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Combating Childhood Obesity Through Nurse Practitioner-Led School Wellness Program

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DEDICATION

"The question is not whether we can afford to invest in every child; it is whether we can afford not to". – Marian Wright Edelman

I dedicate this translational project to Almighty God, my creator, and the source of inspiration, wisdom, knowledge, and understanding. He has been the source of my strength and courage throughout this program and on His wings I have soared higher than I could possibly imagine.

To my mother, Rayceen King, you are the reason I strive for excellence in all that I do. Thank you for every word of encouragement and support you have given me during this quest. You have instilled in me a strong sense of discipline and integrity, for which I am eternally grateful. It is because of your guidance and example I am the woman I am today. No words are sufficient to describe my late father's influence on my life and my decision to become a healthcare provider. This translational project is dedicated to his memory.

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Abstract

Overweight children and childhood obesity have been identified as an area of national and global concern. The prevalence of childhood obesity has been described as one of the most common chronic childhood conditions (Faguy, 2016). During the past decade, childhood obesity has been on the rise throughout the nation with an estimated childhood rate of 42 million to 70 million by 2025 (World Health Organization [WHO], 2014). The purpose of this prospective, quantitative study was to develop and implement a family nurse practitioner-led wellness intervention program in the school setting that incorporated nutrition and physical activity for adolescents. The review of literature revealed a lack of evidence regarding effectiveness of FNP-led wellness initiative in the school setting. Specific aims were to evaluate the pre- and post-intervention activity level and self-efficacy for diet and exercise of adolescents ages 14 to 17 during a 4-week FNP led school-based initiatives. Activity level was assessed through the use of Jawbone UP Move and Patient-Centered Assessment & Counseling for Exercise (PACE+) surveys. Participants experienced a significant improvement in their perspectives related to limiting the consumption of dietary when comparing baseline data to 4 weeks. Participants showed an increase in physical activity through the Jawbone UP Move from baseline to the end of the program. Participants demonstrated a reduction in diastolic blood pressure from baseline to completion of study. This translational childhood obesity school based project will contribute to the body of knowledge regarding FNPs and their role in reducing the prevalence and incidence of childhood obesity.

Keywords: Childhood obesity, family nurse practitioner, adolescents

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CHAPTER I

Introduction

Overweight children and childhood obesity have been identified as an area of national and global concern for healthcare providers and society. The prevalence of childhood obesity has been described as one of the most common chronic childhood conditions (Faguy, 2016). Obese children are at increased risk of many health conditions that originate during childhood years and continue into adulthood. These conditions include hypertension, dyslipidemia, and diabetes, which are often associated with decreased quality of life and life expectancy (Hopkins, Decristofaro, & Elliott, 2011; Faguy, 2016). Factors such as these often contribute to a lifespan that is shorter than their parents and this trend will continue if current practices do not address the prevention and treatment of childhood obesity (Moglia & Dill, 2015). Health-related quality of life is significantly lower in overweight or obese children as compared with normal weight children in the same age group (Lee, Cheah, Chang, & Raudzah, 2012). The percentage of children between the ages of six to eleven in the United States who were obese increased from 7% in 1980 to nearly 18% in 2012, and the percentage of obese adolescents aged twelve to nineteen years increased from 5% to 21% over the same time period (Moglia et al., 2015). From a global perspective forty-three million children were estimated to be overweight or obese, and an additional ninety-two million were at risk of becoming overweight worldwide in 2010 (World Health Organization [WHO], 2014). The number of obese infants and young children will increase from forty-two million to seventy million by 2025 if this trend continues (World Health Organization [WHO], 2014).

The psychological effects of childhood obesity can leave a lasting impression. These are manifested through poor body image, low self-esteem, social isolation, recurrent anger, early forms of eating disorders, clinical depression, and tantrums in school and other social settings (Moglia et al., 2015). Additionally, research has found that obesity was the most strongly correlated, modifiable risk factor for low self-esteem in pubescent girls (Eddy, 2014). This expands the implications of the psychological and physical effects of overweight and obesity during childhood.

Causes of Childhood Obesity

Childhood obesity is often the result of a caloric imbalance, which results from greater caloric intake than energy expenditure. This imbalance accounts for 95-99% of all cases of childhood obesity and is affected by diet, physical activity, and genetic predisposition (Faguy, 2016). The genetic mechanism related to childhood obesity remains uncertain; however, obese parents increase the risk and severity of obesity for their children (Faguy, 2016). Modifiable lifestyle factors that contribute to caloric imbalance include increased consumption of high-calorie beverages and high-fat foods, increased television viewing/video gaming, and decreased physical activity (Faguy, 2016). Notably, a decline in family prepared meals and an increase in fast-food consumption has been found to contribute to the incidence of childhood obesity. Families who prepare meals for their children often have better quality diets and healthier body weights than those who do not (Faguy, 2016).

The beneficial effects of physical activity and detrimental consequences of a sedentary lifestyle for children and adolescents have been demonstrated in multiple research studies. An increase in sedentary activity with reduced overall activity levels has been shown to increase cholesterol, elevated systolic blood pressure, and increased the incidence of obesity, insulin

resistance, and type 2 diabetes (Nemet, 2015). Specifically, children who engage in television viewing or video game use for three hours or more per day have increased risk for developing obesity (Perpich, Russ, Rizzolo, & Sedrak, 2011). Adolescents are generally less active than younger children, which places this group at increased risk for obesity (Faguy, 2016). More than 40% of children age 6 to 11 reported one hour or more of physical activity compared to 8% of 12 to 15 year olds with a slightly lower percentage of activity among older adolescents (Faguy, 2016).

