences; and their parents/guardians’ behaviors. Then two of the groups participated in a nutrition and physical activity education program. One group was taught by TRY 4-H teams and the other group was taught by adult volunteers from the community. After participating in the program, the youth’s nutrition knowledge and food preferences; and their parents/guardians’ behaviors were re-assessed. The control group was unavailable for re-assessment due to limited accessibility. Teen leadership was assessed using a teen leadership and life skills assessment tool. At baseline, the three
samples had no statistical differences. The TRY 4-H treatment and Adult Volunteer treatment were found to produce statistically similar nutrition knowledge outcomes. Parents/guardians reported improvements in youth participant nutrition and physical activity habits. Teen members of the TRY teams experienced an increase in leadership and life skills. Teens from the TRY 4-H program are as effective as adult volunteers at teaching younger youth about nutrition. This education delivery method should be utilized in additional communities to aid in the fight against childhood obesity.

Introduction

Childhood obesity has been referred to as “one of the most pressing health issues of our time” (1). It has devastating effects on both the physical and psychological health of children. A clinical study observed that “severely obese children and adolescents have lower health-related QOL (quality of life) than children and adolescents who are healthy and similar QOL as those diagnosed as having cancer (2)”. Childhood obesity is frequently accompanied by co-morbidities of type II diabetes, hypertension, certain cancers, and cardiovascular disease (3). In addition to negative effects on physical health, childhood obesity plays a role in diminished psychological health, and has negative social implications (3). One alarming observation is that obese children are more likely to contemplate and attempt suicide as a direct result of being teased about their weight (4-6).

In the United States, prevalence of childhood obesity is on the rise. In the 1960s about 5% of children were obese; by 2005 this had doubled. In 2005 it was estimated
that 25% of U.S. children were overweight and 11% were obese (7-9). Utah has not been exempt from the childhood obesity epidemic. In 2006 the Utah Department of Health surveyed Utah elementary students, grades 1-6. They observed that approximately one in four, or 22.5%, of Utah elementary students were overweight. If past and current trends continue, it is projected that by the year 2016 30.3% of Utah elementary school students will be at an unhealthy weight (9).

The TRY 4-H Program is a proven teaching and leadership model. It bridges three life stages: adults, teens, and younger youth (10). It has been shown to be an effective teaching model and has been utilized since 1987. Its two main objectives are to help teenagers increase self-esteem and feelings of belonging in their community, and to assume responsibility of self and others (10).

A TRY team consists of 3-4 teenagers and an adult leader. Each TRY team receives leadership and curriculum training; TRY teams then reach out and provide education to younger youth within the community (10). Adults serve as leaders, who mentor and coach the teens. Teenagers are able to work with the younger youth and serve as role models. The TRY Program enables teens to contribute to their community, expand their leadership skills, and learn subject-matter. It provides them with meaningful involvement and legitimate responsibilities (10). Adult leaders play an important role; they are able to share their knowledge and life-skills with the teens (10). In addition, adult leaders provide support and encouragement while reinforcing the importance of the teens and their contributions to society. The TRY Program also provides additional volunteers which facilitates increased program outreach (10,11).
There is a great need for youth programs which teach and encourage healthy lifestyles. This childhood nutrition and physical activity education program was implemented to evaluate the effectiveness of the Teens Reaching Youth (TRY) 4-H model; in delivering nutrition and physical activity education to children in Northern Utah.

Methods

Curriculum and Delivery

Our program utilized six TRY Teams and five adult volunteers from the community to deliver nutrition and physical fitness education to youth, grades third through sixth. The TRY teams involved in this study consisted of three or four teens and one adult leader. The TRY teams came from youth involved in the Salt Lake County 4-H program. Program involvement was offered to any teen from Salt Lake County involved in 4-H, all that volunteered were involved. The TRY teams received training on nutrition and leadership; their training was conducted during four training sessions. The adult volunteers were invited to participate in the program by referral from the study coordinators. The adult volunteers had been previously involved in the community as Boy Scouts of America Leaders, Cub Scout Leaders, or 4-H Leaders. They were trained to teach the curriculum to additional youth; which provided a comparison population for the study.

The TRY teams and adult volunteers were responsible to recruit the younger youth, grades third to sixth. They were recruited from local schools, after school programs, community groups, Cub Scout groups, and church groups. A recruitment letter
was used to inform participants and their parents of the study’s purpose (Appendix A).

They taught the youth participants the eight lessons from the ReCharge! Curriculum in a four to eight week time period.

A control sample was taken from youth, grades third through sixth, from an elementary school in Northern Utah. The control sample participants provided a comparison sample at baseline. They participated in the initial assessments; and did not receive any lessons. A second sampling of the control group was unfortunately not possible due to limited access.

All study participants and there parent or legal guardian signed a parent permission/youth assent form (Appendix B).

The program’s curriculum consisted of eight lessons from the ReCharge! Curriculum, which was developed by Action for Healthy Kids and the National Football League (12). The ReCharge! Curriculum was selected after an extensive review of current and up-to-date childhood nutrition curriculums. It was selected because of its interactive teaching style and focus on energy balance. Eight parent newsletters which complemented the lessons were developed and sent home after each lesson. They provided a brief overview of that day’s lesson and were designed to help and encourage participants’ families to develop healthy lifestyles.

**Subjects**

There were six TRY teams involved in this study; which included 20 teens and nine adult leaders. There were five adult volunteer teachers involved in this study. Over the course of a year 178 youth completed the program. Not all of the youth participants
chose to enroll in the study portion of the program (consent form and assessments).

Fifty-six of the TRY taught youth enrolled in and completed the study. Thirty-six of the adult volunteer taught youth enrolled in and completed the study. The control group included 45 additional youth. Table 1 summarizes the demographics of study participants. This information was self-reported.

<table>
<thead>
<tr>
<th>Table 1. Study Participant Demographics</th>
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</tr>
<tr>
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</tr>
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</tr>
<tr>
<td>4th</td>
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<tr>
<td>5th</td>
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<tr>
<td>6th</td>
</tr>
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</tr>
<tr>
<td>Hispanic</td>
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</tr>
<tr>
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</tr>
<tr>
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<td>Total (N)</td>
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</tbody>
</table>

*Other includes: Black, Asian, Pacific Islander, and Other.

Assessments

To measure the effectiveness of the TRY 4-H model in delivering nutrition and physical activity education to children, outcomes of youth taught by TRY teams were compared to those taught the same curriculum by adult volunteers from the community. The study utilized a nutrition knowledge quiz, a youth lifestyle questionnaire, and a
parent/guardian lifestyle questionnaire to assess changes in youth participants. Teen members of the TRY 4-H teams completed the Youth Leadership Life Skills Development Scale.

Nutrition knowledge was measured using a 20 question multiple choice quiz with a total of 23 points possible (Appendix C). Youth participants were given this assessment before and after program participation. The questions were based on the expected knowledge outcomes of the eight lessons. The quiz was compared to the curriculum for content validity by ten nutrition professionals. The quiz was reviewed by faculty at a local elementary school to ensure age appropriateness. It was piloted among 20 youth, grades third through sixth, to assess face validity.

Behavior change and food preferences were measured through parent/guardian and youth lifestyle questionnaires (Appendices C,D). Parents/guardians were given a pre and post survey which included multiple choice questions regarding youth and family behavior.

The youth pre/post questionnaires used six pairs of foods to assess youth participants’ food preferences. They were asked to circle which of the two foods they would pick if they had to choose just one. The pairs included: soda/milk, whole wheat bread/white bread, cookies/fruit, fresh cut vegetables/chips, low-fat milk/regular milk, and regular soda/diet soda. This portion of the questionnaire was adapted with permission from the questionnaire used for third and fourth graders in The Child and Adolescent Trial for Cardiovascular Health (CATCH) study (13).

The parent/guardian and youth lifestyle questionnaires included qualitative questions. After program participation, youth and their parents/guardians answered open-
ended questions. The qualitative comments provided insight into how the program affected the youth participants and their families (Appendices C, D).

It was anticipated that teen members of the TRY teams would gain leadership and life skills as a result of their involvement in the TRY4-H program. Gains were assessed using the *Youth Leadership Life Skills Development Scale*, designed by researchers at New Mexico State University, which was designed and validated for teens involved in the 4-H and Future Farmers of America programs (*Appendix E*) (14). The assessment asked teen TRY team members to retrospectively rate the extent of their leadership and life skill improvement due to their TRY 4-H Program involvement. The scale included 30 leadership and life skills which were rated on a zero to three point scale: no gain (0 points), slight gain (1 point), moderate gain (2 points), or a lot of gain (3 points).

