

BEHAVIORALLY ORIENTED NUTRITION EDUCATION AND CHILDREN'S HEALTHY
EATING CHOICES

by

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Abstract

Purpose: Dietary habits are established in childhood and are often maintained into adulthood. Fruit and vegetable consumption contributes to prevention of several chronic diseases, but many children do not meet dietary guidelines for fruit and vegetable intake. In this study, two versions of a theoretically informed, behaviorally oriented nutrition education program were evaluated.

Methods: This study used a quasi-experimental design, conducted at a summer camp in northwestern Russia. Data were collected on boys and girls ($n=40$), aged 8-12y (mean=10.4; SD= 1.0) with mean BMI percentile of 56.7 (SD=26.7), assigned to receive 15 sessions of enhanced nutrition education with skill-training (intervention) or classic nutrition education (comparison); both nutrition education programs were based on Social Cognitive Theory. For the intervention condition, an additional skill-training component included healthy snack preparation activities and games. Data were obtained through previously published questionnaire items and from a menu for snack selection. Independent and paired t-tests were performed to assess differences between groups and across time, respectively. Alpha was set at $p < 0.05$.

Results: Both groups showed statistically significant differences from baseline to post-intervention in nutrition knowledge ($p<0.001$), healthy eating attitudes towards fruit and vegetable consumption ($p=0.001$), and healthy eating behavior (snack selection) ($p<0.001$). No statistically significant differences between time points were found, however, for children's self-efficacy to eat fruits ($p=0.822$) or vegetables ($p=0.118$). There were no differences between intervention and comparison groups for change in nutrition knowledge ($p>0.05$), attitudes, self-efficacy, or behavior (snack selection).

Conclusion: In this study nutrition education, with or without skill training, was associated with improved knowledge, attitudes, and behavior in a Russian camp setting. Therefore, future research should examine the long-term sustainability within different school-aged children's environments.

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Dedication

To my Mom. No one else will ever know the strength of my love for you. I loved you from the moment I opened my eyes.

Chapter 1 - Introduction

Overweight and obesity remains a matter of urgency. People all over the globe, regardless of their ethnicity, sex, age, socioeconomic status, or whether they live in a developed or developing country, are at risk of being overweight or obese; they are also at risk of developing heart problems, diabetes, metabolic syndrome, stroke, certain types of cancer, and other diseases or complications (Guh et al., 2009).

The U.S. has a very long history of overweight and obesity problems, and these remain a leading public health concern (Ogden, Carroll, Kit, & Flegal 2012). In the U.S. obesity prevalence doubled in adults (Flegal, Carroll, Kit, & Ogden, 2012) and tripled in children and adolescents (Ogden, Carroll, Kit, & Flegal, 2012) over last two decades. Fryar, Carroll, & Ogden, (2015) in the NHANES reports shared the following statistics: about 35% of the adult population in the USA is obese; an additional 36% of adults are overweight; and about 17% of American children (2-19 years old) are obese.

The systematic review by Wang and Beydoun (2007) revealed trends and underlying causes that led to the increased prevalence in obesity among Americans since 1980s, and the factors that have contributed to the existing disparities. Since obesity is of a big Public Health concern, and is the second leading preventable killer disease in the U.S., it is a national priority to fight the problem. Obesity is a multifactorial disease, but in most persons, weight gain comes from consumption of excess calories in a combination with lack of physical activity (Wang, & Beydoun, 2007). There are also other factors of social, economic, and historical nature contributing to the overweight and obesity epidemic affecting men, women and kids all over the globe, such as, changes in eating behaviors, mostly sedentary jobs, development of technology,

global trade (nutrition transition), increased screen time, lack of time and effort or simply limited budget (Wang, & Beydoun, 2007). The last but not the least is the environment. The overall environment in which people live, work, learn, and play has contributed to the obesity epidemic greatly (Wang, & Beydoun, 2007). Ultimately, individuals choose the type and amount of food they eat and how physically active they are. However, choices are often limited by what is available in a person's environment, including stores, restaurants, schools, and worksites (Wang, & Beydoun, 2007). The environment in the United States has been characterized as "obesogenic" meaning that consumption of high energy foods and low energy expenditure are promoted; those high energy and low nutritional value "unhealthy" foods are cheap and available everywhere, while healthier options tend to be more expensive (Wang, & Beydoun, 2007). Eating behaviors also changed drastically especially in the period from 1970s to 1990s, states Wang. Frequent eating at fast food places, overconsumption of sugar sweetened beverages, inadequate fruits and vegetable consumption as well as the increase in portion size – are all contributing factors.

At the same time studies show that obesity is preventable (Danaei et al., 2009; Ofei, 2005). The U.S. government works on environmental issues to make healthy foods and sports facilities accessible for citizens, as well as funding research and programs to encourage healthy lifestyles in both kids and adults all over the country. Yanovski and Yanovski (2011) have stated that a possible explanation to the recent stabilization of obesity prevalence in the U.S. might indicate recognition of the problem by health professionals that might be associated with positive environmental changes.

The situation in Russia differs quite a bit from the one in the United States. Around 50% of the adult population is overweight or obese; the number differs if we compare to the US statistics, but it has been rapidly increasing (almost doubled) since mid-1990s, according to the

data provided by the Russian Federation Ministry of Healthcare (2012). The latest reports (The Russian Federation Ministry of Healthcare, 2011; Statistics, The Russian Federation Ministry of Healthcare, 2012; The Russian Federation Ministry of Healthcare, 2013) show that obesity morbidity rates for adults were 743.0 per 100,000 in 2010; the number increased up to 820.9 per 100,000 adults by 2012. Statistical reports for children and adolescents are represented within 2 age categories: kids 0-14 years old, and 15-17 years old, and morbidity rates for obesity in 2012 were 1060.3 per 100,000 and 2289.3 per 100,000 respectively. According to the article “Obesity in Kids” (Peterkova, & Remizov, 2004), the prevalence of obesity in children is 5.5% in rural areas, and 8.5% in urban areas.

The situation in Russia is similar to the one in market economy countries. The two main contributing factors remain the same: caloric intake (caloric intake increased over past twenty years in Russia) and decreased physical activity levels (Huffman, & Rizov, 2007). The same article discussed possible reasons for Russians to be overweight or obese. The traditional Russian diet is high in sugars, meat and dairy products. Consumption of meat has been favored since times of the Soviet Union (dietary guidelines recommended higher animal protein intake for better health); together with high dairy intake, which makes the typical diet high in fat, the traditional Russian diet is reported to be extremely low in fruits and vegetables intake (Huffman, & Rizov, 2007). Limited budgets lead to making cheaper and less healthy daily choices: people tend to buy cheaper products (potatoes, processed sugars) rather than fruits, vegetables, fish, poultry; but the food price factor is not the leading problem (Staudigel, 2011).

Fruits and vegetables are rich in a wide range of micronutrients, and are known to prevent a number of chronic diseases, including cardiovascular disease, obesity, and certain cancers (Van Duyn, & Pivonka, 2000). Numerous studies on the association of fruit and vegetable

consumption and non-communicable diseases prevention focus on adults, although several researchers have studied the association of diet in childhood and chronic diseases in adulthood (Gunnell, Frankel, Nanchahal, Braddon, & Smith, 1996). Findings show fruit and vegetable consumption in children and adolescents to be a protective factor for chronic diseases in adults (Maynard, Gunnell, Emmett, Frankel, & Smith, 2003) as well as for a range of childhood diseases (Antova et al., 2003).

Water does not provide energy, but it is essential for life; human bodies are at least 60% water, and different proportions of water are found in different tissues (Grosvenor, & Smolin, 2009). Water has various functions, and among those are participation in a variety of metabolic reactions, transport of nutrients and waste, body temperature and acid-base balance regulation, and protection, such as lubrication or cushioning effect (Grosvenor, & Smolin, 2009). Decreased water consumption is discussed with regard to consumption of sugar-sweetened beverages (SSBs) in both kids and adults; and the latter are often associated with higher calorie intake and excess consumption of simple sugars (Reedy & Krebs-Smith, 2010) – both are contributing to diabetes type II (Malik et al., 2010) and obesity (Ludwig, Peterson, & Gortmaker, 2001). Hence, water consumption and maintaining a healthy diet can be beneficial for weight management (Muckelbauer et al., 2009) and can possibly avert adverse consequences associated with increased SSB intake (Malik et al., 2010; Ludwig, Peterson, & Gortmaker, 2001).

Various studies have shown that obesity in childhood, adolescence, and young adulthood results in weight-related problems (overweight, obesity) and various health problems (chronic diseases) in older adults (Guo, Roche, Chumlea, Gardner, & Siervogel, 1994; Daniels, 2006). Studies also have shown there is a link between parental overweight/obesity and childhood obesity, and the factors contributing are both genetic and environmental. Since the prevalence of

overweight and obesity in children has a tendency to increase over time, preventing the problem is of urgent importance to public health professionals in different countries.

Research interventions, population-based policies, and programs were developed and implemented over past decades in the USA, targeting both kids and adults: some were more successful than others, but there are several conclusions that health professionals can make from these efforts (Wang, & Beydoun, 2007). One of the conclusions is that childhood and adolescence are key times when people establish their habits and tend to maintain those into adulthood. Throughout school years kids become more independent, they learn to make their own food choices and take personal decisions regarding what they eat (Perez-Rodrigo, & Aranceta, 2003). Thus, healthy lifestyles should be promoted, and obesity prevented during school years.

Nutrition Education

One way to promote healthy lifestyles and prevent obesity is through nutrition education. The Society for Nutrition Education and Behavior (SNEB) adopted the definition of nutrition education by Dr. Isobel Contento (2007): “Nutrition education is any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food- and nutrition-related behaviors conducive to health and well-being. Nutrition education is delivered through multiple venues and involves activities at the individual, community and policy levels.”

Nutrition education is an important component of almost all major programs that promote healthy lifestyles (Briggs, Safai, & Beall, 2003), and also plays an important role in all child nutrition programs and offered in all schools, after-school settings, child care facilities, and summer camps.

In the definition by Contento (2007) as well as in most literature, nutrition education refers to a broad range of all different kinds of activities that promote healthy eating behaviors. The “classic” understanding of nutrition education is described as “a set of planned educational activities targeted at certain population groups and aimed at acquiring healthy nutrition behaviors” in Gil’s publication (as cited in McNulty, 2013). The goal of nutrition education in this setting is to provide “accurate, reliable and science-based information consumers need to make informed choices” (Dietary Guidelines Alliance, 1997). Contento (2007) stated that even if given the knowledge about food and nutrition, people would still need help of professionals to make healthier food choices on daily basis; the information by itself is not enough.

Another approach that Contento (2007) introduced to nutrition education is the facilitating behavior change approach. With regard to this approach, nutrition education aims at changing behaviors focusing on personal motivations, interpersonal interactions as well as environmental factors and community patterns that might affect certain behaviors. In this approach, enhanced nutrition education is referred to as a “form of planned change that involves the deliberate effort to improve nutritional well-being by providing information or other types of educational/behavioral interventions” (Sims, 1987).

A number of literature reviews on nutrition education interventions have been conducted to examine whether nutrition education was effective, and if yes, what the best practices were. In the review by Contento et al. (1995), nutrition education interventions were more effective for improving diets if they were targeting behavior change. Horodyska et al. (2015) identified 53 good practice characteristics for both interventions and policies that target healthy eating practices and physical activity; among those are: Defining target audience; using tailored content and materials; sufficient program duration; and developing a theory-based intervention. A

review by Sharma (2011) on dietary education interventions for children also showed the importance of developing a theory-based program, as using a behavioral theory helps the educator/investigator to determine specific methods for behavior change, measurable outcomes, using a theory helps to identify proper program duration, choose right strategies, and improve overall effectiveness of the program. There are various theories that can be used by an educator when targeting behavior change and Social Cognitive Theory is among the most popular (Sharma, 2011).

Social Cognitive Theory is frequently used to promote healthy lifestyles on the interpersonal level, meaning that researcher assumes that individuals exist within a society, that opinions, beliefs, and thoughts are formed not only on the individual level, but are highly affected by surrounding people (Glanz, & Rimer, 1997). Social Cognitive Theory posits that there are three main factors that lead to a behavior change: 1) self-efficacy or belief in one's ability to perform an certain behavior; 2) goals provide a sense of purpose, have strong motivational effects, clearly set goals help better performance; 3) outcome expectancies or beliefs about value of the consequences of performed behavior (Bandura, 1988). Bandura (the founder of Social Cognitive Theory) added the self-efficacy component to already existing Social Learning Theory, since he thought that having self-efficacy, individuals can make a change even if they face some difficulties (Glanz, & Rimer, 1997).