Endocrine, central nervous system, and genetic conditions have also been linked to the development of childhood obesity. These conditions account for 1-5% of childhood obesity cases (Faguy, 2016). Examples of these disorders include Cushing syndrome, Prader Willi syndrome, growth hormone deficiency, and hypothalamic tumors or lesions. Genetic syndromes often cause rapid onset of obesity and are associated with developmental and intellectual delays (Faguy, 2016). Traumatic brain injury or brain surgery can also lead to obesity in children (Perpich et al., 2011).

Long-term Effects

Overweight and obese children often become obese adults. Obesity and inactivity increase the development of chronic diseases that can lead to adult mortality. Research has shown adults who experienced obesity during their childhood have increased morbidity and mortality independent of their adult weight (Nemet, 2016).

In addition to having a significant effect on future health, childhood obesity also creates a financial burden on health care and society. It has been estimated the direct health care cost of obesity in children is over $14.3 billion per year (Ling, King, Speck, Kim, & Wu, 2014). As this

trend persists, obese children transition into obese adults and the health care cost increases to an astounding $147 billion per year (Ling et al. 2014). If this epidemic continues, health care cost of obesity-related conditions has the potential to increase to $900 billion per year by 2030 (Ling et al. 2014).

Psychological Implications

Psychosocial abilities and cognitive skills needed for functioning in daily life are developed during childhood years. Therefore, a child's mental health is constantly evolving. Children who are overweight or obese have been shown to have both short- and long-term psychological consequences associated with low self-esteem, negative self-image, eating disorders, and low health-related quality of life (Pizzi & Vroman, 2013). Those children who are chronically obese have an increased risk of psychological disorders. Studies conducted in 2003 and 2005 found obese children and adolescent experienced more difficulties with anxiety and depression than their peers of normal weight (Pizzi & Vroman, 2013).

In addition, these children are more likely to have lower self-worth and lower psychosocial skills than their non-obese peers (Pizzi & Vroman, 2013). Social biases can affect the mental health of overweight and obese children. The American Psychological Association (APA) placed emphasis on six factors observed in childhood that are directly related to the stigma of being overweight or obese. These include social isolation, behavioral difficulties, negative self-view, low self-esteem, depression, and increased risk of suicide (Pizzi & Vroman, 2013).

Preventative Measures

Health behaviors are established during childhood and this creates an ideal environment for childhood health interventions that foster significant changes to a child's lifestyle. Several studies have found success in implementing nutrition and physical activity programs in the community and clinical settings for children and adolescents to improve health outlook (Mandeya & Kridli, 2014; Alexander, Grant, Pedrino, & Lyons, 2013). These programs have demonstrated success in areas of body mass index (BMI) reduction and improvement of dietary choices in children and adolescents. Several of the studies indicated the utilization of nurses and advance practice nurses contributed in the success of the programs.

Health promotion programs in the school setting have been found to be the most effective and efficient method to encourage positive health behaviors (Ling et al., 2014). Schools are considered an ideal setting for health promotion initiatives because of the familiar atmosphere and the amount of time spent in the classroom setting (Ling et al. 2014). Conducting wellness initiatives within this familiar environment should be explored extensively to forge new pathways of optimizing adolescent health outcomes.

Nursing Implications

Nurse practitioners have the ability to perform roles of health promotion, disease prevention, advocacy, and leadership to address childhood obesity. Considerations in determining the level and type of prevention most appropriate for the child include culture, socioeconomic factors, family dynamic, and environment (Berkowitz & Borchard, 2009). In addition to identifying appropriate interventions, advanced practice nurse led initiatives to prevent childhood obesity often require attention to policy and advocacy. Factors leading to

obesity, such as health disparities, poor access to nutritious food, and poverty, are often best approached from a systems and health-determinants perspective (Berkowitz & Borchard, 2009). The role of policymaking can be a powerful tool in advocating for changes in conditions that contribute to obesity. Doctoral prepared advanced practice registered nurses possess the capacity to implement research findings that produce positive health behaviors into clinical practice. By encouraging participation in interventions during this critical part of children's lives, doctoral prepared advanced practice nurses have the opportunity to potentially decrease children's risk of future health problems and help shape the ideas and attitudes of the future generation by creating strong role models (Eddy, 2014).

Health Disparities & Socioeconomic Factors

Health disparities caused by racial, ethnic, and socioeconomic factors related to the development of childhood obesity have been widely publicized. Among 14 to 19 year old children and adolescents, the prevalence of overweight and obesity is higher in Latino and African American children than among Caucasian children (Chesnay & Anderson, 2012). Notably, the rate of overweight and obese children increases when family income falls below the poverty level (Chesnay & Anderson, 2012). Rates of obesity are higher among Latino preschool-aged children from low-income families than among Caucasian and Asian children from low-income families (Chesnay & Anderson, 2012).

Individuals from economically disadvantaged backgrounds and multicultural families often face barriers to preventative health care, including lack of access, insurance, and transportation, discrimination, and difficulty navigating the healthcare system (Chesnay & Anderson, 2012). These barriers are often encountered in the community and clinical setting and

may inhibit participation in health initiative programs. There is limited research regarding culturally sensitive health strategies for ethnically diverse families. It is imperative to understand modifiable lifestyle factors, including dietary and physical activity patterns, to develop culturally sensitive weight management interventions (Chesnay & Anderson, 2012).