**Statistical Methods**

To determine the similarity of the three groups (TRY, Adult, and Control), 1X3 ANOVAs were used to compare BMI, total score on knowledge pre-test, and total healthy choices. A paired t-test was used to determine knowledge improvement by all youth participants (TRY and Adult). A grouped t-test was calculated to determine if there was a difference between knowledge gained by the TRY taught youth and the Adult taught group. A repeated measures ANOVA was used to compare learning by gender. A chi-square test was calculated to determine the program’s ability to influence food preferences of children. A Wilcoxon Signed Ranks Test was utilized to assess the program’s effect on parents/guardians who had youth participate in the program.
Results

Three 1x3 ANOVAs were used to determine the similarity at baseline of the three groups (TRY, Adult, and Control). It was found that there was no statistically significant difference between the three groups at baseline for BMI, nutrition knowledge, and food preference (Table 2).

| Table 2. Baseline 1X3 ANOVAs comparing BMI, Knowledge, and Food Preferences for youth participants in all three groups (Control, TRY, and Adult). |
|---|---|---|---|---|---|
| | N | Mean | Std. Deviation (+/-) | F value | Sig. (p value) |
| BMI | Control | 40 | 21.51 | 4.524 | 1.034 | .358 |
| TRY | 69 | 20.69 | 3.704 |
| Adult | 35 | 20.24 | 3.624 |
| Knowledge | Control | 45 | 11.44 | 3.864 | .972 | .381 |
| TRY | 72 | 12.01 | 4.359 |
| Adult | 36 | 10.89 | 3.503 |
| Food Preferences | Control | 39 | 2.90 | 1.553 | .109 | .897 |
| TRY | 63 | 2.94 | 1.523 |
| Adult | 36 | 3.06 | 1.548 |

All youth, regardless of being taught by TRY teams or adult volunteers, experienced an increase in their nutrition knowledge (Table 3). Furthermore, teens were found to be as effective as adult volunteer teachers at improving nutrition knowledge in youth. The knowledge test had 23 possible points; TRY taught youth increased their score by an average of 2.96 and adult volunteer taught youth increased their score by an average of 3.86. When knowledge outcomes of youth taught by TRY teams were compared to knowledge outcomes of youth taught by the adult volunteers, there was no statistically significant difference (Table 4). A repeated measures ANOVA was used to
compare the affect of time and gender on learning (Table 5). There was a statistically
significant difference for pre-test compared to post-test scores for all participants,
regardless of gender. In this repeated measures ANOVA pre/post-test was the time factor
(p-value = 0.000). It was found that gender had no statistically significant affect on
knowledge of nutrition at the beginning or end of the program in our repeated measures
time X gender factors (p-value = 0.954).

| Table 3. Paired t-test to determine knowledge improvement by all participants. |
|------------------|-----------------|-----------------|-----------------|-----------------|
|                  | N   | Mean | Std. Deviation (+/-) | T   | Sig. (p value) |
| Pre Score        | 92  | 11.78| 4.278              | -7.369 | 0.000       |
| Post Score       | 92  | 14.93| 3.944              | 0.000 |

| Table 4. Grouped t-test to determine if there was a difference in knowledge gained. |
|------------------|------------------|-----------------|-----------------|-----------------|
|                  | N   | Mean | Std. Deviation (+/-) | F value | Sig. (p value) |
| Pre Score        | TRY  | 56  | 12.36              | 4.649   | 1.357          | .247       |
|                  | Adult | 36  | 10.89              | 3.503   |               |           |
| Post Score       | TRY  | 56  | 15.05              | 3.768   |               |           |
|                  | Adult | 36  | 14.75              | 4.252   |               |           |

| Table 5. Repeated Measures ANOVA to determine affect of time and gender on learning |
|------------------|------------------|-----------------|-----------------|-----------------|
|                  | Time 1 (Pre-test) | Time 2 (Post-test) |
|                  | N   | Std. Deviation (+/-) | Mean | N   | Std. Deviation (+/-) | Mean | F Value | Sig. (p value) |
| Male             | 47  | 4.393              | 11.53 | 47  | 4.332              | 14.79 | .003    | .954           |
| Female           | 39  | 4.289              | 12.15 | 39  | 4.459              | 15.46 |         |               |
| Combined Average | 86  | 4.332              | 11.81 | 86  | 3.963              | 15.09 |         |               |
| F Value          |     | 51.437             |       |     | 0.000              |       |         |               |
| Sig. (p value)   |     | 0.000              |       |     |                   |       |         |               |
Both groups had comparable impact on food preferences. There were six pairs of foods: soda/milk, whole wheat bread/white bread, cookies/fruit, fresh cut vegetables/chips, skim milk/regular milk, and regular soda/diet soda. Youth were asked to circle which of the two foods they would pick if they had to choose just one. The two education delivery methods were comparable in their effect on youth food preferences as measured by Pearson Chi-square tests (Tables 6-11). The only statistically significant difference observed was that adults were more effective at helping children switch from soda to milk (Table 6). The adult taught group had 12 youth who preferred soda over milk at baseline, seven (58%) switched and preferred milk over soda at the end of the study. There was a strong trend for the TRY teams in their influence on fruit (Table 8). The TRY teams were able to help 40% of their youth who started out preferring cookies over fruit switch to preferring fruit over cookies.

<table>
<thead>
<tr>
<th>Table 6. Pearson Chi-square test to calculate the program’s ability to influence preferences between milk (M) and soda (S).</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>TRY Count</td>
</tr>
<tr>
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<tr>
<th>Table 7. Pearson Chi-square test to calculate the program’s ability to influence preferences between whole wheat bread (WW) and white (Wh).</th>
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### Table 8. Pearson Chi-square test to calculate the program’s ability to influence preferences between fruit (F) and cookies (Ck).

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### Table 9. Pearson Chi-square test to calculate the program’s ability to influence preferences between vegetables (V) and chips (Ch).

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<tr>
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<th>Ch to V</th>
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### Table 10. Pearson Chi-square test to calculate the program’s ability to influence preferences between skim milk (Sk) and regular milk (R).

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<th>R to Sk</th>
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<td>4</td>
<td>16</td>
<td>9</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Expected</td>
<td>5.1</td>
<td>13.1</td>
<td>11.4</td>
<td>3.4</td>
<td></td>
</tr>
</tbody>
</table>

### Table 11. Pearson Chi-square test to calculate the program’s ability to influence preferences between milk diet soda (DS) and regular soda (RS).

<table>
<thead>
<tr>
<th></th>
<th>DS to RS</th>
<th>RS to DS</th>
<th>DS to DS</th>
<th>RS to DS</th>
<th>Total (N)</th>
<th>Sig. (p value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRY</td>
<td>Count</td>
<td>4</td>
<td>32</td>
<td>9</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Expected</td>
<td>3</td>
<td>30.3</td>
<td>10.1</td>
<td>3.6</td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>Count</td>
<td>1</td>
<td>19</td>
<td>8</td>
<td>4</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Expected</td>
<td>2</td>
<td>20.7</td>
<td>6.9</td>
<td>2.4</td>
<td></td>
</tr>
</tbody>
</table>
The program was found to have a positive impact on some lifestyle behaviors of parents/guardians of youth who participated in the program. Statistically significant results were observed in some parents, including a shift towards increased physical activity and increased frequency of eating dinner as family. Adversely, some parents self reported consumption of fewer servings of vegetables (Table 12).

<table>
<thead>
<tr>
<th>Table 12. Wilcoxon Signed Ranks Test to assess parent/guardian lifestyles before and after their youth participated in the program.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Parent 1 Physical Activity</td>
</tr>
<tr>
<td>Negative Ranks*</td>
</tr>
<tr>
<td>Positive Ranks</td>
</tr>
<tr>
<td>Ties</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Parent 1 Vegetable Consumption</td>
</tr>
<tr>
<td>Negative Ranks**</td>
</tr>
<tr>
<td>Positive Ranks</td>
</tr>
<tr>
<td>Ties</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Frequency of Family Dinner</td>
</tr>
<tr>
<td>Negative Ranks***</td>
</tr>
<tr>
<td>Positive Ranks</td>
</tr>
<tr>
<td>Ties</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

*A negative rank is indicative of a shift towards increased physical activity.  
**A negative rank is indicative of a shift towards decreased vegetable intake.  
***A positive rank is indicative of a shift towards increased frequency of eating dinner as a family.