Social Cognitive Theory consists of several important concepts (Glanz, & Rimer, 1997): the first one is Reciprocal Determinism (person-behavior-environment setting in which one performs a certain behavior); the second one is Behavioral Capability or simply an ability to perform a certain behavior; the third concept is Expectations (expected outcomes of a certain behavior); the fourth concept is the concept of Self-efficacy or confidence of being able to make

a change even when facing obstacles; concept five deals with Observational Learning (modeling) (understanding the outcome difference when watching a different behavior in others); and the last concept is Reinforcements (response to behavior that encourages/discourages one to repeat it).

Previous research suggests that effective nutrition education programs are not only theory-based, but also focus on both delivering information and skill development such as food preparation, tasting of prepared samples, food preservation, etc. (Sharma, 2011; Perez-Rodrigo, & Aranceta, 2001) In the relevant literature, behaviorally-oriented theory-based programs tend to be more effective in producing actual behavior change (e.g., fruit and vegetable consumption) compared to knowledge-oriented programs; theory-driven programs target not only desired behavior itself, but motivators and skills necessary to perform the behavior (Cerin, Barnett, & Baranowski, 2009).

School-based, afterschool-based or camp-based nutrition education interventions are popular among nutrition educators and researchers because they reach a large number of children and adolescents (Coleman, Geller, Rosenkranz, & Dzewaltowski, 2008). A camp setting provides kids an opportunity to practice healthy eating behavior and implement new knowledge, help kids to resist peer pressure and keep on making healthy choices and maintaining healthy practices (Perez-Rodrigo, & Aranceta, 2001; Tilley, Weaver, Beets, & Turner-McGrievy, 2014).

Summer camps in Russia are seasonal recreational programs, providing child care 24 hours a day for 3-4 weeks; presenting a unique opportunity to implement a nutrition education program to influence kids' eating habits and test its effectiveness. According to the Act #99/230 (12/22/1999) by the Russian Federation Ministry of Healthcare, all summer camps are to follow recommendations on daily consumption on macro- and micronutrients that follow “requirements

in nutrients and energy based on healthy eating scientific concept”. These recommendations specify that kids consume a fruit, a vegetable, and drink enough water daily. The extent to which summer camps in Russia meet those standards remains unknown. One study conducted in a summer day camp setting showed that nutrition education interventions can potentially result in increased fruit, vegetables consumption (Tilley, Weaver, Beets, & Turner-McGrievy, 2014).

Thus, there is evidence that multicomponent nutrition education interventions can be effective for promoting healthy eating behaviors in after-school as well as camp-based settings in children and adolescents (Anliker, Drake, Pacholski, & Little, 1993).

HOP’N Program

One example of a behaviorally-oriented nutrition education intervention based on Social Cognitive Theory is Healthy Opportunities for Physical Activity and Nutrition, or HOP’N (Dzewaltowski et al., 2010). The HOP’N After School Program targeted fourth- and fifth-graders from 2005-2008 in different after-school settings. HOP’N was designed as an intervention to target skill development and self-efficacy in kids, and the program used Social Cognitive Theory constructs.

The HOP’N program consisted of 32 modules that focused on both healthy eating behaviors and increasing physical activity. The program materials provide the educator with information, supplement materials for each class, class outline. In some modules class activities are games, in others – snack preparation practices with tasting sessions. HOP’N brings in the concept of distinguishing between foods and behaviors that are good for health (“go”) and not-so-good (“slow”), and kids practice the concept through games and activities.

The HOP’N program modules on healthful eating focus on increasing fruit and vegetable consumption as well as promoting water consumption among kids. Main findings from the

program were published by Dzewaltowski and colleagues (2010) concluding that HOP’N After School is a “promising framework to promote healthful behavior”.

Problem Statement

Fruit and vegetable consumption contributes to the prevention of several chronic diseases, but many Russian children do not meet dietary guidelines. There is some evidence that nutrition education programs based on Social Cognitive Theory (SCT) can increase fruit and vegetable intake, but there are few such studies in a Russian context. The current study compared a SCT-based program using an interactive classroom and outdoor curriculum emphasizing fruit and vegetable consumption to an enhanced program that included additional skill-training with healthy snack preparation activities and games.

The objective of the present research project was to evaluate the overall effectiveness of behaviorally-oriented theory-based nutrition education program with the skill training component (intervention condition) in Russian children; and its effectiveness compared to nutrition education in the classic interpretation (comparison). The primary outcomes were nutrition knowledge, healthy eating attitudes, self-efficacy, and behavior change. Based on the previous literature we hypothesized that the intervention condition will show statistically significant improvement for all outcomes listed compared to the comparison group. We also hypothesized that both conditions will show statistically significant improvement from baseline to post-intervention for nutrition knowledge, healthy eating attitudes, self-efficacy, and behavior change.

Chapter 2 - Methods

Camp Setting

The study took place at a kids' summer camp "Yantar" in the northwestern part of Russia (Veshniaki village, Cherepovets district, Vologda region). Children live at the camp for three weeks (21 days) without leaving its territory. The camp facilities include the main building with the dining hall; housing buildings; hospital building; gym, soccer field; administrative and maintenance buildings. For the purpose of the study one of the dining hall rooms was used to hold nutrition education sessions. In good weather conditions several sessions were partially held outside to perform outdoor activities for the intervention condition.

Participants

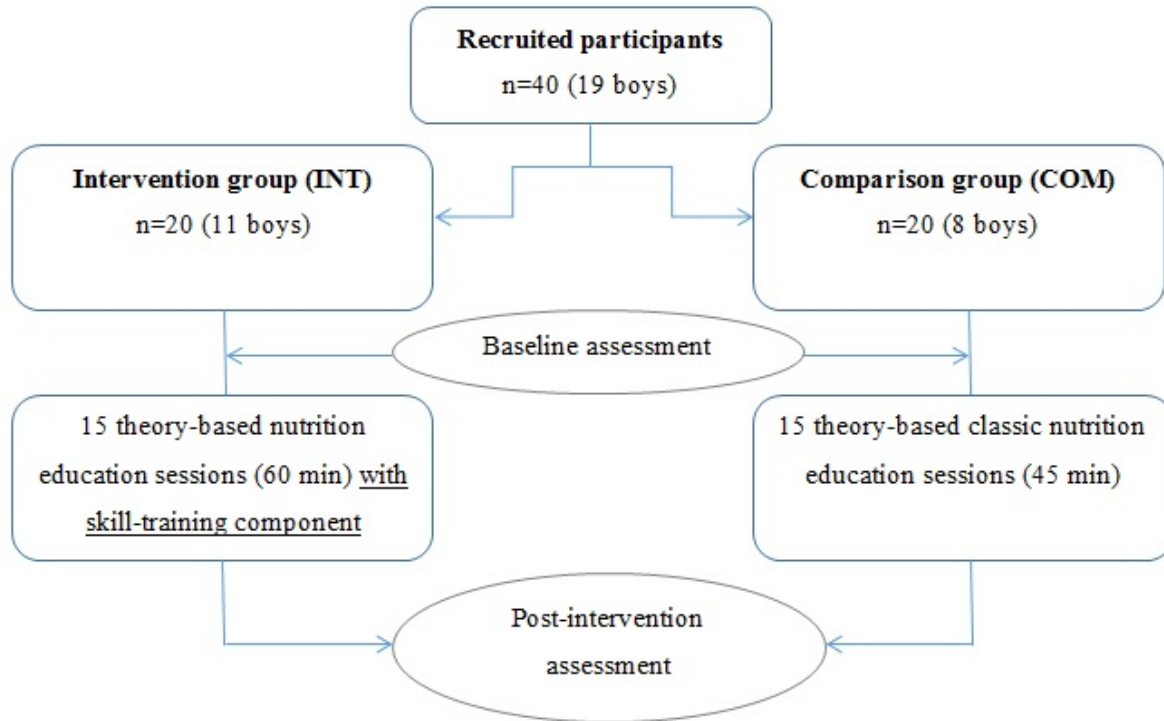
Data were collected on healthy boys and girls ($n=40$; 19 boys), aged 8-12y (mean = 10.4; SD = 1.0y) with mean BMI percentile of 56.7 (SD=26.7). Prior to the study, written informed consent was obtained first from parents (through the camp office), and then from the study participants on the first day of camp. Participants' parents also filled in a survey to assess demographics. The experimental protocol was approved by Institutional Review Board at Kansas State University, Manhattan campus.

Quasi-Experimental Design

Children arrived at the camp on Sunday (20 July, 2014), and two teams of adolescent boys and girls started the study. A total number of 20 boys and girls (11 boys) were assigned by their camp counselors who were blind to the study to receive enhanced nutrition education with skill-training component in the intervention (INT) group; another 20 children (8 boys) were assigned by the camp counselors to receive classic nutrition education sessions in the comparison group (COM).

The study used a quasi-experimental design. Both groups were to complete a total of fifteen nutrition education sessions (Monday-Friday for three weeks).

Figure 2.1



Comparison Group

Participants in the comparison group had their sessions scheduled for 10 am daily, Monday through Friday for 3 weeks in a row; and the duration of each session was 45 minutes. A total of twenty participants attended fifteen classic nutrition education sessions based on HOP’N modules’ materials (Dzewaltowski et al., 2010) translated into Russian language, along with additional materials from MyPlate for kids. During the first nutrition education session the baseline questionnaire was completed by each participant. At this session two snacks were chosen from the offered menu to assess behavior at baseline. The same questionnaire was

completed and menu snack selection was performed by each child at the end of the last session, three weeks later.

Intervention Group

The intervention group was scheduled for 11 am daily on week days for three weeks in a row. For the intervention group the duration of the session was one hour. Twenty participants followed the same nutrition education curriculum based on HOP’N modules (Dzewaltowski et al., 2010) and MyPlate for children as the comparison group did; the difference was in the last 15 minutes of each session, when different kinds of additional activities were introduced. Those activities included snack preparation sessions, role-playing games, creating posters, playing games promoting healthier behaviors.

Baseline questionnaires and snack selection menus were completed within the first 15 minutes of the first class. Post-intervention assessment (questionnaires and snack selection) took place during the last session with the group, three weeks later. Below in Table 2.1, we have provided a brief outline of the daily modules taught for the INT and COM groups.

Table 2.1 Sessions schedule and contents for INT and COM groups.

Week	Daily modules, topics	COM group	INT group
Week 1	Session 1: Getting acquainted	This session was the same for both groups: <ul style="list-style-type: none"> - baseline assessment; - the Kick-Off module; - presentation on macronutrients 	
	Session 2: Proteins, Carbohydrates and Fats	Nutrition education session on main macronutrients (except water); A game “What is on your plate?”	Nutrition education session on main macronutrients (except water); A game “What is on your plate?” Additional activities (activity

			sheet-Maze) from MyPlate
	Session 3: Proteins, Carbohydrates, and Fats Encore; Nutrition labels	Nutrition education session on main macronutrients (repeat main ideas); Reading nutrition labels activity (different kinds of foods); Discussion; Developing a good nutrition label	Nutrition education session on main macronutrients (repeat main ideas); Reading nutrition labels activity (different kinds of foods); Discussion; Developing a good nutrition label Additional activity – two crosswords (based on MyPlate crossword puzzle)
	Session 4: Wonderful Water module	Following HOP’N module program	Following HOP’N module program; Added water break in the middle of the session; Drawing a poster “Wonderful Water” for the dining hall (the poster was pre-made; kids only add information on it)
	Session 5: Wonderful Water module Encore	Following HOP’N module program; “Red-Yellow-Green” activity	Following HOP’N module program; “Red-Yellow-Green” activity; Added water break in the middle of the session; Drawing chalk pictures on camp territory “Drink water”
Week 2	Session 6: Taste the Rainbow!	Following HOP’N module program; Word search activity included (adopted	Following HOP’N module program; Word search activity included (adopted

		from MyPlate) (NB: tasting activity from the module excluded)	from MyPlate); Tasting activity as described in the module
	Session 7: Let's make a fruit snack	Following HOP'N module program; Drawing activity; No snack preparation	Following HOP'N module program; Drawing activity; Banana dolphins – snack preparation
	Session 8: Vegetable snack preparation	Following HOP'N module program; Drawing activity; No snack preparation	Following HOP'N module program; Drawing activity; Vegetable snack preparation (dip) from the module
	Session 9: Mighty fruits and vegetables	Sum up the information; Add information on the pre-made poster for the dining hall	Sum up the information; Add information on the pre-made poster for the dining hall; Fruit kebobs – snack preparation
	Session 10: What is your favorite snack?	Following HOP'N module program; Creating a “healthy snack” shopping list	Following HOP'N module program; Creating a “healthy snack” shopping list; Fruit dip preparation activity (recipe from the HOP'N module on “Let's make a fruit snack!”)
Week 3	Session 11: Truth about snacks module	Following HOP'N module program	Following HOP'N module program; MyPlate snack tips discussion and add-ons
	Session 12: Move More, Sit Less	Following HOP'N module program	Following HOP'N module program; Additional activity from the

			module Move More, Sit Less Encore
	Session 13: My HOP’N-at-Home Poster	Following HOP’N module program;	Following HOP’N module program; Crossword puzzle on healthy environments, homes
	Session 14: Cool Contracts	Following HOP’N module program	Following HOP’N module program; Role game (family situations)
	Session 15: Sum-up session	This session was the same for both groups: HOP’N review module; go through handouts; reinforce with fruits/vegetables stickers; post-intervention assessment	