Children who reside in rural areas have been linked with an increased risk of becoming overweight or obese and participating in unhealthy behaviors (Ling et al., 2014). Research has shown that children from rural areas consumed diets with more fat and sugar than those children from urban areas (Ling et al., 2014). Additionally, these children also engage in television viewing and non-school related computer use for more than 3 hours a day, which is more often than urban overweight or obese children (Ling et al., 2014). Both unhealthy dietary habits and periods of inactivity may directly relate to the increase of rural children who are overweight or obese. The increase in unhealthy habits emphasizes the need for school-based wellness programs for these rural students.

Family Dynamics

Understanding the family environment can reveal areas of consideration when addressing the childhood obesity epidemic. The family life of a child or adolescent plays a fundamental role in obesity due to genetics and in the development of health behaviors, including dietary habits, activity level, and sedentary patterns (Jang & Whittemore, 2015). Parents with obese genetic propensity are more likely to have sedentary lifestyle practices that are often shared with their children (Jang & Whittemore, 2015). Children also adopt food preferences through observation of parental habits. Factors such as feeding practices, parental support, role modeling, and knowledge of healthy nutrition and activity behaviors have strong correlation with children's

weight and establishment of health-related behaviors (Jang & Whittemore, 2015). Additional family environment influences include food availablity, accessibility, and parental beliefs and attitudes toward diet and exercise (Jang & Whittemore, 2015). Therefore, parental perspectives have a direct influence on the occurrence of childhood obesity.

The influence of a child's extended family also contributes to the development of poor health behaviors. Older generation family members often have distorted perception of overall health and how it correlates to a child's weight. The belief that high body weight in children is associated with better health when compared to their normal size peers is often seen in Hispanic and African American populations (Alexander, Alfonso, & Hansen, 2015; Ganter et al., 2015). 13.0% of parents surveyed about perceived barriers regarding prevention of childhood obesity mentioned that grandparents' beliefs that heavy babies are healthy influenced the families' daily routines (Ganter et al., 2015).

CHAPTER II

Review of Literature

Literature searches for available English language literature conducted in the United States from January 2010 to December 2015 were conducted utilizing the PubMed, CINAHL, and ProQuest databases. In order to maximize search results for studies that conducted obesity interventions in school-age children, several keywords were used including "school-based intervention", "obesity intervention", "nutritional program", "physical activity", "nurse practitioner school health program", and "nurse practitioner obesity program". Abstracts were reviewed to select studies that met the selection criteria. The compiled and refined CINAHL, Medline, PubMed results were further scrutinized to eliminate duplicate studies. The final sample of the studies were identified and compiled into a database recording reference information, purpose, sample, age range of sample, outcome measures, study duration, and results

Study Selection and Eligibility Criteria

After removing duplicates, relevant articles were selected in two separate stages. The first stage involved screening the titles and abstracts of each article and removing irrelevant papers. Many of the articles excluded were systematic reviews, meta-analysis, and editorial reviews. In the second phase, the full text of recruited articles were thoroughly reviewed and dissected to include research article appropriately related to the subject. Studies were selected based on meeting the following standards: (1) an obesity-related intervention, (2) an age criterion where subjects are between 5 to 18 years old, (3) use of pre- and post-test outcome variables related to nutrition and physical activity, and (4) implementation of the intervention in a school

setting. Exclusion criterions were those studies that did not intervene on obesity or related health and fitness measure or those studies that were not conducted in a school setting.

Data extraction and abstraction

Information specific identified in this review from eligible articles was as follows:

(i) General characteristics of the study

(ii) Characteristics of the study population

(iii) Type and duration of the intervention and measure(s) used

(iv) Study findings

Reduction of body mass index (BMI)

The use of school-based intervention has demonstrated success regarding reduction of body mass index (BMI). Specifically, predominantly Hispanic (70.5% Hispanic and 29.5%) overweight and obese children from low-income families significantly decreased BMI levels through the use of SPARK and Healthy for Life/PE4ME programs (Bryars, Mouttapa, McMahan, & Tanjasiri, 2012). The mean baseline BMI percentile for overweight students was 92.7 (SD=4.5) at pre-test and showed a statistically significant decrease to 89.4 (SD= 11.8) at post-test (t=3.36, p=.001) (Bryars et al., 2012). Obese students pre-test BMI percentile was 96.6 (SD= 0.8) and significantly decreased to 94.6 at post-test (t=2.03, p=.05) (Bryars et al., 2012).

Another school-based initiative called the Catch Kids Club was utilized with low-income, diverse elementary school students. From baseline to follow-up of the study, overweight or obese students in the intervention group decreased significantly when compared with the control group (Slusser, Sharif, Erausquin, Kinsler, Collin, & Prelip, 2013). Overweight or obese participants in the intervention group decreased by 3.1% (from 40.6% to 37.5%) compared to the control group (from 46.7% to 44.7%), which decreased by 2.0% (p=.000) (Slusser et al., 2013).

Longitudinal studies also validated that school-based programs have long-term effects on students. Active Living by Design (ALbD) program was explored with an elementary school in Chicago to aid in the reducing rates of childhood obesity (McCreary, Park, Gomez, Peterson, Pino, & McElmurry, 2012). No specific demographic were provided in this study; however, the school involved serves primarily (98.5%) low-income, Spanish-speaking Latino immigrant population. Students were continuously enrolled in the program for 4 years with weight gathered annually (McCreary et al., 2012). Students who participated in the study had significantly lower BMIs after 4 years when compared to students who had transferred to the elementary school after initiation (SE=.54, t=1.59, p=.05) (McCreary et al., 2012). Additional evidence of the lasting impact of school-based childhood obesity prevention programs is a nurse-directed 6-week study that utilized the Kids N Fitness program with elementary school students from urban, low-income backgrounds between the ages of 8 to 12 (Wright, Giger, Norris, & Suro, 2013). It demonstrated significant success in the reduction of BMI (p=.047) and BMI z-scores (p=.05) for the female students from baseline to 4 months post-intervention (Wright et al., 2013). These results were sustained 12 months after completing the program (Wright et al., 2013). Though not significant, the male students also experienced reduction of BMI and BMI z-scores post-intervention.