Youth and parent/guardian responses to open ended questions about the program were overwhelmingly positive. Parents/guardians of youth from both groups reported observing positive changes. Below are some sample comments parents/guardians of youth participants made when asked what changes they observed in their child’s eating and fitness habits.

- He has asked me about nutritional values in food.
- He’s more aware of his eating habits and exercise routines.
[She] tells us all how to eat better. Tells kids to go outside and play.  
[She] learned it wasn’t just because her parents said “eat healthy.” She now makes the right choices on her own and better choices at school.  
She works out more: biking, walking, etc. She chooses on her own to eat healthy and understands what happens if you don’t.  
It has definitely helped [him] to be more individually motivated and not do it just because I say it is good for [him].  
He is more willing to eat extra veggies.  
He has talked about eating the right foods. He is more concerned on how many fruits/veggies/milk products he has had.  
He’s learned it can be fun, not just healthy.  

Several youth indicated that they looked up to the teens as mentors, and others indicated interest in becoming TRY team members when they grow up. Below are some sample comments made by youth participants when asked what they liked about the program and what they liked about meeting with their teachers.  

- It teaches you about food. It is a good program, I had fun.  
- [The TRY team Leaders] are lots of fun - they know a lot about food.  
- I liked how we really learned that we should stay healthy and we can prove to other people to stay healthy too. We won’t get sick as often as we do now. I loved this program!  
- I liked [it] because they teach us about healthy things.  
- You get to know how many servings you [need].  
- I learned how [many] servings of milk, vegetables, and meat (I knew fruits and grains). I also learned that combination foods [are] good for you and what a combination food is.  

One aspect which is difficult to quantify is the value of having teens work with younger youth. One example of this positive interaction was an experience one of the teens had with a youth participant. The youth who wore glasses approached a 17-year-old TRY Team member who also wore glasses. He asked, “When you were my age did people call you four eyes?” To this the teen replied “all the time”. The youth smiled. This is just one precious example of how the teens were admired and respected as leaders; and the positive impact they had on the lives of the youth they worked with.
Out of the 20 teens involved in the TRY 4-H program, 16 completed the *Youth Leadership Life Skills Development Scale* (14). TRY Team members all reported an increase in leadership and life skills as a result of their TRY 4-H program participation. The scale is a retrospective survey with a one-time measurement; this makes statistical analysis not possible. The scale had a total possible point value of 90, a score of 60 or greater was indicative of noteworthy leadership and life skill gain. Fourteen of the 16 respondents had scores greater than 60; the overall average score was 73.67.

**Discussion**

Increases in nutrition knowledge have been associated with improved lifestyle habits and health (13,15,16,17). The *Child and Adolescent Trial for Cardiovascular Health* (CATCH) found that school-age children who increase their nutrition and physical activity knowledge have improvements in eating and exercise behaviors (13). As a result of participation in this program, all of the youth increased their nutrition knowledge. Many of the study’s youth participants’ parents/guardians reported improved dietary and physical activity habits in their children. It is anticipated that the knowledge gained during the program will lead to short- and long-term lifestyle improvements, which will ultimately result in better health for the youth participants.

It is estimated that between 1970 and 1997 soda consumption increased by 118% per capita and milk beverage consumption decreased by 23% (*Table 13*) (7,18). This study found an increased effectiveness of the adult volunteer teachers at helping youth switch their food preference from soda to milk. These findings may suggest that adults are more effective at helping influence children’s attitude towards soft drinks and milk.
This may warrant that efforts to decrease childhood soda consumption and increase milk consumption aimed at parents and guardians may be more effective than those aimed towards children.

**Table 13. CSFII soft drink consumption trends per capita from 1977 to 1998.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Girls</td>
<td>105 grams/day</td>
<td>136 grams/day</td>
<td>200 grams/day</td>
</tr>
<tr>
<td>Boys</td>
<td>112 grams/day</td>
<td>169 grams/day</td>
<td>217 grams/day</td>
</tr>
</tbody>
</table>

Another major trend in U.S. food consumption has been the increased intake of carbohydrate snack foods, which tripled between 1977 and 1998 (18). This study found that fruit was preferred over cookies by 77.5% of the youth participants at the end of the study. Perhaps high “snacky” food intake and low fruit intake in children is due to a lack of access and not actual food preference. Parents have a direct impact on their children’s food intake and they should be encouraged to make healthy foods easily available to their children, this can help them develop healthy food habits (19).

Historically community organizations have relied heavily on professionals and adult volunteers, often times these resources are limited. Teens can serve as an excellent source of volunteers for community organizations. In 1991, the Gallup Organization reported that teenagers (14-17 years) were volunteering at the same rate or higher as adults (20). They cited a desire to do something useful and anticipation of enjoyable work as the most common reasons youth volunteer. Researchers at the University of Florida found that youth are most likely to become involved in community service for the following reasons: to provide community service, attain skills and experience, and have
influence by setting an example for others (21). Youth who become involved in their community often feel ownership of their community and have a desire for it to improve. In addition, they often become lifelong contributors to local well-being (21). Not only do these youth provide additional resources for community programs, youth who are involved have historically gained leadership and life-skills (22). Youth who get involved in 4-H often gain skills which include improved public speaking, organization, time management, presiding over meetings, problem solving, teamwork, and independent thinking (22). The TRY 4-H Program is a model which facilitates the use of teen volunteers in community organizations.

Conclusions

Teen volunteers involved in the TRY 4-H program are as effective as adult volunteers at teaching younger youth about nutrition and physical activity. Efforts to decrease childhood soda consumption and increase milk consumption aimed at parents and guardians may be more effective than those aimed towards children. In addition to helping expand program outreach by providing additional volunteers for community programs; when teens are involved they gain life skills and leadership skills. Community programs should utilize the TRY 4-H model to help disseminate education about nutrition and physical activity. It is hoped that this and other delivery methods of nutrition education can curtail the spread of childhood obesity and its devastating effects on society and individuals.
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CHAPTER 3

PRACTICAL STEPS TO PROGRAM EVALUATION: A CASE STUDY
OF THE IMPLEMENTATION OF THE TEENS REACHING
YOUTH 4-H MODEL IN A CHILDHOOD NUTRITION
AND PHYSICAL ACTIVITY EDUCATION
PROGRAM

Abstract

Program evaluation provides in-sight into program effectiveness, efficacy, and success. In a results based world, program evaluation is necessary. Members of the American Dietetic Association (ADA) need to become proficient in program evaluation in order to ensure proven success and continued funding. This article uses the evaluation of a childhood nutrition and physical activity education program as a case study to help illustrate effective evaluation and discuss common barriers to program evaluation and how to overcome them. The TRY program was evaluated on the four levels of evaluation: 1) Reaction, 2) Learning, 3) Behavior, and 4) Results. These levels of evaluation can be used to evaluate a variety of programs. By making program evaluation a priority and taking some simple steps to ensure that it is properly conducted, members of the ADA can focus their efforts and create more successful programs.
Introduction

Members of The American Dietetic Association are the leading source of nutrition expertise. It is their education and experience which makes them uniquely qualified to provide the public with science-based nutrition information (1). In today’s results-based world, program evaluation is becoming increasingly important (2,3). This is because administrators and other stakeholders demand accountability and there is an increasing significance being placed on results. Stakeholders want to know what return their company/organization received as a result of the investment. They also want to know what business needs were satisfied. The role of the evaluator is to provide this information (2,3). It is for this reason that ADA members should be actively involved in program evaluation.

This paper will use the implementation of the Teens Reaching Youth (TRY) 4-H model in a youth nutrition education program, in Northern Utah, as a case study to illustrate effective program evaluation and how to overcome barriers to program evaluation.

The program was implemented between the spring of 2007 and the spring of 2008. It utilized the Teens Reaching Youth (TRY) 4-H model, an evidence-based practice, which allows teens to teach and mentor youth (4). A TRY team consists of three to four teens and one adult leader. A group of adult volunteers from the community were recruited and trained to teach the curriculum which provided a comparison population for our study. The TRY teams and adult volunteers were responsible to recruit the younger youth, grades third to sixth, from local schools, after school programs,
community groups, and church groups. A recruitment letter was used to inform participants and their parent of the study’s purpose (*Appendix A*). They taught the youth participants the eight lessons from the *ReCharge!* Curriculum in a four to eight week time period.