Surveys and Measurements

Anthropometric Measurements

Anthropometric measures (height, weight, waist circumference) were obtained on arrival day at the hospital building with the help of a trained research assistant. Height was measured to the nearest 0.1cm using stadiometer (RM-1-“Diakoms”, Moscow, Russia); weight was measured on a digital scale (VEM-150 (A3), Massa-K, Saint Petersburg, Russia) to the nearest 0.1kg; waist circumference was measured with a non-elastic tape measure in cm to the nearest 0.1cm. For the waist circumference measurement, participants were asked to put hands on shoulders, take a deep breath; when kids were exhaling the research assistant placed tape measure around abdomen in between the hip bone and belly button parallel to the floor. Height, weight, and waist circumference were measured three times for each subject, and the average was used for data

analyses. BMI percentile was calculated using gender, age, weight average and height average for each child using the Centers for Disease Control and Prevention online calculator.

Questionnaire

To assess children's nutrition knowledge, attitudes, self-efficacy, and behavior related to fruit and vegetable consumption previously published questionnaires were modified for use in the present study of the Russian summer camp context. We ran Cronbach's alpha to assess the internal consistency of each part of the survey. If Cronbach's alpha falls in $0.6 \leq \alpha < 0.7$ interval, internal consistency of the questionnaire is considered to be acceptable; if Cronbach's alpha falls in $0.7 \leq \alpha < 0.9$ interval, internal consistency of the questionnaire is considered to be good (Bland, & Altman, 1997).

The first part of the survey assessed enjoyment of fruits, vegetables, and water consumption; this part of the questionnaire was utilized from "Eat Well Be Active Community programs" (Wilson, Magarey, & Mastersson, 2008), Cronbach's $\alpha=0.668$. The second part of the survey was on nutrition knowledge adopted from University College London (Parmenter, & Wardle, 1999). After translation, adopted version consisted of ten questions on basic nutrition knowledge, Cronbach's $\alpha=0.715$. The third part of the questionnaire on dietary habits, was adopted from the same validated Australian questionnaire as the first part of the survey (Wilson, Magarey, & Mastersson, 2008), and was translated into Russian. Most modifications appeared in this part of the questionnaire, because it was adapted to the diversity of foods in Russia. The fourth part of the questionnaire assessing participants' self-efficacy in fruits and vegetables consumption, was adopted from HOP'N program materials (Geller, Dzewaltowski, Rosenkranz, & Karteroliotis, 2009; Dzewaltowski et al., 2010), Cronbach's $\alpha=0.796$.

Snack Selection Menu

To assess behavior change from baseline to post-intervention, a special menu of snack options was created. Hanks and Wansink's research suggests that making fruits and vegetables as well as other nutritious foods "convenient, attractive, and normative", increases the likelihood of their consumption by school-aged children (Hanks, Just, & Wansink, 2013); based on this research, we created enticing names for high nutritious value foods to enhance attractiveness of those foods to the study participants (e.g., "Super Brain" walnuts).

The snack menu consisted of six snack choices, we based those choices on NuVal scores for food items (Katz, Njike, Rhee, Reingold, & Ayoob, 2010): three highly nutritious value foods (carrots, grapes, walnuts) and three calorie-dense low nutrition value foods (crackers, cookies, sugar-covered cereal). All participants were instructed to choose any two options of snacks both at baseline and post-intervention; kids got their two snacks the next day (day two of classes after baseline assessment, the last day of camp after post-intervention assessment). Snacks were weighed (3 oz.) and packed in Ziploc bags for participants' convenience.

Statistical Analysis

Statistical analyses were performed using SPSS version 22.0 (IBM Corp., Armonk, NY). Descriptive statistics were expressed as means \pm standard deviations; 95% confidence intervals were calculated to show the direction and strength of the demonstrated effect. Data were tested for normality, and parametric assumptions were met. We created change scores and ran independent t-tests to assess the hypothesis whether there were significant differences between intervention and comparison group for changes in nutrition knowledge, enjoyment of fruit and vegetable consumption, self-efficacy, and behavior. Paired t-tests were performed to test whether

there were significant differences from baseline to post-intervention within both conditions regarding the same outcomes. For all tests, statistical significance was set at $p < 0.05$

Chapter 3 - Results

Participant Characteristics

Table 3.1 shows anthropometric data for both the intervention (INT) and comparison (COM) groups, and shows overall data on all study participants. There were no differences between the two groups in age (10.4 ± 1.0 years), weight (39 ± 9.6 kg) or height (145.3 ± 7.9 cm) at baseline.

Most of the study participants were 10-11 years old with the mean BMI percentile of 56.7 ± 27.7 , and mean BMI of 18.3 ± 2.9 for all participants. The difference in BMI percentile between two conditions is statistically significant ($p=0.003$).

Table 3.1 Baseline participant characteristics (anthropometrics)

	All Kids	INT Group		COM Group	
	Mean \pm SD	Mean \pm SD	range	Mean \pm SD	range
Age (years)	10.35 ± 1.0	10.2 ± 1.0	8-12	10.5 ± 0.9	9-12
Body mass (kg)	39 ± 9.6	36.6 ± 6.5	28-53	41.4 ± 11.5	23-78
Height (cm)	145.3 ± 7.9	144.8 ± 8.7	126-164	145.8 ± 7.3	133-160
BMI percentile	56.7 ± 27.7	69 ± 26.7	9-98	44.4 ± 23.2	1-84
BMI	18.3 ± 2.9	19.4 ± 3.3	14-29	17.1 ± 1.9	13-22

Demographics derived from parent surveys showed no significant differences between the intervention and comparison groups. All parents reported their kids' ethnicity as Caucasian

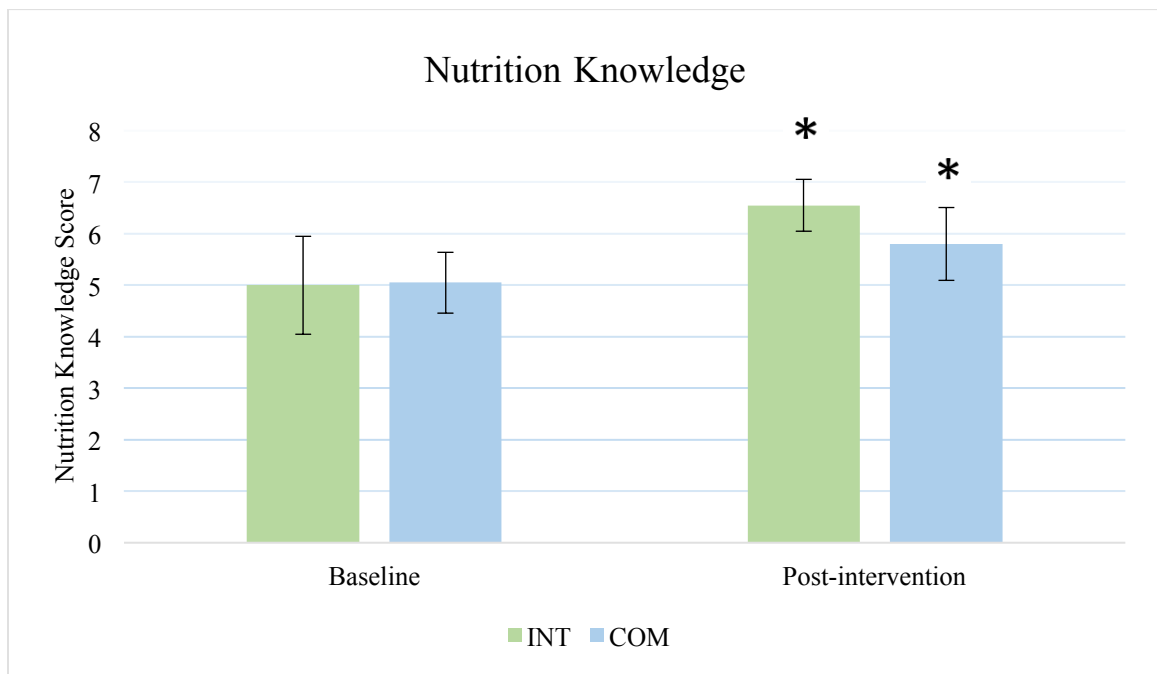
(White). There was no statistically significant difference between the intervention and comparison groups in self-reported education for either mothers or fathers.

Nutrition Knowledge

Both intervention group (baseline mean score = 5.0; 95% CI = 4.1-6.0; post-intervention mean score = 6.6; 95% CI = 6.1-7.1) and comparison group (baseline mean score = 5.1; 95% CI = 4.5-5.6; post-intervention mean score = 5.8; 95% CI = 5.1-6.5) increased nutrition knowledge significantly from baseline and post-intervention time points ($t = -5.044$; $df = 39$; $p < 0.001$).

There were no statistically significant differences in nutrition knowledge change scores between intervention and comparison groups ($t = 1.804$; $df = 39$; $p = 0.079$).

Figure 3.1 Mean scores for nutrition knowledge.



Higher scores indicate better knowledge in study participants

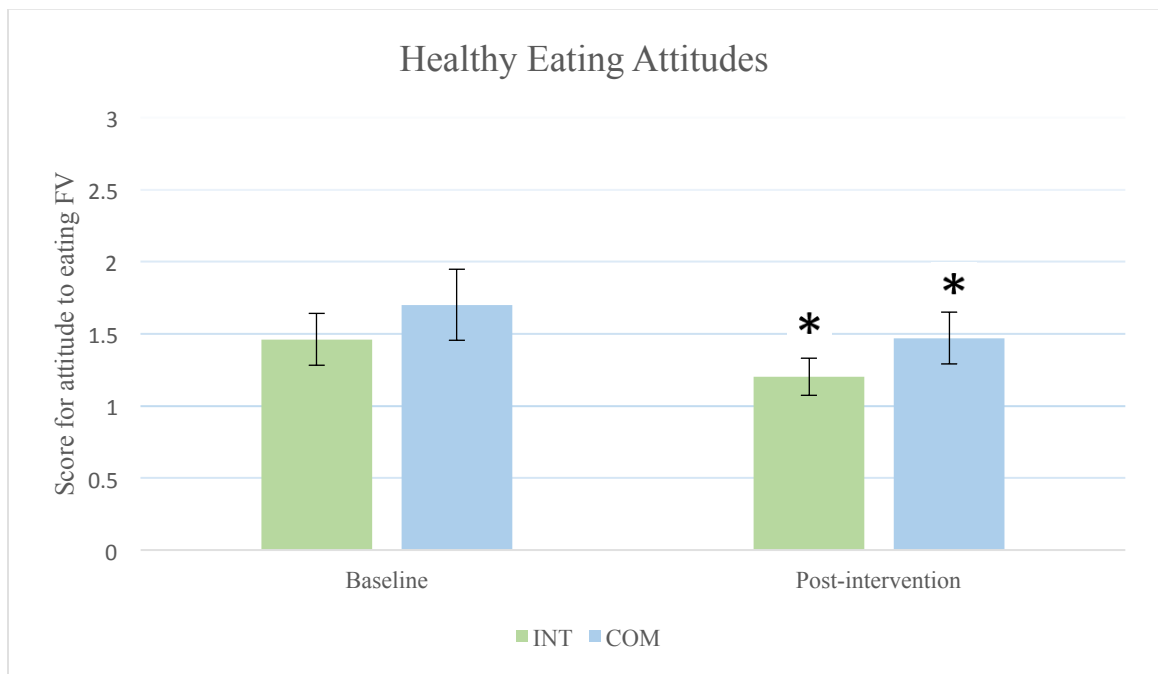
Error bars indicate 95% CI

***Statistically significant difference between baseline and post-intervention scores ($p < 0.05$)**

Healthy Eating Attitudes

There was a statistically significant difference with regard to healthy eating attitudes towards fruit and vegetable consumption in either intervention group (baseline mean score = 1.5; 95% CI = 1.3-1.6; post-intervention mean score = 1.2; 95% CI = 1.1-1.3) or comparison group (baseline mean score = 1.7; 95% CI = 1.5-2.0; post-intervention mean score = 1.5; 95% CI = 1.3-1.7) in time ($t = 3.458$; $df = 39$; $p = 0.001$); when compared between INT and COM groups – no difference ($t = -0.126$; $df = 39$; $p = 0.900$).