Promotion of healthy diet

Wellness programs that incorporate nutrition and dietary educational components have been proven to be effective in the school setting. These initiatives often focus on the benefits of fruits and vegetables consumption while intertwining negative aspects associated with unhealthy food options. After completion of a health promotion program with predominantly low-income, Hispanic elementary school students, parents reports a significant decrease in consumption of

non-nutrient rich foods among overweight (z=-1.98, p=.05) and obese (z=-2.55, p=.001) (Bryars et al., 2012). The Junior Doctors of Health (JDOH) program was implemented with students in grades 4 through 6 in five different schools to determine self-efficacy for healthy eating behaviors (Rosemond, Blake, Jenkins, Buff, & Moore, 2014). Upon completion of the program, boys in the intervention group demonstrated self-efficacy with the consumption of green salad, carrots, and milk ($p<.05$) (Rosemond et al., 2014). Though not statistically significant, boys in the intervention group increased their weekly consumption of vegetables and decreased their weekly consumption of sugar-sweetened beverages. Girls in the intervention group showed self-efficacy with the consumption of potatoes, carrots, other vegetables, and milk ($p<.05$) (Rosemond et al., 2014). Girls also decreased consumption of sugar-sweetened beverages though not significantly correlated.

Through the use of the Catch Kids Club program, predominantly minority students (60% Asian) showed an increase in nutrition knowledge over time (p=.009) and decrease in non-nutrient rich foods consumption (p=.035) (Slusser et al., 2013). A quasi-experimental design study used a comprehensive school-based approach to address healthy behaviors among minority elementary school children in a rural area and found nutrition level significantly increased (Ling, King, Speck, Kim, & Wu, 2014). Specifically, the intervention increased the number of students who met nutritional recommendation ($p<.001$).

Promotion of physical activity

Emphasis of the importance of physical activity and decreasing the amount of sedentary time is one of the vital components of health programs implemented in the school setting. With the growing popularity of computer and television related activities, highlighting the importance of exercise to decrease weight gain in children is crucial. After completing a five-month study of

students at four elementary school in rural Kentucky, there was a significant improvement in the percentage of children who met the physical activity recommendation (p<.001) (Ling et al., 2014). The longitudinal study involving the use of Active Living by Design (ALbD) also demonstrated an improvement in physical activity knowledge (McCreary et al., 2012). Students increased their scores on the Physical Activity Knowledge questionnaire from a pretest mean score of 4.8 (SD= 2.17) to the posttest mean score of 6.0 (SD= 2.25, SE= .08, t= 15.05, p<.001) (McCreary et al., 2012). The nurse-directed school health program conducted over 6-weeks also found success with improving physical activity in the participants and decreasing television viewing (Wright et al., 2012). Both males and females in the study increased physical activity to at least 60 minutes per day from baseline to 4 months and after 12 months (p=.002,.005 respectively) (Wright et al., 2012).

Satisfaction and participation of students

School-based health initiatives are generally received well by students, which helps improve the likelihood of adapting health behaviors. In 2013, a research study was conducted with adolescents with various backgrounds from three Connecticut public schools that aimed to evaluate the HEALTH[e]TEEN, an internet school-based obesity prevention program (Whittemore, Chao, Jang, Jeon, Liptak, Popick, & Grey, 2013). Researchers assessed the participants satisfaction and engagement based on gender, age, school, and ethnicity (Whittemore et al., 2013). This study found student satisfaction and participation was significantly higher in the schools that implemented their program in class (p<.001) compared to the school that implemented the program as homework (Whittemore et al., 2013).

Reduction of risk factors of atherosclerosis

A 10-week research study involving sixth grade students in 23 middle schools incorporated the Project Healthy Schools initiative to decrease factors that contribute to the development of atherosclerosis (Eagle et al., 2013). Measurements collected at baseline and upon completion included blood pressure, cholesterol panel, and random blood glucose. This study found students' mean total cholesterol value decreased significantly from 161.64 ± 28.99 mg/dL to 154.77 ± 27.26 mg/dL ($p < .001$) (Eagle et al., 2013). The low-density lipoprotein (LDL) also decreased from 89.37 ± 25.08 mg/dL to 87.14 ± 24.25 mg/dL ($p < .001$) (Eagle et al., 2013). Triglycerides decreased from 113.34 ± 73.19 mg/dL to 101.22 ± 63.93 mg/dL ($p < .001$) and random glucose readings decreased from 97.51 ± 16.00 to 94.94 ± 16.62 ($p < .001$) (Eagle et al., 2013). Blood pressure readings reduced significantly with mean systolic blood pressure decreased from 109.47 ± 15.26 mm Hg to 107.76 ± 10.87 mm Hg ($p < .001$), and the mean diastolic blood pressure decreased from 64.78 ± 8.57 mm Hg to 63.35 ± 7.81 mm Hg ($p < .001$) (Eagle et al., 2013).