A control sample was taken from youth, grades third through sixth, from an elementary school in Northern Utah. The control sample participants provided a comparison sample at baseline. They participated in the initial assessments; and did not receive any lessons. A second sampling of the control group was unfortunately not possible due to limited access.

**Effective Program Evaluation**

Program evaluation is necessary to demonstrate and document the connection between a program, participant behavior, and the overall impact the program has on the community/organization (3). It helps define a program’s effectiveness, efficacy and efficiency. The results can be used to identify areas for improvement, and often are used to help determine if a program should be continued or dropped (2,3,5).

In the 1950s, Donald Kirkpatrick presented four levels of evaluation. They have become almost universally used and are considered by many to be the most effective method of program evaluation (2,3,5). Kirkpatrick’s four levels of evaluation include: 1) *Reaction*, 2) *Learning*, 3) *Behavior*, and 4) *Results* (2,3,5).

The first level of evaluation is *Reaction*: How people react to the program or customer satisfaction (2,3,5). This level of evaluation often has a direct impact on future funding and the outcome of the other three levels. It has been shown that if participants
do not “like” the program, they are less likely to have favorable learning outcomes (5). A satisfaction survey is an effective way to measure program reaction (3,5). To develop the survey, ask a few open-ended questions designed to discern whether participants liked the program (3). Keep in mind that positive results on the reaction level indicate that participants like and value the program; it is a measure of their willingness to participate in the program. It does not measure the program’s ability to help participants change/learn (3).

The second level of evaluation is Learning. It asks the question: How much did program participants learn as a result of program participation (2,3,5)? The evaluation tool must be based on the program’s expected learning outcomes/objectives. Memory tests and reaction forms are the most common assessment tools utilized to measure learning outcomes (3). They are often used because of their ease in administration, but have limitations. Memory tests are capable of assessing knowledge gained, but cannot measure learning in its fullest sense. The use of reaction forms, which ask participants to retrospectively assess how much they learned, is a common mistake made in measuring learning (3). Reaction forms are sometimes called retrospective pre-post testing. This type of form does not assess actual knowledge gained, but how much the participants feel they learned. It often inaccurately skews learning outcomes, and can do so in either direction. When possible, use an assessment which has participants apply what they have learned or has them explain how to do it (3). This will not only demonstrate knowledge gained, but the ability to apply the knowledge gained (2,3).

The third evaluation level is Behavior. It asks the question; “How much did participant behavior change as a direct result of program participation?” (2,3,5).
Behavior change happens when knowledge gain transfers to action. There are four parts to optimal evaluation on the behavior level (3). First, obtain responses from all, or a sample of, program participants. In addition, survey the support group or others who are affected because the participant took part in the program. Second, use a control group of similar individuals who have not participated in the program. Third, repeat the evaluation over time. This will measure the endurance of the behavior change. Fourth, try to find examples that reflect the application of skills/knowledge gained from the program. In the assessment, ask for examples of how participants have been able to apply the knowledge and skills learned in the program. Success stories can serve as concrete examples of the program’s effectiveness and illustrate the program’s value (3).

It is important to note that there are factors which affect the likelihood of behavior change. Behavior change is affected by desire to change, knowledge of what and how to change, climate, and reward for change (5). The program is capable of providing knowledge, and can influence desire, climate, and reward. Desire to change comes from within; the program can help inspire individuals to change. A participant’s climate is affected by their support group. A climate can be preventing, discouraging, neutral, encouraging, or requiring. A program can positively affect a participant’s support group by including them in the program. It is also helpful when a program helps participants recognize the rewards of behavior change. Satisfaction, recognition, monetary rewards are a few examples of rewards for behavior change (5).

The fourth level of evaluation is Results: 1) Did the program achieve the goals it set out to accomplish? And 2) How much did the community/organization improve because of the program (2,3,5)? Results illustrate the overall impact of the program and
measure how well it was able to meet its objectives. The results often help determine if the program is continued and legitimize future funding (2,3,5).

The TRY Program was evaluated at all four levels. Table 1 outlines the four levels of evaluation; the right column outlines what evaluation forms were used to evaluate the program at each level of evaluation.
<table>
<thead>
<tr>
<th>Level of Evaluation</th>
<th>TRY Evaluation Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Reaction: How people reacted to the program</td>
<td>• Qualitative assessment, youth and parents/guardians answered open-ended questions to gain insight into how the program affected their lives (both family and the individual youth).</td>
</tr>
<tr>
<td>2. Learning: How much participants learned</td>
<td>• Youth participants were given a pre- and post-quiz testing their nutrition knowledge.</td>
</tr>
<tr>
<td>3. Behavior: How much participation in the program changed behavior:</td>
<td>• Teens were given a life skill and leadership development questionnaire to assess the level of impact the program had on their life.</td>
</tr>
<tr>
<td>• Obtain responses from all (or a sample of) program participants and their support group</td>
<td>• Youth were asked to fill out a lifestyle questionnaire assessing food preferences.</td>
</tr>
<tr>
<td>• Use a control group</td>
<td>Parents/guardians were given a pre- and post-survey which assessed their diet habits, exercise habits, and family eating patterns.</td>
</tr>
<tr>
<td>• Repeat evaluation over time</td>
<td>• A comparison group and a control group were utilized to assess the model’s effectiveness.</td>
</tr>
<tr>
<td>• Use examples that reflect the application</td>
<td>• Given the short duration of the program and limited access to youth, it was not possible to repeat the evaluation over time.</td>
</tr>
<tr>
<td>4. Results: Whether the program achieved the goals it set out to accomplish. How much the organization gained from the program.</td>
<td>• At the end of the program, parents were asked “What changes have you observed in your child’s eating and fitness habits?”</td>
</tr>
<tr>
<td></td>
<td>• Statistical analysis of results</td>
</tr>
<tr>
<td></td>
<td>• Program Report to grant agency</td>
</tr>
<tr>
<td></td>
<td>• Poster Presentation at ADA’s FNCE</td>
</tr>
<tr>
<td></td>
<td>• Future publications</td>
</tr>
</tbody>
</table>
The above mentioned evaluations enabled the study group to answer two important questions; 1) *Did the intervention achieve the goals it set out to accomplish?* and 2) *How much did the participants gain from the program?* The program was funded through a grant from the Dannon Corporation, results from the program implementation were compiled and presented to them. The return was not in the form of financial gain, but in the form of a healthier population of children in Northern Utah. Perhaps the most important result is the continuation of the program; it is anticipated that it will be continued for years to come.

**How to Overcome Barriers to Program Evaluation**

Program evaluation is often resisted for a variety of reasons, one of the major reasons being a fear of documented failure (3).

Communities and organizations need programs which will help individuals make changes in a cost-effective way. Richard Clark and Fred Estes state in their book, *Turning Research into Results*, “without program evaluation, we are left with wishful thinking or self-serving impressions that are often wrong and sometimes dangerous” (3). Members of the American Dietetic Association need to utilize program evaluation to clearly and objectively measure and demonstrate the success of their efforts. Program evaluation is avoided for different reasons, the most common being fear, cost, time pressures and a lack of knowledge (3). Individuals may fear evaluation because it has the ability to document failure or negative results. Negative results can be personally threatening; individuals may fear if the program is not proven effective it will lose funding and disappear (3).
Program evaluation is sometimes avoided because individuals may view it as expensive, difficult, time intensive, and cumbersome. In addition, they may lack the knowledge of how to effectively and efficiently evaluate programs (3,6). The Center for Disease Control and Prevention (CDC) has sited lack of evaluation skills as one of the major barriers to evaluation of public health initiatives (7).

The *Center for Public Health Nutrition* investigated the small-grants process. They found that program evaluation was a challenge faced by community agencies implementing nutrition education programs (9). Some common barriers faced include: evaluation was not a priority, unrealistic planning, lack of continuity and sustained commitment to evaluation, small sample size for evaluation analysis, no control group, and lack of valid and reliable data collection tools (9).