Figure 3.2 Mean scores for healthy eating attitudes.



Lower scores indicate positive attitudes to healthy eating (fruit, vegetable consumption) in study participants.

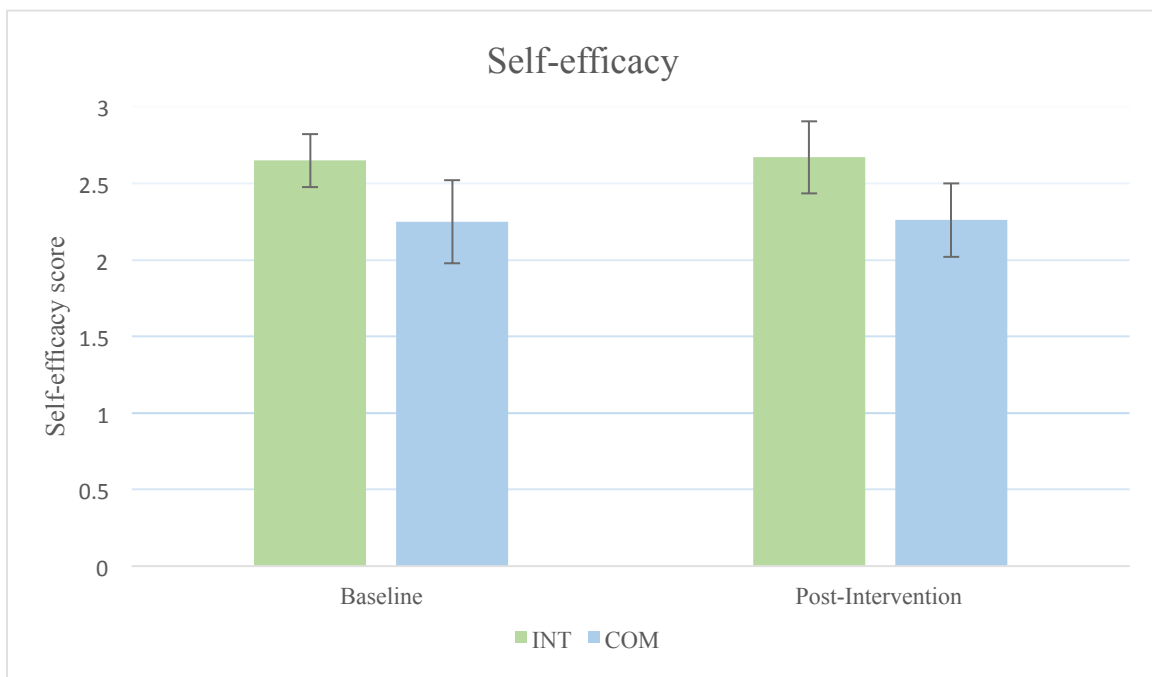
Error bars indicate 95% CI.

***Statistically significant difference between baseline and post-intervention scores ($p < 0.05$)**

Self-efficacy

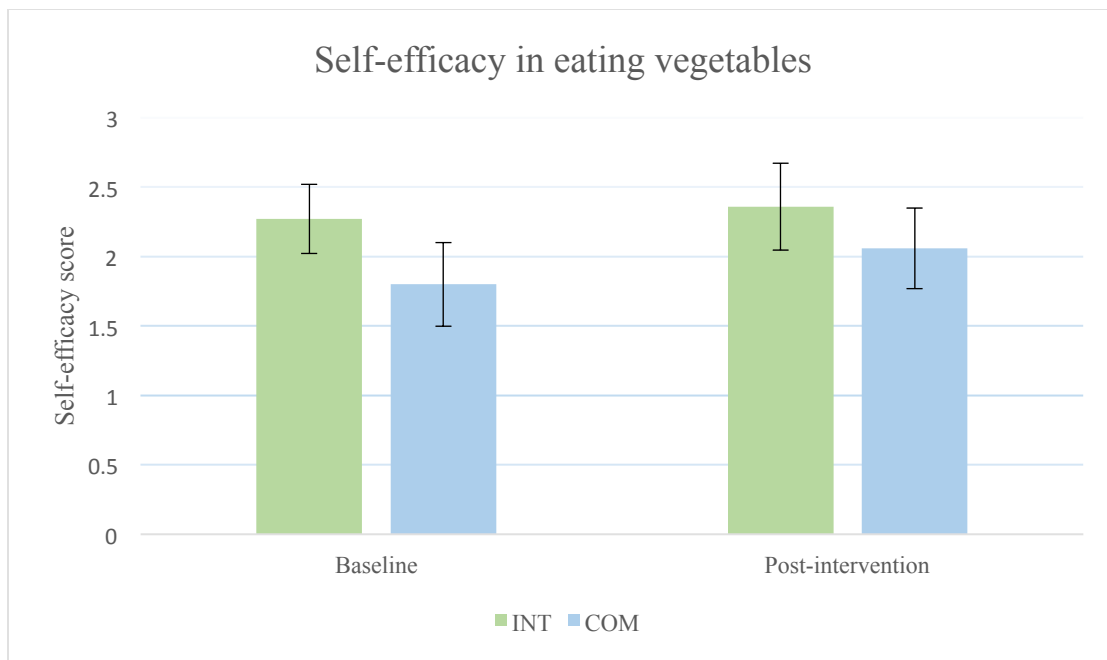
No statistically significant differences across time were found for children's self-efficacy in eating fruits ($t = -0.226$; $df = 39$; $p = 0.822$) or vegetables ($t = -1.597$; $df = 39$; $p = 0.118$). There were also no significant differences between intervention and comparison groups in self-efficacy toward eating fruit ($t = 0.045$; $df = 39$; $p = 0.965$) or vegetables ($t = -0.776$; $df = 39$; $p = 0.443$) found, whatsoever.

Figure 3.3 Mean scores for self-efficacy in eating fruit.



**Higher scores indicate higher self-efficacy in study participants.
Error bars indicate 95% CI.**

Figure 3.4 Mean scores for self-efficacy in eating vegetables.

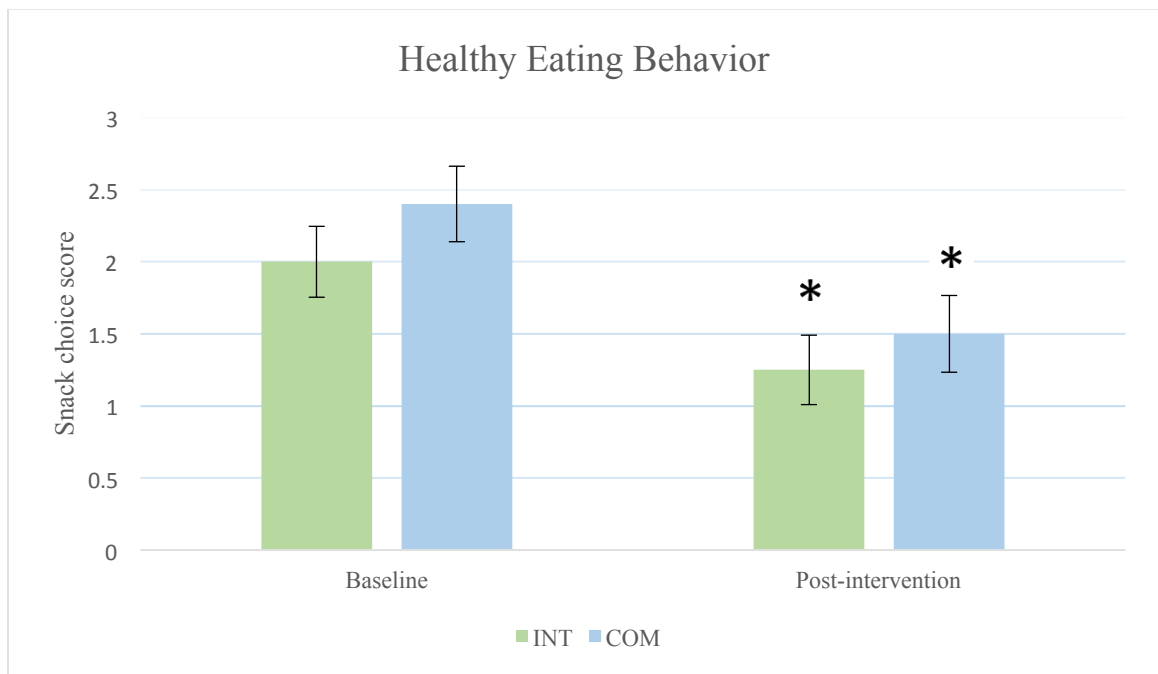


**Higher scores indicate higher self-efficacy in study participants.
Error bars indicate 95% CI.**

Healthy Eating Behavior

Both intervention group (baseline mean score = 2.0; 95% CI = 1.8-2.3; post-intervention mean score = 1.3; 95% CI = 1.0-1.5) and comparison group (baseline mean score = 2.4; 95% CI = 2.1-2.7; post-intervention mean score = 1.5; 95% CI = 1.2-1.8) showed statistically significant differences between time points (from baseline to post-intervention) in healthy eating behavior (snack selection from menus) ($t = 9.496$; $df=39$; $p<0.001$). There was no statistically significant difference with regards to intervention and comparison groups ($t = 0.860$; $df = 39$; $p = 0.395$).

Figure 3.5 Mean scores for healthy eating behavior.



Lower scores indicate healthier snack choices (fruit, vegetable or walnuts over cookies, crackers or cereal) in study participants.

Error bars indicate 95% CI.

***Statistically significant difference between baseline and post-intervention scores ($p<0.05$)**

Chapter 4 - Discussion

Major findings

The objective of the current research project was to determine whether or not a behaviorally oriented theory-based enhanced nutrition education program with a skill-training component would be more effective than classic nutrition education with regard to nutrition knowledge, healthy eating attitudes, self-efficacy, and behavior change in a group of Russian children. We hypothesized that nutrition education would be associated with improvements in knowledge, attitudes, efficacy, and behavior. Our results showed that was supported for nutrition knowledge, attitudes to eating fruit and vegetables, and behavior regardless of intervention condition. We thought the intervention group would show greater changes than the comparison group, but our results showed that was not supported.

Nutrition Knowledge

Findings of the present research contribute to the growing body of evidence suggesting that short interventions (10-15 hours over 3-15 week period) have positive effects on the classic knowledge-attitude-behavior model (Contento, Manning, & Shannon, 1992). Change in nutrition knowledge is desirable for health promotion programs, but is not the only factor needed for behavior change to occur (Reynolds, Hinton, Shewchuk, & Hickey, 1999). Both theory-based nutrition education programs (classic nutrition education for comparison group and nutrition education with a skill-training component for intervention group) appeared to be effective in terms of improving nutrition knowledge in kids in a camp setting from baseline to post-intervention; yet there was no difference found between the groups in terms of nutrition knowledge. Studies suggest, that multicomponent nutrition education programs have greater effects on nutrition knowledge in kids (Prelip, Kinsler, Le Thai, Erausquin, & Slusser, 2012),

therefore, we hypothesized that nutrition knowledge would differ between groups as well. The present research showed no significant differences between the groups, however, a different study design and program components were utilized.

Healthy Eating Attitudes

The program curriculum focused greatly on healthy eating attitudes, especially with regard to fruit and vegetable consumption. Low fruit and vegetables intake in both kids and adults can be attributed to a variety of factors of different nature (psychosocial and/or environmental) (Reinaerts, de Nooijer, Candel, & de Vries, 2007). Some studies show that positive attitudes to eating fruits and vegetables are likely to result in increased consumption of the foods (Baxter, & Thompson, 2002), while other studies suggest that nutrition educators will succeed in promoting consumption of healthier foods only if increased positive attitude is supported by positive taste experience with the same food item (Aikman, Min, & Graham, 2006). In the present study statistically significant difference with regard to healthy eating attitudes towards fruit and vegetable consumption were found in both groups from baseline to post-intervention, however, there were no differences between the groups. Therefore, the current study supports the idea discussed in the study by Baxter and Thompson (2002).