Need for Further Research

Literature searches conducted seeking implementation of wellness intervention programs in the school setting by advanced practice nurses, specifically family nurse practitioners, are very limited. There is a need to explore the potential opportunities for learning new health behaviors in a familiar setting for children. The use of nutritional and physical activity education program in the community and clinical settings has demonstrated success in area such as reduction of BMI and improvement in nutritional dietary choices. By exploring these concepts in the

classroom setting, new horizons in combating childhood obesity may be exposed and lead to the creation of new roles for nurse practitioners in the school setting.

Theoretical Framework

Dorothea Orem's Self-Care Deficit Theory was used as the theoretical framework for this wellness initiative. The Self-Care Deficit Theory has been associated with empowering individuals to take initiative in being responsible for their own health care (Chesnay & Anderson, 2012). Doctorate-prepared APRNs possess the ability to facilitate these self-care behaviors. Nurse practitioners can provide resources and support needed to address childhood obesity.

According to the Orem's self-care deficit nursing theory, a person initiates and performs healthy functioning and well-being behaviors by acquiring self-care agents influenced by Basic Conditioning Factors (BCFs) (Wong, Ip, Choi, & Lam, 2015). These BCFs are often guided by individual participation in self-care operations or through modification of the type or amount of self-care operation required (Wong et al., 2015). BCFs include age, developmental stage, health state, socioeconomic status, family system factors, and environmental factors (Theory Based Nursing Practice, 2014).

Specific components of Orem's Self-Care Deficit theory applicable to the wellness initiative include self-care operations that focus on an individual's wellbeing. Operations refer to an intellectual or psychomotor action directed towards a goal (Moore, et al., 2005). Therefore, operations can be associated with educational measures geared towards the goal of producing positive outcomes of improving the concept of nutrition and physical activity in the adolescents.

One of the components of the Self-Care Deficit theory is estimative self-care operations, which gather information, acquire knowledge, and identify alternatives (Moore, et al., 2005). Through educational information presented to participants, they obtained the ability to process knowledge in order to identify alternative behaviors, such as choosing to select food with nutritional value instead of non-nutrient rich foods.

Translational operations are behaviors that consider various options, practice decision-making, and plan according (Moore et al., 2005). Each education session presented information about alternatives in nutrition and incorporating physical activity daily. This encouraged students to explore these to contribute to planning their diet and engaging in exercise regularly.

Lastly, production operations are those activities that initiate action, identifying resources, and evaluating behaviors acquired to meet self-care needs (Moore, et al., 2005). Students were asked about their ability to incorporate knowledge gained on a daily basis and evaluations were conducted through the use of pre- and post-test data collection.

CHAPTER III

Purpose

One of the most effective treatments for childhood obesity is prevention and education of both children and parents. Obesity is less likely to occur in families and schools that support healthy lifestyles, which consists of balanced nutritional consumption, physical activity, and sufficient sleep (Moglia et al., 2015). The purpose of this project was to develop and examine the effectiveness of a wellness intervention that incorporated nutrition and physical activity implemented by a nurse practitioner in a classroom setting. The specific aim of this program was to positively influence the participants' outlook on health and wellness through the education provided. The clinical questions are addressed below:

Clinical Questions

1. Is there a statistically significant improvement between the self-efficacy, activity level, and eating habits in rural adolescents age 14 - 17 who undergo a family nurse practitioner led wellness intervention in their school over a 6-week period?
    a. What is the self-efficacy level of participating rural adolescents at the beginning of the intervention?
    b. What is the self-efficacy level of participating rural adolescents at the end of the intervention?
    c. Was there a statistically significant increase in the self-efficacy of the rural adolescents participating in the intervention?
    d. What is the activity level of participating rural adolescents at the beginning of the intervention?

e. What is the activity level of participating rural adolescents at the end of the intervention?
f. Was there a statistically significant increase in the activity of the rural adolescents participating in the intervention?
g. What are the eating habits of participating rural adolescents at the beginning of the intervention?
h. What are the eating habits of participating rural adolescents at the end of the intervention?
i. Was there a statistically significant improvement in eating habits of the rural adolescents in the study?

2. Is there a statistically significant improvement in the rural adolescent participants on weight, blood pressure, and waist circumference?
    a. What is the baseline blood pressure in the rural adolescent participants at the beginning of the intervention?
    b. What is the blood pressure of participating rural adolescents upon completion of the intervention?
    c. Was there a statistically significant improvement in blood pressure at the end of the intervention?
    d. What is the baseline weight of the rural adolescent participants at the beginning of the intervention?
    e. What is the weight of participating rural adolescents upon completion of the intervention?

f. Was there a statistically significant reduction in weight of the rural adolescents in the study?
g. What is the baseline waist circumference of the participating rural adolescents in the study?
h. What is the waist circumference of the participating rural adolescents upon completion of the intervention?
i. Was there a statistically significant reduction in waist circumference of the rural adolescents in the study?

By giving these students a solid foundation about health habits, this could offset the incidence of adult obesity and health disparities that accompany this condition.

Methods

This translational project aimed to evaluate the pre- and post-intervention activity level and self-efficacy for diet and exercise of rural adolescents ages 14 to 17. This information determined if there was a statistical significance difference between the self-efficacy and activity level of adolescents who participated in a family nurse practitioner led wellness intervention. This information will help create a platform for future research in the use of nurse practitioners in the school setting.