The researchers at Utah State University faced all of the above mentioned challenges in evaluating the program. Table 2 outlines these barriers and the column on the right outlines how the researchers at Utah State University overcame the barriers (8).
<table>
<thead>
<tr>
<th>Barrier</th>
<th>TRY method to overcome Barrier</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Evaluation not a priority:&lt;br&gt;• Evaluation was a lower priority than project implementation&lt;br&gt;• Limited time and resources were made available for evaluation</td>
<td>A graduate student and a professor from the university were invited to act as the researchers and evaluate the program’s impact. This took the research burden away from the project director.</td>
</tr>
<tr>
<td>2. Unrealistic planning&lt;br&gt;• Project timeline was too short to allow for evaluation follow-up&lt;br&gt;• Staff and community partners had less time than originally planned due to competing obligations&lt;br&gt;• Volunteers were expected to gather evaluation data but could not be recruited</td>
<td>Volunteers were provided with an overview of their time commitments. Also, as needed, the graduate student went to sites to assist in data collection.</td>
</tr>
<tr>
<td>3. Lack of continuity and sustained commitment to evaluation&lt;br&gt;• Staff who wrote the original evaluation plans were not part of implementation and/or evaluation&lt;br&gt;• Inexperienced staff and community partners had limited understanding of the importance of evaluation</td>
<td>The extension agent who wrote the proposal left her position, which created a lack of continuity. As a result, the Graduate Student and University Professor worked very hard to develop a relationship with the volunteers. It was also helpful that the Graduate Student and University Professor had been involved in the program from the beginning so they were familiar to the volunteers.</td>
</tr>
<tr>
<td>4. Small sample size for evaluation analysis&lt;br&gt;• Projects failed to involve as many community members as planned due to lack of community awareness of project, unanticipated events in the community, and restricted access to potential participants&lt;br&gt;• Participant turnover during the projects restricted the number of participants who provided both pre- and post-intervention data</td>
<td>Limited access is one of the challenges in data collection when teaching children. In an effort to prevent drop-out, the time commitment required to participate was communicated up front. To encourage finishing the program, incentives were provided, i.e. bowling passes, movie passes, etc. The evaluation tools were piloted to test for response rates. After a low response rate, the lifestyle questionnaire was adjusted. Also, the youth nutrition knowledge quiz was altered to include the youth lifestyle questionnaire. This helped facilitate more complete youth pre/post data.</td>
</tr>
</tbody>
</table>
5. No control group
   • Control group participants were not recruited as planned because this was not a priority
   • The concept of a control group was difficult for community partners to understand

   The Graduate Student and University Professor were solely responsible for finding a control sample and collecting the data. This alleviated the project director’s time allowing her to focus on implementing the program.

6. Lack of valid and reliable data collection tools
   • Existing tools were not sufficient
   • Community agencies lacked the time, resources, and skills to validate new tools

   Existing tools were adapted and used. The Graduate Student and University Professor were solely responsible for tool development.

Conclusion

Evaluation provides evidence to support the value of a program. When done correctly, evaluation can provide reliable and valid information about: the community/organization before implementation of the program, the effectiveness of the program at helping individuals change, and the overall impact the program has on the community/organization (3). The evaluation of the TRY 4-H program is an example which demonstrates how practitioners can evaluate, overcome barriers and improve their programs. It is hoped that members of the American Dietetic Association will implement program evaluation into their practice as a means of documenting success, effectiveness, and efficiency; and pave the way for continued and increased funding.

References


CHAPTER 4
CONCLUSION

In conclusion, childhood obesity is one of the greatest public health concerns of our time. It has devastating physical, psychological, and social implications. It is a problem with a complex etiology that needs to be addressed on all levels. There is a great need for youth programs which teach and encourage healthy lifestyles. Program evaluation is an important component in program implementation.

This childhood nutrition and physical activity education program was implemented to evaluate the effectiveness of the Teens Reaching Youth (TRY) 4-H model in delivering nutrition and physical activity education to children in Northern Utah. Teen volunteers involved in the TRY 4-H program were as effective as adult volunteers at teaching younger youth about nutrition and physical activity. Efforts to decrease childhood soda consumption and increase milk consumption aimed at parents and guardians may be more effective than those aimed towards children. In addition to helping expand program outreach by providing additional volunteers for community programs, teens involved gain life skills and leadership skills. Community programs should utilize the TRY 4-H model to help disseminate education about nutrition and physical activity. It is hoped that this and other delivery methods of nutrition education can curtail the spread of childhood obesity and its devastating effects on society and individuals.

Program evaluation is an important part of program implementation. Evaluation may provide evidence to support the value of a program. When done correctly,
evaluation can provide reliable and valid information about: the community/organization before implementation of the program, the effectiveness of the program at helping individuals change, and the overall impact the program has on the community/organization. The evaluation of the TRY 4-H program is an example which demonstrates how practitioners can evaluate, overcome barriers and improve their programs. It is hoped that members of the American Dietetic Association will implement program evaluation into their practice as a means of documenting success, effectiveness, and efficiency. This can help pave the way for continued and increased funding.
Dear Parent/Guardian:

Utah State University Extension is evaluating a new youth nutrition curriculum. It is the Recharge Curriculum, an exciting nutrition and fitness curriculum, which is nationally acclaimed. It was developed by the Action for Healthy Kids and the National Football League. To date over 200 children have learned more about healthy living through this program.

The program consists of four 1-hour lessons, which will be taught in a 4-8 week time period. The lessons will be taught during your child’s program. Through fun and hands-on activities, 3rd-6th grade youth learn a healthy approach to eating and staying physically active. There is no cost to your family to participate.

As part of this project, we are conducting a research study to evaluate the effectiveness of the curriculum. This information help identify knowledge and behavior changes. All of these assessment tools will be conducted using appropriate research protocol and participant confidentiality will be maintained.

The study’s assessment tools will include:

- **Parent/Guardian Questionnaire**: You will be asked to fill out a 1 page lifestyle and satisfaction questionnaire before and after participation in the program.
- **Student Questionnaire**: Your student will be asked to fill out a pre and post assessment form. This will include a lifestyle and satisfaction questionnaire and a 20 question multiple choice quiz.
- **Student Height and Weight**: Your student’s height and weight will be measured at the beginning of the program.

We hope that you will join in our effort to help improve childhood nutrition. The volunteer educators have experience in teaching nutrition to youth. Your child is sure to learn a lot and benefit immensely from this program. Should you have questions about this program, please feel free to contact me at 435-797-3631, or kristen.strong@usu.edu.

In this packet you will find:

- 2 copies of a Parent Permission/Youth Assent Form. Please sign one and send it back. You may keep the additional copy for your personal records.
- Parent/Guardian Initial Questionnaire.

If you and your child decide to participate, please have your child return the signed form and completed questionnaire to their program prior to the first lesson on ____________.

Sincerely,

Kristen Rae Strong, RD
Graduate Student, Utah State University
435-797-3631
kristen.strong@usu.edu

“Utah State University is an affirmative action/equal opportunity institution.”
Parent Permission/Youth Assent

TRY

Introduction/ Purpose: We would like to invite your student to participate in our nutrition and physical activity education intervention in Salt Lake County. This study is being conducted by Salt Lake County 4-H and researchers from Utah State University (USU), Professor Nedra Christensen and research assistant, Kristen Strong. You are being asked for your permission to allow your student to participate in this study because you live in Salt Lake County and your student is between the third and sixth grade. We are trying to assess nutrition and physical activity knowledge and practices among youth in Salt Lake County. We are also trying to assess the effectiveness of a nutrition and physical activity program. If we know this, we may be able to help prevent childhood obesity which is a growing problem in the U.S. There will be approximately 10 participants at this site. There will be approximately 400 total participants in this research.

Procedures: If you agree to be in this research study, you understand that:

1. Your student will be asked to fill out a preliminary and final questionnaire asking questions about family, the food they eat, and his/her physical activity.
2. Your student will be measured for height and weight.
3. A pre-test and post-test will be given to assess nutrition and physical activity knowledge.
4. Your student will participate in a series of lessons teaching nutrition and physical activity. There will be 8 lessons which will last 30 to 60 minutes each. These lessons will be held at ___________ at ___________________________________________.

(When)              (Where)

Confidentiality: Research records will be kept confidential, consistent with federal and state regulations. Names of participants will be replaced with a number on all information collected to protect privacy and keep confidentiality. Only Kristen Strong will have access to this information and it will be kept in a locked file cabinet in a locked office. A final report will be prepared but this summary will not identify anyone who participated in this research. The data will be kept indefinitely and all identifiable information will be destroyed after five years.