Self-efficacy

A number of studies targeting behavior change show significant improvements in self-efficacy, yet they do not always show positive behavior change. Within a theoretical framework, it is believed that expectations of personal efficacy are positively associated with behavior change, in other words, perceived self-efficacy initiates behavior change in subjects (Bandura, 1977). We hypothesized positive changes in self-efficacy in the study participants in time and between the groups. There was a change in participants' behavior (positively related to healthy

eating practices) over time, yet there was no significant difference in subjects' self-efficacy in eating fruit and vegetables neither in time nor between the two groups/conditions. The discrepancy between behavior and self-efficacy in our study may be related to the self-efficacy instrument's sensitivity to change. Alternatively, our sample size may have been prohibitive to detecting change in self-efficacy over times.

Healthy Eating Behavior

Food and dietary behaviors are complex, and according to Contento, Manning, and Shannon (1992), the effect of classic nutrition education on behavior change is minimal, while nutrition education interventions designed to target behavior change have better outcomes, though research results are inconsistent. Nutrition education is still a developing field of knowledge, with regard to the complexity of human behaviors and surrounding environments, there is no “gold standard” in terms of theoretical framework (Achterberg, & Miller, 2004). There is yet no single dominant theory that might be suitable for all kinds of interventions. Social Cognitive Theory construct is systematically used in a range of studies, suggests that healthy eating behavior is influenced by both social and interpersonal interactions and is widely used for interventions that focus healthy eating practices, for example, on fruit and vegetable consumption (Lytle, 2005). For the current research project we utilized HOP’N program modules that were designed to target behavior change,

In the present study introduction of the “convenient, attractive, normative” approach (Hanks, Just, & Wansink, 2013) to the menus for kids may have made their choices/behavior change easier. In the research article, Hanks and Wansink discuss the makeover that they introduced to lunchrooms implementing the approach. Basically, the main idea was to make healthful choices available and convenient and easy for kids, and targeting the increase in fruit

and vegetable consumption. With regard to both the Social Cognitive Theory construct, and “convenient, normative, attractive” approach the researchers saw significant difference from baseline to post-intervention in both groups in terms of behavior change.

Humans are born with a preference for sweet and salty foods (Desor, Maller, & Andrews, 1975), and they are likely to refuse eating foods with other tastes or to eat novel foods (the concept of “neophobia”) (Birch, 1999). At the same time, there is evidence, that exposure to even simple culinary skills, acquiring taste for fruits and vegetables, viewing, tasting new and familiar foods helps to shape behavioral capacity to choose and consume healthy foods (Kratt, Reynolds, & Shewchuk, 2000; Cullen, Watson, Zakeri, Baranowski, & Baranowski, 2007). Based on previous research evidence, part of our hypothesis was that there would be a significant difference in healthy eating behaviors not only in time, but between the two groups as well (to test the skill-training component was added to curriculum of the intervention group); yet there was no difference observed between intervention and comparison group, and that might be due to some limitations of the present study.

Experimental Considerations

Strengths of the Current Study

The present study contributes to the literature in several ways. To our knowledge, this intervention is the first one comparing enhanced nutrition education including a skill-training component with a classic nutrition education program in a Russian summer camp context. We introduced an intensive nutrition education program to youth at the summer camp. Children in the intervention group were involved in 15 hours of instruction in a 3 week period, while boys and girls in the comparison group were involved in more than 11 hours of classic nutrition

education over the same period of time. In one of the studies Contento, Manning, and Shannon (1992) show that short interventions (10-15 hours over 3-15 week period) result in positive effects on nutrition knowledge, skills related to healthy eating practices, healthy eating behavior. With regard to positive behavior change in our study participants – behavior was supported by receiving the chosen snacks within a day period. One of the other strengths of the study was a 100% participation rate for all 3 weeks, as better compliance is important to achieve positive results in population based studies (Duppe, Gärdsell, Hanson, Johnell, & Nilsson, 1996). Finally the present study utilized well-structured, previously published educational materials that were shown to be effective previously (Dzewaltowski et al., 2010).

Limitations of the Current Study

There are several limitations to the present study that must be acknowledged. First, the study was based on a convenience sample where one team of twenty boys and one team of twenty girls was assigned by the camp representative to participate in the study prior to their arrival. Further, there was no true random allocation of study participants into the intervention or comparison group. Instead, camp counselors divided their teams in halves and accompanied groups of children to daily sessions at a certain time. Therefore, inequalities at baseline in participant characteristics that we saw between intervention and comparison groups might have been due to selection bias. We used quasi-experimental design with no true control group, that allowed us to make inferences on the relative effectiveness of the intervention by looking at the difference in the pre-test and post-test results, however, interpreting the differences should be done with caution since we cannot be sure that the differences from baseline to post-intervention are causally related to the intervention itself (Harris et al., 2006). Second, data were collected by self-report, and may be subject to recall bias; when completing surveys, children might have

chosen more desirable options to them and the instructor, especially post-intervention. Another measurement concern was lower Cronbach's alpha (at acceptable, but not good level) for attitudes towards eating fruit and vegetable consumption part of the questionnaire may reflect the lack of use of a validated instrument. Fourth, the sample size of twenty participants for each condition might have limited the ability to detect small effects. There also was a potential for contamination effects due to the ability of the study participants from different conditions to interact with each other outside of the camp classroom. Finally, the study was conducted at the camp for children and adolescents from one part of the north-western region of Russia, and the results might not be generalizable to other regions of the country.

Future directions

The present study highlighted the importance of implementing nutrition education programs targeting youth that include knowledge and behavior change components; development of nutrition education interventions for children is becoming more important with the rising prevalence in chronic diseases that have nutritional roots (Lenfant, 1995). Future studies should consider utilizing a fully powered randomized controlled trial design to achieve better quality of the data. Although a quasi-experimental design is also feasible, randomization is essential to ensure equality between study conditions at study beginning. Additionally, further research should incorporate not only larger sample size potentially including at-risk populations, but longer duration programs – as an ongoing nutrition education intervention exposure amount of at least 50 hours is considered to be necessary to see positive and lasting results in behavioral outcome measures (Briggs, 2010). Human behaviors are complex and are highly influenced by the environment (Story, Neumark-Sztainer, & French, 2002), therefore, future research should also focus on nutrition education interventions accompanied by environmental changes (e.g.,

implementing “convenient, attractive, normative approach” (Hanks, Just, & Wansink, 2013)) that can alter dietary changes in Russian children.

Conclusion

The present study contributes to the existing body of nutrition education research. There is a clear need to improve dietary behaviors in children all over the globe, however, most of the published research is done either in North America or in Europe. The present study shows the positive impact of theory-based nutrition education program with or without a skill-training component on youth’s nutrition knowledge, healthy eating behavior and attitudes. Further research and implementation of nutrition education programs in Russian school-aged children is warranted.

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Appendix A - Child Surveys and Menu

Figure A.1 Child survey (baseline, post-intervention).

ФИО _____

Возраст _____

ИН # _____

Употребление в пищу овощей и фруктов. Удовольствие.

	Полностью согласен	Почти согласен	Не уверен	Немного не согласен	Полностью не согласен
a. То, что я ем фрукты и овощи позволяет меня чувствовать себя здоровым	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Мне нравится вкус многих овощей	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. У меня дома мы кушаем овощи на ужин почти каждый день	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Мне нравится пробовать новые овощи	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Мне кажется, овощи легко приготовить, например, сделать салат	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. То, что я кушаю фрукты, позволяет мне чувствовать себя здоровым	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Мне нравится вкус многих фруктов	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Фрукт – готовый к употреблению перекус	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Мне нравится пробовать новые фрукты	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Я могу в любое время скушать фрукт дома	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Я люблю пить воду	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Я прошу своих родителей купить мне еду или напитки, которые рекламируют по телевизору	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Мои родители поощряют (рады), когда я кушаю фрукты и овощи	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. Большинство моих учителей поощряют учеников, если они кушают фрукты и овощи	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Когда я кушаю фрукты и овощи, ...

	Полностью согласен	Почти согласен	Не уверен	Немного не согласен	Полностью не согласен
a. мне скучно	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. мне не нравится	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. это вообще невесело	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. меня это раздражает	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. это совсем не интересно	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. я бы лучше поел(а) что-нибудь еще	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Знания о правильном питании.

Как ты считаешь, что диетологи советуют кушать?

	Больше	В равном количестве	Меньше	Не знаю
a. Овощи	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Фрукты	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Мясо	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Сладости	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Еда с высоким содержанием крахмала	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Жирная пища	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Еда с высоким содержанием клетчатки	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

h. Соленая еда

Как ты думаешь, сколько порций фруктов нужно кушать в день (в чашках)? _____

Как ты думаешь, сколько порций овощей нужно кушать в день (в чашках)? _____

Пищевые привычки.

1. Вспомни прошлую неделю (любой день). Опиши, что ты кушал в какой прием пищи?

Обозначь столько квадратиков, сколько нужно

Еда, которую ты кушал(а) в любой из дней: Завтрак Обед Перекус Ужин

a. Ничего	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Чипсы	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Шоколад/конфетки	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Леденцы	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Фруктово-ореховый батончик	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. Йогурт	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Крекеры	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Печенье/Торт/Кекс/Панчик	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Мороженое	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Овощи или салат	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Фрукты (свежие или консервированные)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Сухофрукты (например, изюм)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Картофель фри	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
n. Пирог	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
o. Хот дог	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
p. Пицца	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
q. Бутерброд	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
r. Хлеб	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

s. Макароны/вермишель/рис	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
t. Суп	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
u. Каша	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
v. Курица	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
w. Свинина/Говядина	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
x. Морепродукты	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
y. Сыр	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
z. Молоко/Кефир	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Другое _____

Уверенность в себе.

Насколько ты уверен, что ты можешь покушать...

	Совсем не уверен	Возможно могу	Точно могу
Одну порцию (1/2 чашки) фруктов каждый день	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Две порции (1 чашку) фруктов каждый день	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Три порции (1,5 чашки) фруктов каждый день	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Одну порцию (1/2 чашки) овощей каждый день	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Две порции (1 чашку) овощей каждый день	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Три порции (1,5 чашки) овощей каждый день	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Отлично! Опрос закончен!

Спасибо!

Figure A.2 Menu for snack selection (baseline, post-intervention).

Menu

Amber Kingdom, 3 shift, 2014 год.

Please select any 2



Carrot sticks
"DIAMOND
EYE"



Cookies



Crackers



Grapes "MIGHTY BOGATYR"



Walnuts
"SUPER BRAIN"