Project Site

The translational project was conducted in Baldwin County, Georgia. According to the 2014 American Community Survey, Baldwin County school systems consists of 55.2% Caucasian and 43.6% African American students (Georgia School District Demographic Profiles, 2014). Other ethnic groups include American Indian and Alaska Native, which for

account for 0.2%, 1.5 % are Asian students, and other races (Hispanic, Native Hawaiian, and Other Pacific Islander) comprise 0.2% of the student population (Georgia School District Demographic Profiles, 2014). Also, 14.1% of families in this area live below the poverty level (Georgia School District Demographic Profiles, 2014), which is a risk factor in the development of obesity. As mentioned previously, rates of obesity are higher in African American and Hispanic students, which encompass 45.1% (3,091) of this population. This further emphasizes the population at risk for the development of childhood overweight and obesity.

The translational project was conducted at Georgia College Early College, which is on the campus of Georgia College and State University in Milledgeville, Georgia. The first Early College in Georgia was established in 2005 through funded from the Bill & Melinda Gates Foundation and Robert W. Woodruff Foundation (Georgia Early College Initiative, 2012). The Early College initiative was developed as an intervention strategy for students who are underrepresented on Georgia college campuses. Specifically these include students of low socioeconomic background, minority (with emphasis on minority males), first generation college, and struggling academically (Georgia Early College Initiative, 2012). Early College sites partner with local colleges to provide students with a demanding course of study. Upon graduation, the students obtain a high school diploma and college academic credits (Georgia Early College Initiative, 2012). Early College sites in Georgia are composed on 86% minority students with 78% from low-income families (Georgia Early College Initiative, 2012).

This translational project took place during the course of a 4-week period in April through May 2016. During this timeframe students engaged in nutritional education and class sessions that emphasized the importance of physical activity. Participants were required to obtain parental consent and minor assent forms prior to participating in the study. The primary

investigator provided educational sessions twice a week with 45 to 60 minutes duration per class. The SuperTracker Nutrition Lesson Plans for High School Students and the SPARK High School Physical Education Lesson Plans were incorporated into the lesson plan for each session. In addition to the education and physical activity component of this project, students utilized pocket activity tracker to assist with analysis of activity levels throughout the program.

SuperTracker Nutrition Lesson Plan

SuperTracker is a free online nutrition and diet interactive tool created by the USDA Center of Nutrition Policy and Promotion and Team Nutrition to support the development of health lifestyle practices in effort to reduce chronic diseases (SuperTracker, 2015). Students were able to create personalized recommendations about nutrition and physical activity, track food and physical activity, incorporate personal recipes into the tracker, and set personal nutrition and physical activity goals. Students were able to create their personal profiles in order to receive helpful tips and support through the SuperTracker website. The SuperTracker Lesson Plans for High School Students aims to achieve the following objectives:

- Eat a variety of foods within each food group every day.
- Eat fruits and vegetables every day.
- Choose to eat whole-grain products and fat-free or low-fat milk or milk products.
- Eat a variety of foods from the Protein Foods group each week.
- Limit foods and beverages high in added sugars, solid fat, and sodium.
- Eat healthy snacks.
- Prepare food in healthful ways.
- Balance caloric intake with caloric expenditure.

- Follow an eating plan for healthy growth and development.
- Support others to eat healthfully.
- Eat the appropriate amounts from each food group every day.

SPARK Physical Education

The SPARK (Sports, Play, and Active Recreation for Kids) program was created in 1989 through funding by the Heart, Lung, and Blood Institute of the National Institutes of Health and San Diego State University and originated as a study focused on creating, implementing, and evaluating new and innovative approaches to elementary school physical education (SPARK Physical Education Curriculum, 2009). These efforts led to the establishment of a research-based physical activity and nutrition programs to be utilized in grades K-12. The SPARK High School Physical Education Program specifically launched after two research studies in Texas and Pennsylvania. Findings indicated an increase in student participation, activity levels, satisfactory performance in the program (SPARK Physical Education Curriculum, 2009). The SPARK program has been recognized by the Centers for Disease Control (CDC) as a model for national programs aimed to address childhood obesity. It was also named as an Exemplary Program of the U.S. Department of Education and featured in the Surgeon General's Report as a "School-based solution to our nation's healthcare crisis (SPARK Physical Education Curriculum).

Each lesson consists of two parts, which focus on motor/sport skills and health-fitness. The fitness component incorporates activities such as aerobic dance, aerobic games, and jump robe activities. As the program progresses, the intensity, duration, and complexity of activities are modified to develop cardiovascular endurance and develop abdominal and upper-body strength (McKenzie, Sallis, & Rosengard, 2009). The motor/sports component uses sports such

as soccer and basketball to also promote cardiovascular health and reinforce activities commonly seen in students' communities (McKenzie et al., 2009).

Instruments

Data was collected regarding participants' diet and activity level through the completion of the Patient Centered Assessment & Counseling for Exercise (PACE +): Physical Activity and Diet Surveys for Adolescents prior to initiation and upon completion of the wellness intervention. Students were also provided Jawbone UP Move activity trackers to monitor physical activity during the study period. Both of these instruments aided in providing data regarding the effectiveness of the wellness initiative.

Jawbone UP Move

Participants were asked to utilize the Jawbone UP Move activity tracker. UP Move functions through tri-axis accelerometer technology with an interface containing 12 white, 1 orange, and 1 blue LED light that indicate time, activity progress, and one of the two optional modes (activity mode and sleep mode). The device is a 27.64 mm length, 27.64 mm width, and 9.75 mm height water resistant and durable activity tracker with 4.0 BLE Bluetooth capabilities (Jawbone UP Move). The UP Move is encased in medical-grade, hypoallergenic rubber and is latex free (Jawbone UP Move). The clip that accompanies the activity tracker is also composed of medical-grade hypoallergenic rubber (Jawbone UP Move).