Risks/Benefits: There is minimal risk in participating in this study. If your son/daughter participates in this study, he/she may learn more about nutrition and physical activity. This may contribute to a healthier life

Explanation & offer to answer questions: If you have any questions about the study you may contact Dr. Nedra Christensen at (801) 484-9374 or Kristen Strong at (801) 468-2520.

IRB Approval Statement: The Institutional Review Board for the protection of participants in research has approved this study. If you have questions about your rights or if there is something that you do not feel you can discuss with Nedra or Kristen please contact the IRB at (435) 797-1821.
Voluntary nature of participation and right to withdraw without consequence: Participation in research is entirely voluntary. You may withdraw your student at any time from the study without consequence or you student may decide at any time to stop being in the study.

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

Statement of Researcher: “I certify that the research study has been explained by me or my student researcher and that the parent/guardian understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered.”

_______________________________  ______________________________
Nedra Christensen, Ph.D. R.D.   Kristen Strong, R.D.
Principle Investigator    Student Researcher
(801-484-9374)     (801-468-2520)

Signature of Parent of Guardian: I understand that you are asking for my permission to allow my child to participate in this research. I have been told about the purpose, procedures, possible risks and benefits of the study and my child’s rights as a participant in the study. By signing below I give my permission to have my child participate in this study.

_______________________________  ______________________________
Signature of Parent or Guardian   Date

Child/Youth Assent: I understand that my parent(s)/guardian is/are aware of this research study and that permission has been given for me to participate. I understand that it is up to me to participate even if my parents say yes. If I do not want to be in this study, I do not have to and no one will be upset if I don’t want to participate or if I change my mind later and want to stop. I can ask any questions that I have about this study now or later. By signing below, I agree to participate.

_______________________________  ______________________________
Name       Date
Parent Permission/Youth Assent
Adult Volunteers

Introduction/ Purpose: We would like to invite your youth to participate in our nutrition and physical activity education intervention in Northern Utah. This study is being conducted by Salt Lake County 4-H and researchers from Utah State University (USU), Professor Nedra Christensen and research assistant, Kristen Strong. You are being asked for your permission to allow your student to participate in this study because you live in Northern Utah and your student is between the third and sixth grade. We are trying to assess nutrition and physical activity knowledge and practices among youth in Northern Utah. We are also trying to assess the effectiveness of a nutrition and physical activity program. If we know this, we may be able to help prevent childhood obesity which is a growing problem in the U.S. There will be approximately 10 participants at this site. There will be approximately 400 total participants in this research.

Procedures: If you agree to be in this research study, you understand that:
1. Your student will be asked to fill out a preliminary and final questionnaire asking questions about family, the food they eat, and his/her physical activity.
2. Your student will be measured for height and weight.
3. A pre-test and post-test will be given to assess nutrition and physical activity knowledge.
4. Your student will participate in a series of lessons teaching nutrition and physical activity. There will be 4 lessons which will last 60 minutes each. These lessons will be held at ___________ at ___________________________________________.
   (When)              (Where)

Confidentiality: Research records will be kept confidential, consistent with federal and state regulations. Names of participants will be replaced with a number on all information collected to protect privacy and keep confidentiality. Only Kristen Strong will have access to this information and it will be kept in a locked file cabinet in a locked office. A final report will be prepared but this summary will not identify anyone who participated in this research. The data will be kept indefinitely and all identifiable information will be destroyed after five years.

Risks/Benefits: There is minimal risk in participating in this study. If your son/daughter participates in this study, he/she may learn more about nutrition and physical activity. This may contribute to a healthier life

Explanation & offer to answer questions: If you have any questions about the study you may contact Dr. Nedra Christensen at (801) 484-9374 or Kristen Strong at (435) 797-3631.
IRB Approval Statement: The Institutional Review Board for the protection of participants in research has approved this study. If you have questions about your rights or if there is something that you do not feel you can discuss with Nedra or Kristen please contact the IRB at (435) 797-1821.

Voluntary nature of participation and right to withdraw without consequence: Participation in research is entirely voluntary. You may withdraw your student at any time from the study without consequence or you student may decide at any time to stop being in the study.

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

Statement of Researcher: “I certify that the research study has been explained by me or my student researcher and that the parent/guardian understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered.”

_______________________________  ______________________________
Nedra Christensen, Ph.D. R.D.   Kristen Strong, R.D.
Principle Investigator    Student Researcher
(801-484-9374)     (435) 797-3631

Signature of Parent of Guardian: I understand that you are asking for my permission to allow my child to participate in this research. I have been told about the purpose, procedures, possible risks and benefits of the study and my child’s rights as a participant in the study. By signing below I give my permission to have my child participate in this study.

_______________________________  ______________________________
Signature of Parent or Guardian   Date

Child/Youth Assent: I understand that my parent(s)/guardian is/are aware of this research study and that permission has been given for me to participate. I understand that it is up to me to participate even if my parents say yes. If I do not want to be in this study, I do not have to and no one will be upset if I don’t want to participate or if I change my mind later and want to stop. I can ask any questions that I have about this study now or later. By signing below, I agree to participate.

_______________________________  ______________________________
Name       Date
Parent Permission/Youth Assent
Public Schools

Introduction/ Purpose: We would like to invite your student to participate in a survey of
nutrition and physical activity knowledge and behavior. This study is being conducted by Salt
Lake County 4-H and researchers from Utah State University (USU), Professor Nedra
Christensen and research assistant, Kristen Strong. You are being asked for your permission to
allow your student to participate in this study because you live in Salt Lake County and your
student is between the third and sixth grade. We are trying to assess nutrition and physical
activity knowledge and practices among youth in Salt Lake County. If we know this, we may be
able to help prevent childhood obesity which is a growing problem in the U.S. There will be
approximately 100 participants at your child’s school. There will be approximately 400 total
participants in this research.

Procedures: If you agree to be in this research study, you understand that:
1. Your student will be asked to fill out a questionnaire asking questions about family, the
food they eat, and his/her physical activity.
2. Your student will be measured for height and weight.
3. A 20 question multiple choice test will be given to assess nutrition and physical activity
knowledge.

Confidentiality: Research records will be kept confidential, consistent with federal and state
regulations. Names of participants will be replaced with a number on all information collected to
protect privacy and to keep confidentiality. Only Kristen Strong will have access to this
information and it will be kept in a locked file cabinet in a locked office. A final report will be
prepared but this summary will not identify anyone who participated in this research. The data
will be kept indefinitely and all identifiable information will be destroyed after five years.

Risks/Benefits: There is minimal risk in participating in this study. If your son/daughter
participates in this study, he/she may learn more about nutrition and physical activity. This may
contribute to a healthier life

Explanation & offer to answer questions: If you have any questions about the study you may
contact Dr. Nedra Christensen at (801) 484-9374 or Kristen Strong at (801) 468-2520.

IRB Approval Statement: The Institutional Review Board for the protection of participants in
research has approved this study. If you have questions about your rights or if there is something
that you do not feel you can discuss with Nedra or Kristen please contact the IRB at (435) 797-1821.
Voluntary nature of participation and right to withdraw without consequence: Participation in research is entirely voluntary. You may withdraw your student at any time from the study without consequence or you student may decide at any time to stop being in the study.

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

Statement of Researcher: “I certify that the research study has been explained by me or my student researcher and that the parent/guardian understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered.”

Nedra Christensen, Ph.D. R.D. 
Principle Investigator 
(801-484-9374) 

Kristen Strong, R.D. 
Student Researcher 
(801-468-2520)

Signature of Parent of Guardian: I understand that you are asking for my permission to allow my child to participate in this research. I have been told about the purpose, procedures, possible risks and benefits of the study and my child’s rights as a participant in the study. By signing below I give my permission to have my child participate in this study.

Signature of Parent or Guardian Date

Child/Youth Assent: I understand that my parent(s)/guardian is/are aware of this research study and that permission has been given for me to participate. I understand that it is up to me to participate even if my parents say yes. If I do not want to be in this study, I do not have to and no one will be upset if I don’t want to participate or if I change my mind later and want to stop. I can ask any questions that I have about this study now or later. By signing below, I agree to participate.

Name Date
Introduction/ Purpose: We would like to invite your teen to participate in our nutrition and physical activity education intervention in Salt Lake County. This study is being conducted by Salt Lake County 4-H and researchers from Utah State University (USU), Professor Nedra Christensen and research assistant, Kristen Strong. You are being asked for your permission to allow your teen to participate in this study because you live in Salt Lake County. We are trying to assess nutrition and physical activity knowledge and practices among youth in Salt Lake County and through an education intervention to improve their lifestyle. We are also trying to assess the effectiveness of the TRY (Teens Reaching Youth) Program in teaching leadership skills to teens. This knowledge will help in developing additional leadership programs in 4-H. There will be approximately 30 teen participants in the program. There will be approximately 400 total participants in this research.