Cereal

Chapter 5 - Field Experience Report

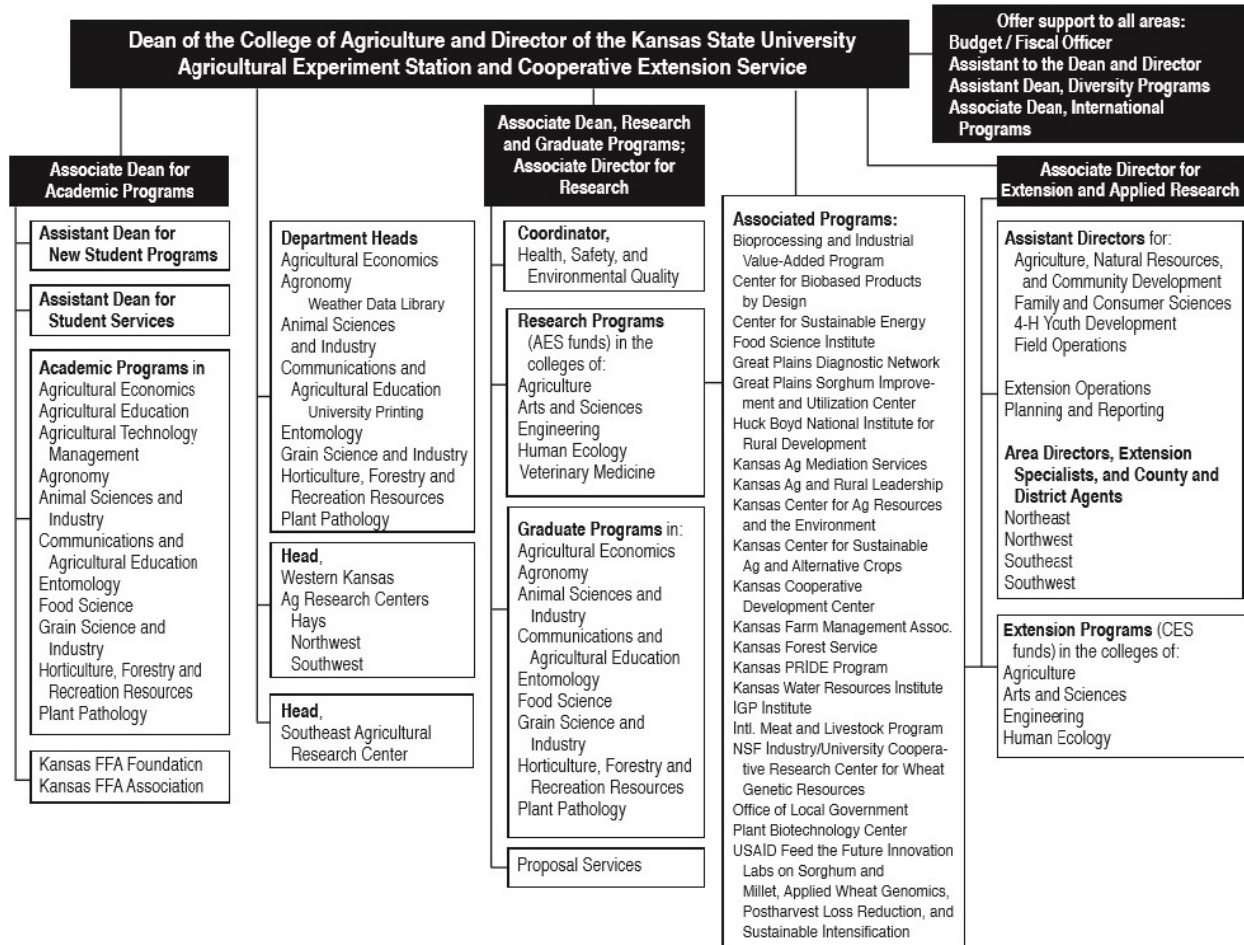
Introduction

Kansas State University was founded as a land-grant institution, and still holds to its mission to bring research to the community, and to disseminate and apply knowledge. For my field experience part of the MPH Nutrition program, I completed one hundred and eighty hours working with the Riley County Research and Extension office at 110 Courthouse Plaza, that is supported by Kansas State University. Required hours were completed between January 15, 2015 and March 12, 2015. In order to help the community to become a better place to live and work, the K-State Research and Extension office (Kansas Agricultural Experiment Station and Cooperative Extension Service) states that its goal is to assist the population technically and to provide evidence-based programs to the community. To fulfil this mission and provide resources and materials on agriculture, economics, family science and youth development as well as leadership and business to the community, the office partners with College of Agriculture, College of Arts and Sciences, College of Engineering, College of Human Ecology, and College of Veterinary Medicine. The structure of K-State Research and Extension office is shown in Figure 5-1.

The Cooperative Extension was founded in 1914, and programs for the county were funded through government sources and land-grant university support (Kansas State University for Riley County). The Riley County Research and Extension office is run by the county extension director who works with extension agents, receptionist and assistants; extension agents work mostly in fields of family and consumer sciences, 4-H program, horticulture and agriculture (Riley County, 2014). Riley County Extension is an active participant of the Flint

Hills Wellness Coalition, and is currently focusing on increasing access to healthier foods (vending, concessions) and creating a tobacco-free community (Riley County, 2014).

Figure 5.1 Organizational chart for Kansas State Research and Extension.



Virginia (Ginny) Barnard was my supervisor for the field experience program. Ginny got her graduate degree in Public Health from Kansas State University and currently works as the Family and Consumer Sciences Agent for Riley County. Ginny is involved with numerous projects/programs for the Research and Extension Office regarding nutrition, food safety, healthy lifestyles and overall well-being. From January to March, 2015 I was involved in several projects that Ginny was in charge of, that fit my interests, skills and education.

As a part of my field experience I had two big projects and several minor projects that required my participation. One of the programs I was involved in was nutrition education for school-aged children playing basketball through Parks and Rec program. Another important part of the field experience was the DIET FREE program (nutrition education and wellness for adults). I was also attending yoga sessions for elementary school kids with Ginny, and participating and leading one of the lunch series lectures at the City Hall in Manhattan, KS.

Nutrition Education for Child Basketball Teams

One of my responsibilities was to lead nutrition education sessions for school-aged children participating in basketball program for Parks and Rec Services in Manhattan, KS. Healthy nutrition is essential for optimal athletic performance, and promotes physiological and biochemical adaptations in the body (Maughan, 2002). Exercise increases nutrient requirements, therefore, overall health, recovery time and athletic performance are affected by athlete's dietary intake (Rodriguez, DiMarco, & Langley, 2009). With regard to providing nutrition information for athletes. Coaches play an important role in disseminating nutrition information, however, they are not always knowledgeable about the subject (Griffin & Harris, 1996). Studies show, that both coaches (Smith-Rockwell, Nickols-Richardson, & Thye, 2001) and athletes (Pratt & Walberg, 1988) are in need of nutrition education for better athletic performance. Another important nutrition-related topic for athletes is hydration, as children are not as efficient in terms of thermoregulation as adults especially when they exercise (Allen, & Overbaugh, 1994). Sweat production in exercise may cause not only loss of fluid, but often the loss of electrolytes (Na, Fe, Ca) (Maughan, 2002). Even a minor decrease in body weight from sweat can affect athlete's performance, and put athlete at risk of heat illness (Casa, Clarkson, & Roberts, 2005). Fluid intake prior, during, and post-exercise helps prevent dehydration, hyperthermia, tachycardia,

cardiac strain (Sawka, Montain, & Latzka, 2001). Depending on intensity and exercise duration, athletes need to meet requirements for macronutrient intakes; it is extremely important to maintain adequate carbohydrate, protein, and fat intake (Rodriguez, DiMarco, & Langley, 2009).

DIET FREE Program for Adults

As a part of my field experience, Ginny assigned me to help her with coaching the DIET FREE class. DIET FREE is a lifestyle program developed by Zonya Foco, RD, CHFI, CSP. The program is 10 weeks long; focusing on 8 habits promoting healthy eating and physical activity.

Obesity and chronic diseases are the major health concerns in the U.S. (Wang, & Beydoun, 2007). Most weight-loss programs are experimental and lack scientific validation (Lustig, 1991). In the systematic review by Tsai and Wadden (2005), the overall findings were that effectiveness of the majority of commercial weight-loss programs was suboptimal. A wellness approach to weight loss was discussed in the publication by Bowles, Picano, Epperly, and Myer (2006). The researchers showed statistically significant improvement in terms of weight loss, BMI reduction, and healthy lifestyle change. The core areas of DIET FREE program are similar to those of other wellness programs, and those are adopting healthy eating behaviors, committing to stay physically active and living a healthy lifestyle, and the author emphasizes the importance of health benefits that come along with the healthy weight loss.

Most of the habits in the DIET FREE program are based on Dietary Guidelines for Americans 2010 (Ahmed, & Blumberg, 2009), and focus on fruit and vegetables, whole grains consumption, water over sugar-sweetened beverages, etc. In weekly videos, the author of the program links healthy eating with reduced risk for chronic diseases. Foco also points out the importance of daily physical activity, and provides videos with workouts for program participants. With regard to lifestyle changes participants are given advice and tips (e.g., to park

the car further away from the mall, and walk to the mall; presentation on reading nutrition labels for different kinds of foods and choosing healthier options; tracking television/sedentary time versus active time on daily bases and reducing the sedentary part of it along with increasing active time, etc.) in program videos, through extra class materials and program supplementary materials. In the outline for each class the last 15-20 minutes are reserved for interactive extra class activities. Foco provides examples for those activities that coaches may use, but we developed several extra class activities according to the topic of the class, including tasting sessions, small presentations with regard to the session topic (for example, on healthier options for snacks, dips; or reading nutrition labels to make healthy choices), and workout options.

Focus and Scope of Work

During our first meeting in December, 2014 Ginny asked me about my interests in Public Health, and gave several potentially interesting programs to choose from for my field experience. I chose to do nutrition education targeting different populations: adolescent boys and girls involved with Parks and Rec basketball program, and adults from Manhattan community.

We started the program with youth basketball teams in late January, 2015; teams had different starting dates because of practice schedules. Each team was to participate in nutrition education sessions regarding basic nutrition knowledge on macronutrients, pre-exercise and post-exercise snacks and meals, and hydration. Each session was held prior to or after practice, and the average length of the session was 15-20 minutes. Children were asked to fill in surveys at the beginning of the first and at the end of the last session; coaches were asked to fill in a questionnaire once during the first session. We brought healthy snacks for several sessions.

The DIET FREE program started on January 8, 2015. Participants filled in surveys at the beginning of the first class and at the end of the last class on March 12, 2015. From January to

March we held 10 sessions following the DIET FREE program guide by Zonya Foco, RD. Sessions were dedicated to a certain habit that participants were to develop. We followed the outline for each session according to the study guide, but we also developed handouts and interactive presentations for the last 15-20 minutes of each class. Program participants were to track their habits, read the book by Zonya Foco, and complete weekly homework.

An additional part of my field experience was to attend three lunch lecture series events at City Hall in Manhattan, KS, and to read one of the lectures (“Stress Management”) on February 6, 2015. I also accompanied Ginny to yoga sessions with T. Roosevelt Elementary School students for several weeks.

I think every component of my field experience fit my interests, education, and skills. It was beneficial for me to learn about the scope of Ginny’s work, the scope of work and structure of the Research and Extension office, and to acquire knowledge and get new skills via participating in all kinds of community programs.

Learning Objectives

Ginny helped me develop my learning objectives so that they were related to my interests in the field of Public Health Nutrition. The first objective was to gain a deeper understanding of the motivations/barriers for adults wanting to make healthy behavior changes. When teaching DIET FREE classes, we spent a lot of time on participants’ questions and feedback weekly. I’ve learned from Ginny to ask questions regarding both motivations and barriers of the program participants, and then not only to listen, but to provide them feedback and tips, based on the knowledge that I gained as an MPH Nutrition student. I think it was my favorite part of our weekly classes to learn how the participants worked on their homework, what difficulties they

faced, and what, on the other hand, they found easy to do. It was a great experience to learn about real-life challenges that highly motivated people face when trying to make a change.

The second learning objective was to learn what established social norms, traditions, and environmental factors influence an individual's ability to increase physical activity and improve access to healthy foods. This objective was very interesting to learn about and accomplish as well. When working with the DIET FREE program, we watched 20-30 minute videos by Zonya Foco in class, and she addressed a lot of environmental and social factors that contribute to one's ability to perform a change. Program participants discussed some of those factors after videos (e.g., one of the participants was leaving for a conference to Wichita, and was concerned about her ability to access healthy foods throughout the day at the conference), and tried to find solutions to overcome those factors/barriers.

The third objective was to be able to describe what internal/external rewards adults may need to successfully change health behaviors. Working with the DIET FREE program participants I discovered how motivation to make a healthy choice is influenced by both internal and external rewards. Internal rewards are one's feelings about performing a certain behavior, for example, one of the study participants shared how she enjoyed herself after doing a simple workout. External rewards usually come from another person: one of the videos discussed the importance of family support (we had several study participants from the same family); another example would be support from other program participants.

The fourth objective was to understand how community partners/organizations work together to impact access to healthy foods and support physical activity. I accomplished this objective when attending Flint Hills Wellness Coalition Meetings. Health professionals from different organizations (Mercy Regional, Fort Riley base, public schools, Research and

Extension office, etc.) meet monthly to discuss what is being done and needs to be done to impact access to healthy foods, support physical activity, make healthy choices easy for the community. In the meeting we were discussing introducing more healthy options to vending machines and concession stands. Meeting participants discuss opportunities, share thoughts and their experiences.

The last objective was to consider the scope of work of K-State Research and Extension. I have learned that extension agents work mostly in fields of family and consumer sciences, 4-H program, horticulture and agriculture; and in community programs. A lot of work is done to promote healthy eating habits, to change the environment to make healthy choices easy, to promote physical activity (for example, annual Walk Kansas program), and expand tobacco-free zones, etc.

Activities performed

Nutrition Education for Child Basketball Teams

Nutrition education for child basketball teams was a new project. We (Natalie Updyke and I) started with obtaining a list of coaches (with emails) working for Parks and Rec services. The flyer was developed and sent out to all the coaches according to the list. The flyer contained information about an opportunity to participate in a series of short nutrition education sessions focusing on healthy nutrition for better athletic performance. It was my first experience in developing promotion flyer for a program. Within a week we started getting emails from coaches and scheduling sessions.