Students were given the option to utilize the UP Move tracking device with the clip or an accessory wristband designed to hold the tracker securely to the wrist area. The wristband accommodates wrist sizes 6.4 to 8.8 inches and is latex free and hypoallergenic (Jawbone UP Move). The non-rechargeable battery for the tracker is a CR2032 Lithium Coin, which last for

six months (Jawbone UP Move). The back panel cover of the battery contains less than 0.5% nickel (Jawbone UP Move). When wore in the clip or the wristband, the back panel does not come in contact with skin; however, participants were screened for sensitivity to nickel during recruitment process.

Participants were instructed to wear this device upon arising in the morning until bedtime from the time of initiation of the program through completion of the study. UP Move devices can be clipped to the students' pocket and shirt collar or inserted into an accessory wristband. Data from each tracker was uploaded to the primary investigator's secured laptop every Wednesday and input into SPSS 22.

Patient-centered Assessment & Counseling for Exercise (PACE+) Overview

Patient-centered Assessment & Counseling for Exercise (PACE) originally began in 1990 as a research project funded by the Center for Disease Control and Prevention (CDC) to develop tools for primary care physicians to encourage physical activity in their patients. This research was conducted by a multidisciplinary team of over 40 professionals from various background, including exercise science, behavioral medicine, pediatrics, nutrition, computer science, and health psychology (PACE Project, 2007). The project has since expanded to encompass specific patient populations with the main objective of improving lifestyle behaviors. The Patient-center Assessment & Counseling for Exercise (PACE+): evaluates four behaviors that contribute to the health of an adolescent. These four domains are 1) total dietary fat consumption (DF), 2) fruits & vegetable consumption (FV), 3) moderate and vigorous physical activity (PA), and 4) sedentary habits (SH). This collection of surveys incorporates five psychosocial dynamics related to health behaviors. These include adolescent use of change strategies, self-efficacy, decisional balance, family influences, and peer influences. The items that incorporate change

strategies have been derived from concepts of the Social Cognitive Theory and the Transtheoretical Model.

A randomized trial of PACE+ was implemented in September 2000 with ethnically diverse sample of 878 male and female adolescents (40% non-white) between the ages of 11 through 15 (PACE+: Counseling Adolescents for Exercise and Nutrition, 2007). The outcome of the PACE+ study demonstrated the effectiveness of PACE+ with a significant stage progress from pre-contemplation to action found in physical activity, sedentary habits, fruit and vegetable consumption, and reduction of dietary fat for participants (PACE +: Counseling Adolescents for Exercise and Nutrition, 2007).

Physical Activity Component of PACE+

The PACE+ Adolescent Physical Activity questionnaire measured activity level of the participants. Fifteen items were created to evaluate thought processes and activities associated with change behavior strategies (Norman et al., 2005). The responses assessed how often each strategy is used with a five-point Likert scale ranging from *1* = never to *5* = many times.

Situational self-efficacy was determined through the use of six questions that revealed the adolescent's confidence to participate in physical activity (Norman et al., 2005). Responses were based on a five-point Likert scale ranging from *1*= I'm sure I can't to *5*= I'm sure I can. Decisional balance was analyzed through a series of ten questions that address cognitive and motivational aspects of decision-making. These questions identified five pros and five cons of physical activity with each item rated on a five-point Likert scale to determine level of importance (Norman et al., 2005). The rating of *1* indicates not at all important to *5* indicates extremely important.

Family influences on physical activity were evaluated to determine encouragement and participation. These four items referenced to a typical week and a five-point scale was used to indicate frequency with *1* meaning never and *5* indicating every day. The same rating scale was used to evaluate peer influences, which were examined through the use of six questions on frequency of encouragement and support (Norman et al., 2005). A single-item assesses the enjoyment level of physical activity on a five-point scale ranging from *1* indicating strongly disagree to *5* indicating strongly agree.

Lastly, environmental components are assessed in regards to facilitating physical activity. Five questions ask participants to indicate their level of agreement on a five-point scale ranging from *1* indicating strongly disagree to *5* strongly agree. This component analyzed the safety and influence of environmental factors on physical activity.

Internal consistency reliability for the Physical Activity component of PACE+ is acceptable (>.70) with test and retest estimates of reliability above .75 (Norman et al., 2005). Physical Activity component of PACE+ demonstrate strong evidence of divergent validity (Norman et al., 2006).

Sedentary Behavior Component of PACE+

The PACE+ Adolescent Sedentary Behavior survey composed of eight subsets of questions that analyze contributing factors to sedentary behaviors. These subsets identify areas of change behavior strategies, pros and cons, and self-efficacy. Intertwined within these questions are the concepts of support provided by family and friends and personal enjoyment experienced during inactivity. Sedentary behaviors are described as activities that lack significant amount of energy expenditure to perform (Norman et al., 2004). Examples of sedentary behaviors include television viewing and computer gaming. Activities excluded from

this category are completing homework, reading, and researching information through the use of a computer (Norman et al., 2004).

The participants' stage of change behavior is established in the first three questions of this instrument. The criteria for the action-stage of change behavior are defined as less than two hours of sedentary activity (Norman et al., 2004). A 12-item questionnaire was created to evaluate the pros and cons of reducing sedentary behaviors. In this section, the adolescent is asked to rate the importance of each statement with responses ranging from *Not Important*= 1 to *Extremely Important*=5. A seven-item questionnaire was developed to assess the confidence of reducing sedentary behaviors by rating responses as *I'm sure I can't*= 1 to *I'm sure I can*= 5.