Procedures: If you agree to be in this research study, you understand that:
1. Your teen will be asked to participate with their TRY team in training sessions. These will be held at the Salt Lake County Office building on April 11 and June 16. They will be 4 to 5 hours in length.
2. Your teen will be asked to help their TRY team teach 20 youth the 8 lesson curriculum. Each lesson lasts 30 to 60 minutes. These lessons will be taught at a date and time to be arranged at the convenience of the team members.
3. Your teen will be asked to fill out a retrospective leadership self assessment form.

Confidentiality: Research records will be kept confidential, consistent with federal and state regulations. Names of participants will be replaced with a number on all information collected to protect privacy and keep confidentiality. Only Kristen Strong will have access to this information and it will be kept in a locked file cabinet in a locked office. A final report will be prepared but this summary will not identify anyone who participated in this research. The data will be kept indefinitely and all identifiable information will be destroyed after five years.

Risks/Benefits: There is minimal risk in participating in this study. If your son/daughter participates in this study, he/she may gain teaching and leadership skills.

Explanation & offer to answer questions: If you have any questions about the study you may contact Dr. Nedra Christensen at (801) 484-9374 or Kristen Strong at (801) 468-2520.

IRB Approval Statement: The Institutional Review Board for the protection of participants in research has approved this study. If you have questions about your rights or if there is something that you do not feel you can discuss with Nedra or Kristen please contact the IRB at (435) 797-1821.
Voluntary nature of participation and right to withdraw without consequence: Participation in research is entirely voluntary. You may withdraw your student at any time from the study without consequence or you student may decide at any time to stop being in the study.

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

Statement of Researcher: “I certify that the research study has been explained by me or my student researcher and that the parent/guardian understands the nature and purpose, the possible risks and benefits associated with taking part in this research study. Any questions that have been raised have been answered.”

_______________________________  ______________________________
Nedra Christensen, Ph.D. R.D.   Kristen Strong, R.D.
Principle Investigator    Student Researcher
(801-484-9374)     (801-468-2520)

Signature of Parent of Guardian: I understand that you are asking for my permission to allow my child to participate in this research. I have been told about the purpose, procedures, possible risks and benefits of the study and my child’s rights as a participant in the study. By signing below I give my permission to have my child participate in this study.

_______________________________  ______________________________
Signature of Parent or Guardian  Date

Child/Youth Assent: I understand that my parent(s)/guardian is/are aware of this research study and that permission has been given for me to participate. I understand that it is up to me to participate even if my parents say yes. If I do not want to be in this study, I do not have to and no one will be upset if I don’t want to participate or if I change my mind later and want to stop. I can ask any questions that I have about this study now or later. By signing below, I agree to participate.

_______________________________  ______________________________
Name      Date
Youth Initial Assessment Form

Section 1: Youth Questionnaire

Circle the one answer that best describes you:

1. What language do you use with your parents most of the time?
   English  Spanish  French  Other

2. What language do you use with your friends most of the time?
   English  Spanish  French  Other

3. What is your ethnic background?
   White  Black  Hispanic  Native American  Pacific Islander  Asian  Other

4. What grade are you in this year?
   3rd  4th  5th  6th

5. Are you a boy or a girl?
   Boy  Girl

Part B — Lifestyle Questions

Circle the one answer that best describes what you usually do:

1. How do you usually get to school?
   Ride the bus  Ride in a car
   Walk  Ride your bike

2. How often do you have P.E. class?
   4-5 days a week  2-3 days a week  1 or less days a week

3. I wash my hands for at least 20 seconds before I touch or eat food.
   Almost always  Sometimes  Not very often

4. Put the time (in minutes) you spend doing the following activities on most days.
   Homework  Sport Practice  T.V./Video Games  Music Lessons

5. For each number, circle which of the two foods that you would pick if you had to choose just one.
   For example: Carrots  Celery
   1) Soda  Milk
   2) Whole Wheat  White Bread
   3) Cookies  Fruit
   4) Fresh Cut  Chips
   5) Lowfat or Skim Milk  Regular Milk
   6) Regular Soda  Diet Soda

Section 2: Nutrition Quiz

Circle one correct answer for each question.

1. Which food is not part of the five food groups?
   a. Applesauce
   b. Brown Rice
   c. Low Fat Yogurt
   d. Pretzels
   e. Peanut Butter
Youth Initial Assessment Form

2. Which food is a Combination Food?
   a. Roast Beef Sandwich
   b. Baked potato
   c. Garden Salad
   d. None of the Above are “Combination Foods”.

3. What is a benefit of exercise?
   a. Helps relieve stress
   b. Helps keep a healthy weight
   c. Makes you an athlete
   d. A & B
   e. All of the Above

4. Which activity is not considered exercise?
   a. Talking on the phone
   b. Dancing in the living room
   c. Walking up the stairs
   d. Working in the garden
   e. A & C

5. How much exercise do you need every day?
   a. 30 minutes (1/2 hour)
   b. 60 minutes (1 hour)
   c. 90 minutes (1 1/2 hour)
   d. 120 minutes (2 hours)

6. You need at least ____ servings of Grains daily.
   a. 2
   b. 3
   c. 5
   d. 10

7. You need at least ____ servings of Vegetables daily.
   a. 2
   b. 4
   c. 7
   d. 10

8. You need at least ____ servings of Fruit daily.
   a. 2
   b. 3
   c. 5
   d. 9

9. You need at least ____ servings of Milk daily.
   a. 2
   b. 3
   c. 5
   d. 7

10. You need at least ____ servings of Meat or Beans daily.
    a. 2
    b. 4
    c. 7
    d. 9

11. Whole Grains
    a. Give you fiber
    b. Make you fat
    c. Give you energy
    d. A & C
    e. None of the above

12. Vegetables
    a. Make your skin healthy
    b. Give you vitamin A
    c. Helps you see in the dark
    d. All of the above
Youth Initial Assessment Form

13. Fruits
   a. Give you vitamin C
   b. Help your cuts heal
   c. Help you fight infection
   d. All of the above
   e. None of the above

14. Milk
   a. Makes your bones and teeth healthy
   b. Gives you calcium
   c. Gives you protein
   d. A & B
   e. All of the above

15. Meat and Beans
   a. Help build strong muscles
   b. Give you protein
   c. Give you Iron
   d. A & B
   e. All of the above

16. Match the parts of the taco with its food group.
   a. Taco Shell ___ Meat & Beans
   b. Lettuce ___ Vegetable & Tomato
   c. Chicken ___ Milk
   d. Cheese ___ Grain

17. You should eat breakfast because it
   a. Helps you do better in school
   b. Gives you energy
   c. Helps you pay attention
   d. All of the above

18. Which is not a healthy breakfast?
   a. Pizza and Fruit
   b. Tortilla and Salsa
   c. Eggs, Pancakes and Milk
   d. Yogurt, Fruit and Cereal

19. Which one is an example of a nutritious snack?
   a. Soda and Cookies
   b. Yogurt, Granola, and Fruit
   c. Peanut Butter and Celery Sticks
   d. B & C
   e. All of the above

20. When should you wash your hands?
   a. Before touching a pet
   b. Before eating
   c. Before using the restroom
   d. All of the above

Height:____________________________

Weight:__________________________

NAME:__________________________
Youth Final Assessment Form

Section 1: Lifestyle Questions
Circle the one answer that best describes what you usually do:

1. How do you usually get to school?
   Ride the bus   Ride in a car
   Walk   Ride your bike

2. How often do you have P.E. class?
   4-5 days a week   2-3 days a week
   1 or less days a week

3. I wash my hands for at least 20 seconds before I touch or eat food.
   Almost always   Sometimes
   Not very often

4. Put the time (in minutes) you spend doing the following activities on most days.
   Homework _____
   Sport Practice _____
   T.V./Video Games _____
   Music Lessons _____

5. For each number, circle which of the two foods that you would pick if you had to choose just one.
   For example: Carrots Celery

1) Soda __________ Milk __________
2) Whole Wheat Bread ______ White Bread
3) Cookies __________ Fruit __________
4) Fresh Cut Vegetables ______ Chips
5) Lowfat or Skim Milk ______ Regular Milk
6) Regular Soda ______ Diet Soda

Section 2: Nutrition Quiz
Circle one correct answer for each question.