For each session we developed flyers that kids could take home that contained all the information we presented; we used those flyers as outlines for sessions. We used “Eat to Compete” materials from Iowa State Outreach department (Litchfield, Westberg, & Metcalf,

2012). The first flyer contained general information on macronutrients and importance of pre-exercise or pre-game meals and snacks on one side; with healthy snack and meal ideas on the other side of the flyer. The flyer for the second session had information about the importance of post-exercise snacks and meals, and basic information about glycogen (its importance for athletes) on the front page; post-exercise and post-game ideas for healthy meals and snacks were presented on the back side of the flyer. Our third flyer for kids focused on importance of proper hydration. The third flyer had only one page, and it focused on basic information about water, benefits of hydration and effects of dehydration, athlete guidelines for proper hydration for better athletic performance, recommended serving sizes of low-fat chocolate milk, 100% fruit juice, and Gatorade, and a quick review on sweat rate estimation.

At the beginning of the first session children filled out a survey on their dietary habits, nutrition knowledge and importance of healthy nutrition for better athletic performance. At the end of the last session we asked our program participants to fill out the same survey. Coaches were to fill out a questionnaire once (on the first day of program). We obtained data on demographics, coaching experience, and nutrition knowledge.

As I have already mentioned, each flyer was used as an outline for nutrition education sessions. It was not my first experience of teaching children basic nutrition information, so I had a chance to improve my skills. At the beginning of each session we would ask children several questions with regard to the topic of the session, and then guide them through flyers emphasizing the most important information. At the end of each session we would either play a game that would require children to use obtained knowledge or give them time to eat or drink a snack we would bring.

After we were done with the program, I was able to review and analyze the data. We had a 50% dropout rate (six teams started participating in the program, three teams completed all the sessions). We do not know the reason of the dropout, thus, coaches were emailed to schedule next sessions, but we did not get emails back from two teams' coaches; one of the teams that dropped out had their practices with the team that completed the program, but the coach would not leave 15 minutes out of practice time for sessions. For the three teams that completed the program, we had one team of seven boys with the age (mean \pm SD) of 11.6 ± 0.8 years; a team of six girls with the age (mean \pm SD) of 10.8 ± 1.0 years; another team of six girls with the age (mean \pm SD) of 10.5 ± 0.9 years. We ran paired-sample t-test to assess the difference in nutrition knowledge across time (statistical significance was set at $p < 0.05$), and we saw significant improvement from baseline to post-intervention ($t = -4.652, df = 18; p < 0.001$).

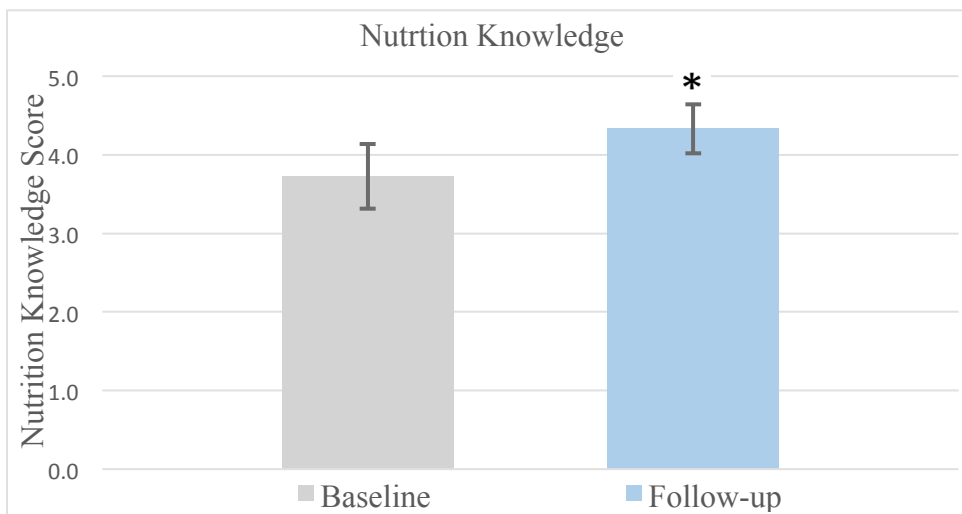


Figure 5.2 Mean scores for nutrition knowledge (Child Basketball Teams)

Higher scores indicate better knowledge in participants. Error bars indicate 95% CI

*Statistically significant difference between baseline and follow-up knowledge scores ($p < 0.05$)

DIET FREE Program for Adults

Major responsibilities for the DIET FREE class were to help Ginny teach classes following the program guide, to answer participants' questions, provide them feedback, and to

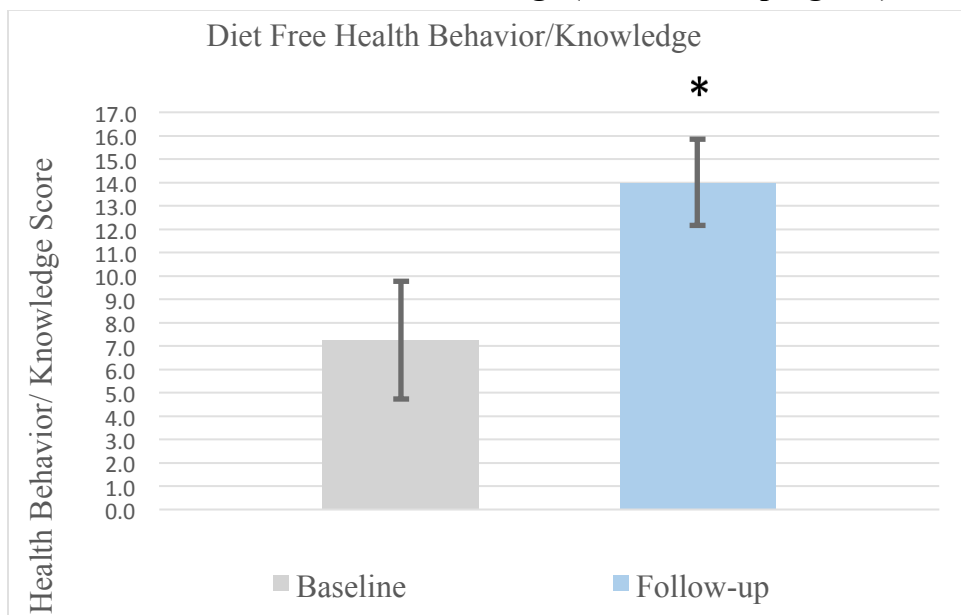
organize and lead interactive extra class activities for the last fifteen to twenty minutes of the class.

The program started in early January with an Introduction seminar. Twenty study participants filled out self-assessment forms (self-assessment snapshot, current knowledge and habits survey) provided by the program, watched the introductory video, obtained their DIET FREE kits (DIET FREE lifestyle guide and habit tracker; DIET FREE novel, Water with Lemon; Everyday Fitness: movement training program DVD; CD set of DIET FREE audio seminars; “LIVE DIET FREE” reminder band, and online video streaming of 10 DIET FREE seminars). We were to meet weekly on Thursdays, and learn about eight habits (one habit a week) that would potentially improve health and result in weight loss in study participants. We saw that participant started to skip classes and even drop out the second week. Throughout the program 8-14 people out of twenty would attend classes. After the first introductory class, we held eight weekly classes on eight habits according to the program guide (drink water; include breakfast and commit to be fit; eat often and include a fruit or vegetable each time; tame your sweet tooth; find the fat (learn about different kinds of dietary fat; replace processed foods with wholesome; eat until no longer hungry; exercise every day). Each class had similar outline: first, we would ask about the previous week and adoption of the new habit, what was difficult and what was easy about it, provide program participants with feedback, and answer their questions; second, we would watch the program video around 20-30 minutes long; third, we would discuss homework; and the last part of the class – was set aside for interactive extra class activities. We developed extra class activities according to the topic of the class: we made presentations on healthier options for dips, cereal and snacks; did several food tasting activities (smoothie preparation; we baked bread and cookies from the program cookbook and brought those to classes), we learnt

about two types of hunger (physical and emotional) and ways to distinguish and control those, and did extra exercise programs. The final class focused on putting everything together, answering questions, providing final feedback for the participants, and the same personal assessment forms were filled out by the study participants. We obtained both baseline and after-program data from eight out of twenty participants.

We did not assess anthropometrics or demographics of the study participants. We had a wide range of ages in the program participants. To perform statistical analysis on the data, we ran paired-sample t-test to assess the difference in nutrition knowledge across time (statistical significance was set at $p < 0.05$), and we saw statistically significant results with regard to nutrition knowledge from baseline to post-intervention: from self-assessment snapshot, $p = 0.005$ ($t = -4.027$, $df = 7$); from baseline/follow-up current knowledge and habits survey $p < 0.001$ ($t = -6.661$, $df = 7$).

Figure 5.3 Mean scores for nutrition knowledge (DIET FREE program)



Higher scores indicate better behavior/knowledge in participants. Error bars indicate 95% CI
*Statistically significant difference between baseline and follow-up health behavior/knowledge scores ($p < 0.05$)


Products Developed

Nutrition Education for Child Basketball Teams

We started working on the flyer for coaches prior to the actual start of the field experience. Personally, I had no previous experience in making flyers for any purposes (to recruit participants for the program, or flyer-handouts for kids), but it was interesting and entertaining to learn. I have learned about effective marketing ideas for promotion flyers, about components of flyers, layout and design considerations. I discovered that flyers are a useful communication tool, making it is easy to spread information quickly and inexpensively.

When working on flyer-handouts we used previously published materials from the “Eat to Compete” program introduced by the Extension and Outreach office of Iowa State University (Litchfield, Westberg, & Metcalf, 2012), and lecture materials (Rosenkranz, 2014). The information provided by “Eat to Compete” is for use by “recreational athletes, competitive athletes, coaches or any person interested in improving overall health through nutrition and exercise” (Iowa State Research and Outreach, 2015). All the flyers developed are presented in figures 5-4 to 5-9.

Figure 5.4 Nutrition Education for Basketball Teams. Coach Flyer



10-15 minute session at practice

Discussion Topics:

- Importance of Proper Hydration
- Fueling for Practice and Competition
- Significance of Protein and Carbohydrate Consumption for Athletic Performance and Recovery

Activities:



- Prepare Healthy Snacks for Athletes
- Play Games and Activities

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SPORTS NUTRITION FOR OPTIMAL ATHLETIC PERFORMANCE

If you and your team are willing to participate contact either Natalie or Natasha to get more information and set a practice for a session

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Figure 5.5 Nutrition Education for Basketball Teams Flyer for Session 1 (front page)



Fueling for Success

Do	Don't
Day Before: Do consume: <ul style="list-style-type: none"> • plenty of complex carbs (whole grains, veggies, and fruits) • moderate source of low-fat protein 	Day Before: Don't consume: <ul style="list-style-type: none"> • foods with little nutritional value (fast food, highly processed foods, sodas, etc.)
3 to 4 hours before: Do consume meal/snack: <ul style="list-style-type: none"> • high in complex carbs • moderate in protein • low in fat 	3 to 4 hours before: Don't consume meal/snack: <ul style="list-style-type: none"> • high in fat • simple carbohydrates • with new foods
Immediately before: Do consume low calorie snack with high-carbohydrate and low -protein	Immediately before: Don't consume: <ul style="list-style-type: none"> • high fiber foods • high fat foods

Carbohydrates
Your body stores carbohydrates as glycogen, which is quickly available to use as fuel. Carbohydrate consumption during high-intensity competition can prevent muscle glycogen depletion and can improve performance.

Protein
Your protein needs can easily be met if you are eating enough food from a balanced diet, and you avoid empty calories (foods that are high in added sugars and/or solid fats with little nutritional value).

Fat
You need fat in your diet, so do not try to eliminate it completely. Instead, incorporate omega-3 fat containing foods like fatty fish (tuna, salmon), walnuts, and flaxseeds into your diet. This type of fat is heart healthy and prevents inflammation. Olive and canola oil, or foods containing them, are also monounsaturated fat that is heart healthy.