1. Which food is not part of the five food groups?
   a. Applesauce
   b. Brown Rice
   c. Low Fat Yogurt
   d. Pretzels
   e. Peanut Butter

2. Which food is a Combination Food?
   a. Roast Beef Sandwich
   b. Baked potato
   c. Garden Salad
   d. None of the Above are “Combination Foods”

3. What is a benefit of exercise?
   a. Helps relieve stress
   b. Helps keep a healthy weight
   c. Makes you an athlete
   d. A & B
   e. All of the Above

4. Which activity is not considered exercise?
   a. Talking on the phone
   b. Dancing in the living room
   c. Walking up the stairs
   d. Working in the garden
   e. A & C
Youth Final Assessment Form

5. How much exercise do you need every day?
   a. 30 minutes (1/2 hour)
   b. 60 minutes (1 hour)
   c. 90 minutes (1 1/2 hour)
   d. 120 minutes (2 hours)

6. You need at least ____ servings of Grains daily.
   a. 2
   b. 3
   c. 5
   d. 10

7. You need at least ____ servings of Vegetables daily.
   a. 2
   b. 4
   c. 7
   d. 10

8. You need at least ____ servings of Fruit daily.
   a. 2
   b. 3
   c. 5
   d. 9

9. You need at least ____ servings of Milk daily.
   a. 2
   b. 3
   c. 5
   d. 7

10. You need at least ____ servings of Meat or Beans daily.
    a. 2
    b. 4
    c. 7
    d. 9

11. Whole Grains
    a. Give you fiber
    b. Make you fat
    c. Give you energy
    d. A & C
    e. None of the above

12. Vegetables
    a. Make your skin healthy
    b. Give you vitamin A
    c. Helps you see in the dark
    d. All of the above

13. Fruits

14. Milk
    a. Makes your bones and teeth healthy
    b. Gives you calcium
    c. Gives you protein
    d. A & B
    e. All of the above

15. When should you wash your hands?
    a. Before touching a pet
    b. Before eating
    c. Before using the restroom
    d. All of the above

16. Meat and Beans
    a. Help build strong muscles
    b. Give you protein
    c. Give you Iron
    d. A & B
    e. All of the above
17. Match the parts of the taco with its food group.
   a. Taco Shell ___ Meat & Beans
   b. Lettuce ___ Vegetable & Tomato
   c. Chicken ___ Milk
   d. Cheese ___ Grain

20. Which one is an example of a nutritious snack?
   a. Soda and Cookies
   b. Yogurt, Granola, and Fruit
   c. Peanut Butter and Celery Sticks
   d. B & C
   e. All of the above

What did you like about the program?

18. You should eat breakfast because it
   a. Helps you do better in school
   b. Gives you energy
   c. Helps you pay attention
   d. All of the above

What did you like about meeting with your teachers?

19. Which is not a healthy breakfast?
   a. Pizza and Fruit
   b. Tortilla and Salsa
   c. Eggs, Pancakes and Milk
   d. Yogurt, Fruit and Cereal

NAME: ____________________
Parent/Guardian Initial Questionnaire—

Parents/Guardians-
Please take a couple minutes to fill this questionnaire out.

Part A— Parent/Guardian Information

What is your child’s name ____________________

1. What is your native language
   Parent/Guardian 1— English Spanish French Other
   Parent/Guardian 2— English Spanish French Other

2. What is your ethnic background?
   Parent/Guardian 1— White Black Native American Other
   Hispanic Asian Pacific Islander
   Parent/Guardian 2— White Black Native American Other
   Hispanic Asian Pacific Islander

3. What is your highest level of education?
   Parent/Guardian 1— Less than High School Associates Degree
   High School or GED Bachelor’s Degree
   Some College/ Tech School Advanced Degree
   Parent/Guardian 2— Less than High School Associates Degree
   High School or GED Bachelor’s Degree
   Some College/ Tech School Advanced Degree

Part B— Parent/Guardian Lifestyle Questions

Circle the one answer that best describes what you usually do.

1. How often are you physically active for at least 30 minutes a day? (jogging, walking fast, swimming, dancing, sports, etc.)
   Parent/Guardian 1— 5-7 days/week 2-4 days/week 1 or less days/week
   Parent/Guardian 2— 5-7 days/week 2-4 days/week 1 or less days/week

2. How many servings of fruit do you eat most days? (1 serving = ½ cup)
   Parent/Guardian 1— <1 1-2 3-4 >5
   Parent/Guardian 2— <1 1-2 3-4 >5

3. How many servings of vegetables do you eat most days? (1 serving = ½ cup)
   Parent/Guardian 1— <1 1-2 3-4 >5
   Parent/Guardian 2— <1 1-2 3-4 >5

4. How many servings of Milk do you eat most days? (1 serving = 1 cup Milk, 8oz yogurt, or 1 ½ to 2 oz Cheese)
   Parent/Guardian 1— <1 1-2 3-4 >5
   Parent/Guardian 2— <1 1-2 3-4 >5

5. How many times do you eat dinner as a family in an average week?
   <1 1-2 3-4 >5

6. How often do you eat out as a family in an average week?
   <1 1-2 3-4 >5

Thank you for your time!

Please have your child return this form to their TRY Team Leaders.
Parent/Guardian Final Questionnaire—
Parents/Guardians-
Please take a couple minutes to fill this questionnaire out.
Part A— Parent/Guardian Lifestyle Questions
What is your child’s name________________________

Circle the one answer that best describes what you usually do.

7. How often are you physically active for at least 30 minutes a day? (jogging, walking fast, swimming, dancing, sports, etc.)
   Parent/Guardian 1— 5-7 days/week 2-4 days/week 1 or less days/week
   Parent/Guardian 2— 5-7 days/week 2-4 days/week 1 or less days/week

8. How many servings of fruit do you eat most days? (1 serving = ½ cup)
   Parent/Guardian 1— <1 1-2 3-4 >5
   Parent/Guardian 2— <1 1-2 3-4 >5

9. How many servings of vegetables do you eat most days? (1 serving = ½ cup)
   Parent/Guardian 1— <1 1-2 3-4 >5
   Parent/Guardian 2— <1 1-2 3-4 >5

10. How many servings of Milk do you eat most days? (1 serving = 1 cup Milk, 8oz yogurt, or 1 ½ to 2 oz Cheese)
    Parent/Guardian 1— <1 1-2 3-4 >5
    Parent/Guardian 2— <1 1-2 3-4 >5

11. How many times do you eat dinner as a family in an average week?
    <1 1-2 3-4 >5

12. How often do you eat out as a family in an average week?
    <1 1-2 3-4 >5

Part B— Parent/Guardian Comments

In what ways has the interaction with Nutrition Educators impacted your child?

What changes have you observed in your child’s eating and fitness habits?

Thank you for your time!
Please have your child return this form to their Educator.
Youth Leadership Life Skills Development Scale

What leadership skills have you improved because of your TRY Team involvement? Please answer each item by circling the number that you feel represents your gain for each skill. Please answer every question.

As a result of my TRY Team experiences I…

<table>
<thead>
<tr>
<th>No Gain</th>
<th>Slight Gain</th>
<th>Moderate Gain</th>
<th>A Lot of Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

1. Can determine needs
2. Have a positive self-concept
3. Can express feelings
4. Can set goals
5. Can be honest with others
6. Can use information to solve problems
7. Can delegate responsibility
8. Can set priorities
9. Am sensitive to others
10. Am open-minded
11. Consider the needs of others
12. Show a responsible attitude
13. Have a friendly personality
14. Consider input from all group members
15. Can listen effectively
16. Can select alternatives
17. Recognize the worth of others
18. Create an atmosphere of acceptance
19. Can consider alternatives
20. Respect others
<p>| | | | | |</p>
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<thead>
<tr>
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<tbody>
<tr>
<td>21. Can solve problems</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>22. Can handle mistakes</td>
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<td>23. Can be tactful</td>
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<td>24. Can be flexible</td>
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<td>25. Get along with others</td>
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<td>26. Can clarify my values</td>
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<td>27. Use rational thinking</td>
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<td>28. Am open to change</td>
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<td>29. Have good manners</td>
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<td>30. Trust other people</td>
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