Figure 5.6 Nutrition Education for Basketball Teams Flyer for Session 1 (back page)

- | | |
|---|--|
| <p>≥ 3-4 hours pregame meal ideas:</p> <ul style="list-style-type: none"> • Low-fat sandwiches with whole grain bread/rolls • Beans (black, pinto, kidney, garbanzo) • Lean meat (turkey, chicken, pork) or fish • Baked potatoes with veggies and cheese • Pasta (preferably whole grain) • Rice (preferably whole grain) • Hummus or peanut butter with whole grain bread • Fruits, vegetables, salads | <p>Pregame/practice snack ideas:</p> <ul style="list-style-type: none"> • Sports drinks • Fruit • Cereal • Granola or bar • Half of wheat bagel with jam • Cereal/fruit bar • Yogurt • Hummus with pita • Crackers • Pretzels |
|---|--|



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Figure 5.7 Nutrition Education for Basketball Teams Flyer for Session 2 (front page)



Do

Within 15 minutes: Do consume:

- liquid carbohydrate
- juice, milk, and sports drink as needed

Within 2 hours: Do consume meal/snack:

- high in carbohydrate, preferably complex carbs
- moderate in protein
- low in fat
- pasta with lean meat, chocolate milk

Glycogen

- an energy storage molecule in your muscles
- composed of glucose molecules
- is an easily available source of energy for your muscles during exercise
- within an hour after exercise your body is most efficient in producing glycogen

Benefits of Post-Exercise Meal

- improved recovery
- reduced soreness
- improved immune function
- improved bone strength and density
- improved body fat utilization

Why

- carbohydrate will help to restore glycogen in muscles
- reduce fatigue/ low energy level
- protein will help your muscles recover and grow stronger
- combination of protein and carbs helps to optimize glycogen replacement




Figure 5.8 Nutrition Education for Basketball Teams Flyer for Session 2 (back page)

- | | |
|---|---|
| <p>≥ 3-4 hours post-practice meal ideas:</p> <ul style="list-style-type: none"> • Low-fat sandwiches with whole grain bread/rolls • Beans (black, pinto, kidney, garbanzo) • Lean meat (turkey, chicken, pork) or fish • Baked potatoes with veggies and cheese • Pasta (preferably whole grain) • Rice (preferably whole grain) • Hummus or peanut butter with whole grain bread • Fruits, vegetables, salads | <p>postgame/practice snack ideas:</p> <ul style="list-style-type: none"> • Sports drinks • Fruit • Cereal • Granola or bar • Half of wheat bagel with jam • Cereal/fruit bar • Yogurt • Hummus with pita • Crackers • Pretzels |
|---|---|



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Figure 5.9 Nutrition Education for Basketball Teams Flyer for Session 3



Estimate sweat rate:

1. weight before training –weight after training=total weight loss
2. fluid consumed during exercise (15oz=1lb)
3. (total weight loss during training+ weight of fluid consumed)/total hours of training=sweat rate

Replace 150% of fluids lost per hour.

Recommended serving sizes:

- Low-fat chocolate milk=6oz
- 100% fruit juice=4oz
- Gatorade=8oz

Before Practice/Game:

- 2-3 hours before drink 12-16oz water (about 1-1½ standard bottles)
- 10-15 min before drink 5-8 oz. water (about 1/2 standard bottle)

During Practice:

- Use thirst as an indicator for drinking
- Take drinks during breaks (5 oz.)

After Practice:

- Immediately afterwards, replace fluids lost during exercise
- For every pound lost during exercise consume 24 oz.

Benefits of Hydrating

- Water helps regulate body temperature which could prevent headaches, nausea, and exhaustion
- Water prevents muscle cramps
- Water helps with nutrient transport and waste removal in the body

Effects of Dehydration

- Even small level of dehydration (1-2%) can have negative impacts on heart rate, core temperature, heart and lung function
- In extreme cases dehydration can increase risk of kidney failure

Key Points

- **WATER** is the best fluid, especially if the practice/game lasts less than one hour
- **Pre-hydrating** before completion can decrease risk of dehydration during the game
- Consuming dilute carbohydrate solution before and after exercise can increase fluid absorption (≤19g per 8oz)
- Consuming beverages with sodium and/or salted snacks with water can help retain fluid (50-170mg per 8oz)
- Consuming a whole 20 oz. Gatorade is not necessary
 - An 8oz serving will adequately replace ions lost during a 1 hour game or practice



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Alignment with Public Health Core Competencies

The field experience part of the MPH Nutrition program helped me gain a lot of knowledge and experience, and meet the core competences of public health. With regard to biostatistics, I applied the knowledge and gained more relevant experience when working on both of the major programs – Nutrition Education for Basketball Teams and DIET FREE. Coaching these programs I utilized surveys and ran statistical analyses on the data that allowed me to answer questions on effectiveness of both programs with regard to nutrition knowledge acquired; the questions tested are relevant to public health, and fit the area of my interest.

Environmental health is the second core competency of public health professionals, and I think I learned the most about it from attending Flint Hills Wellness Coalition meetings. Public health professionals working on different sites in the community discussed and planned how to solve various problems connected to environmental health that are urgent in the community. During the meetings we focused on air quality problems (concern about tobacco use) and food safety and availability, specifically – problems with vendors and concession stands.

Epidemiology is the third core competency that I met while working on my field experience. Designing an intervention requires deep knowledge and understanding of epidemiology from a public health professional. When developing interventions for both the thesis and field experience, I spent a lot of time on background research that would allow me to make assumptions and test those. Applying epidemiology knowledge in my thesis research and field experience programs, helped me better to understand the importance of it.

The fourth core competency is related to healthcare administration. I learned a lot about organization of healthcare in the county. I also learned the importance of community-based prevention programs and their impact on the overall community health, as well as the important role of K-State Research and Extension office for the Riley County healthcare services.

The fifth core competency is connected to social and behavioral sciences. Human behaviors are complex, and understanding those requires deep knowledge in the field. I have learned about the importance of behavior choices on health, and that shifting those choices towards improvement is one of the key roles of any health professional, for example, utilizing a theoretical framework targeting behavior change to design a nutrition education intervention.

Conclusion

I always thought that it is crucial to enjoy what you are doing. I truly enjoyed my field experience, and definitely improved my knowledge and acquired a whole set of new skills and experiences. Working on the programs, I became more observant and passionate about my field of interests. This experience at Kansas State University allowed me not only to grow as a future professional, but as a person. I believe that I learned a lot from my professors and mentors, but I do understand that there is still a lot to learn about and to explore.

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Appendix B - Basketball Team Surveys

Figure B.1 Child Survey (baseline, follow-up)

Name _____ Team _____

Age _____ Gender M / F Date _____

1. How often do you usually do the following?
Tick one box in each row

	Never/rarely OR Less than once/week	About 1-3 times/week	About 4-6 times/week	Every day
	1	2	3	4
a. Drink water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b. Drink fruit juice or fruit juice drink	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Drink soda (not including diet soda)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d. Carry a water bottle	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Eat chocolate or candy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f. French fries	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
g. Eat potato chips	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
h. Eat fast food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i. Help choose or buy groceries for the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
j. Help prepare your dinner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
k. Eat dinner with most of the family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
l. Eat dinner in front of the television	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
m. Eat snacks in front of the television	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

2. How many serves of vegetables do you usually eat each day?
[1 serving = 1 cup of salad vegetables, OR $\frac{1}{2}$ a cup of cooked vegetables, OR 1 medium potato]

1. I don't eat vegetables
2. Less than 1 serve a day
3. 1-2 serves a day
4. 3-5 serves a day
5. More than 5 serves a day

3. How many serves of fruit do you usually eat each day?
[1 serving = 1 medium piece, OR 2 small pieces of fruit e.g. clementine ("Cutie") or apricots, OR 1 cup of diced pieces]

1. I don't eat vegetables
2. Less than 1 serve a day
3. 1-2 serves a day
4. 3-5 serves a day
5. More than 5 serves a day

How many servings of fruit do you think we should eat per day? _____

How many servings of vegetables do you think we should eat per day? _____

1. How beneficial is being properly hydrated for you athletic performance?(Select one)	
Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>
2. How beneficial is maintaining a healthy diet for you athletic performance?(Select one)	
Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>
3. How beneficial is eating throughout the day (before practice/game) for you athletic performance?(Select one)	
Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>
4. How beneficial is eating after practice/game for recovery and future athletic performance?(Select one)	
Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>

Figure B.2 Youth Coach Survey

Youth Coaching Survey

INSTRUCTIONS: Please read all the questions carefully.
 Name/Team _____

1. What is your age? _____ years

2. I describe myself as: (Select one)

Male	<input type="radio"/>
Female	<input type="radio"/>

3. I describe myself as: (Select one)

Coach	<input type="radio"/>
Assistant Coach	<input type="radio"/>
Other	<input type="radio"/>

4. I describe myself as: (Select one or more)

Hispanic or Latino	<input type="radio"/>
American Indian or Alaska Native	<input type="radio"/>
Asian	<input type="radio"/>
Black or African American	<input type="radio"/>
Native Hawaiian or Other Pacific Islander	<input type="radio"/>
White	<input type="radio"/>
Don't know/not sure	<input type="radio"/>
Prefer to not answer	<input type="radio"/>

5. Highest level of education completed: (Select one)

Less than high school	<input type="radio"/>
High school	<input type="radio"/>
Some college or associates degree	<input type="radio"/>
Graduated college	<input type="radio"/>
Master's degree or above	<input type="radio"/>
Prefer to not answer	<input type="radio"/>

6. Do you have any previous experience coaching?(Select one or more)

Coached basketball at least once before	<input type="radio"/>
Coached for a competitive, non-school program at least once before (e.g., Club teams)	<input type="radio"/>
Coached for a school program at least once before	<input type="radio"/>
Coached for a recreational, non-school program at least once before (e.g., Parks and Recreation)	<input type="radio"/>
No previous experience	<input type="radio"/>

7. Do you have any coaching-specific training? (Select one or more for each)

Participant ID # _____

Degree related to coaching (Physical Education, Exercise Science, Kinesiology, etc.)	<input type="radio"/>
Coaching certification(s)	<input type="radio"/>
Coaching workshop(s)	<input type="radio"/>
National Youth Sport Coaching Association training (provided through Manhattan Parks and Recreation)	<input type="radio"/>
No coaching-specific training	<input type="radio"/>

8. Do you have any past experience in sport? (Select one or more)

Participation in organized basketball	<input type="radio"/>
Participation in competitive organized sport (School affiliated, club teams, etc.)	<input type="radio"/>
Participation in recreational organized sport (city leagues, company leagues, intramurals, etc.)	<input type="radio"/>
Participation in unorganized sport (pick-up games, etc.)	<input type="radio"/>
No past participation	<input type="radio"/>

9. What is your primary reason for being a youth sport coach? (Select one)

My own child(ren) enrolled in the program	<input type="radio"/>
Volunteer experience	<input type="radio"/>
Enjoyment of coaching	<input type="radio"/>
Asked to volunteer	<input type="radio"/>
Don't know/not sure	<input type="radio"/>
Prefer to not answer	<input type="radio"/>

10. I have had previous formal nutrition education..... (Select one)

From a Dietician/Health Professional	<input type="radio"/>
During a Clinic/Conference/Workshop	<input type="radio"/>
From a University	<input type="radio"/>
I've never had formal nutrition education	<input type="radio"/>
Other(specify) _____	<input type="radio"/>

11. How confident are you in your sports nutrition knowledge? (Select one)

Not confident at all	<input type="radio"/>
Not very confident	<input type="radio"/>
Somewhat confident	<input type="radio"/>
Confident	<input type="radio"/>
Very confident	<input type="radio"/>
Completely confident	<input type="radio"/>

Participant ID # _____

12. How confident are you in your health-oriented nutrition knowledge?
(Select one)

Not confident at all	<input type="radio"/>
Not very confident	<input type="radio"/>
Somewhat confident	<input type="radio"/>
Confident	<input type="radio"/>
Very confident	<input type="radio"/>
Completely confident	<input type="radio"/>

13. How beneficial do you think teaching your athletes about nutrition for better performance would be? (Select one)

Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>

14. How beneficial do you think teaching your athletes about nutrition for better health would be? (Select one)

Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>

15. How beneficial do you think teaching your athletes about avoiding injury would be? (Select one)

Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>

16. How beneficial do you think teaching your athletes about home-based fitness programs would be? (Select one)

Not beneficial at all	<input type="radio"/>
Not very beneficial	<input type="radio"/>
Somewhat beneficial	<input type="radio"/>
Beneficial	<input type="radio"/>
Very beneficial	<input type="radio"/>
Completely beneficial	<input type="radio"/>

Participant ID # _____

17. What information about nutrition would you like to know? (hydration, snacks, pre/post workout, etc.)

18. What aspects of nutrition and health could be improved at practices and games?

19. Any other comments on these topics?

Participant ID # _____