The remaining eight questions evaluate the participants' social support system and how this influences sedentary lifestyle decisions. Participants are asked about the number of days per week that a household member provided encouragement to reduce inactivity. Responses are based on a 5-point Likert scale from *Never* =1 to *every day* = 5 (Norman, Sallis, & Gaskins, 2005).

Similarly, sedentary behaviors influenced by peers are assessed with regards to encouragement and support of participating in physical activity (Norman et al., 2005). In reference to a typical week, participants are asked to use a five-point scale from *Never* =1 to *every day* = 5 to determine frequency. A single-item question assesses enjoyment level of physical activity and sedentary behaviors (Norman et al. 2005). This is based on a five-point scale ranging from *strongly disagree* = 1 and *strongly agree* = 5.

The internal consistency for this multiple item scale was acceptable with a Cronbach's alpha of .75 for initial test and .78 for retest (Norman et al. 2005). The construct validity of sedentary behavior change staging is supported with significant associations with the MTI

Actigraph accelerometer, which collects information about duration of activity (Hagler, Calfas, Norman, Sallis, & Patrick, 2006). Strong generalized evidence of convergent validity was also demonstrated (Hagler et al., 2006).

Dietary Fat Reduction Component of PACE+

The PACE+ Dietary Fat Reduction survey evaluated factors that impact nutrition intake of the adolescent. Similar to the PACE+ Sedentary Behavior instrument, the survey examines change behavior strategies, self-efficacy, decisional balance, family influences, and peer influences as it relates to nutrition (Hagler, Norman, Radick, Calfas, & Sallis, 2005). Eight-items assess the participant's confidence in their ability to decrease daily consumption of dietary fat with responses on a five-point Likert scale ranging from *1* = I'm sure I can't to *5* = I'm sure I can. Three-items evaluate the perspective of pros and cons of decreasing dietary fat intake. Rating of importance are *1*= not at all important to *5*= extremely important. Family and peer influences on dietary fat consumption are analyzed in two separate scales with four items each. These items inquire about frequency of encouragement and support to consume less dietary fat. Items are asked in reference to a typical week with responses based on a five-point scale from *1* = never to *5* = every day (Hagler et al. 2005). Good internal consistency has been demonstrated for this instrument with a Cronbach's alpha of .81 and .85 for test-retest reliability (Hagler et al., 2005).

Fruit & Vegetable Consumption of PACE+

The PACE + Fruit and Vegetable Consumption questionnaire specifically analyzes internal and external influences on dietary habits. Fifteen items examined the stage of change behavior regarding intake of fruits and vegetables. This sub-survey assessed how often each strategy is used with a five-point Likert scale ranging from *1* meaning never to *5* meaning many

times. A seven-item series of questions determine the participant's confidence in increasing their daily consumption of fruits and vegetables (Hagler et al., 2005). Each item is on a five-point scale ranging from *1*= I'm sure I can't to *5* = I'm sure I can.

Decisional balance comprises the pros and cons of behavior change related to nutrition (Hagler et al., 2005). Ten questions are constructed to perceive the positive and negative aspects of increasing consumption of fruits and vegetables (Hagler et al., 2005). Participants rate the level of importance with *1* indicating not at all important to *5* indicating extremely important.

Family and peer influences are evaluated to determine encouragement and support. Family and peer support are evaluated through a series of four questions each. Participants are asked to indicate the frequency in days per week they encounter the concept in question using a five-point scale from *1* indicating never to *5* indicating every day. A single-item question assesses fruit and vegetable enjoyment based on a five-point scale ranging from *strongly disagree* = 1 and *strongly agree* = 5.

The internal consistency for the fruit and vegetable intake survey performed in the fair-to-excellent range, with Cronbach's alpha ranging from .77 and .96 (Hagler et al., 2005). Concurrent validity was established through comparison between the Fruit and Vegetable Screening measure and the four-item Youth Risk Behavior Survey (YRBS) with a 3-day food record serving as the validity criterion (Prochaska & Sallis, 2004). The Fruit and Vegetable Screening tool was more strongly correlated with the 3-day food record data ($r = .23$, $p < .01$) as compared to the YRBS fruit and vegetable scale ($r = .04$, $p = .67$) (Prochaska & Sallis, 2004).

Data Collection

Personal information was gathered prior to implementing this program and included a physical assessment completed by the researcher who is a family nurse practitioner. As

discussed previously, children who are overweight or obese often experience elevated systolic blood pressure. Therefore, the students' blood pressures were documented prior to initiation and upon completion of the wellness program.

Another important component of the data collection included waist circumference, height, weight, and body mass index (BMI). This helped determine their body mass index for age percentile and define whether the adolescent was categorized as overweight, obese, or at risk of becoming overweight. Waist circumference was obtained using a gulick tape and measured above the child's bare iliac crest. The students were weighed wearing their daily attire (shirt, pants, or skirts) and asked to remove shoes, coats, and jackets. Weight was obtained through the use of the Tanita BF-684W digital calibrated portable scale. Participants' height was measured without wearing shoes using a portable stadiometer. The Tanita BF-648W has a 440 lb (200kg) capacity with 0.2 lb (0.1 kg) weight increments (Step Right Up, 2016). The scale has an 8 mm thick glass platform with a blue LCD display (Step Right Up, 2016). The scale is capable of measuring body weight, body fat percentage, and body water percentage; however, only body weight was collected from participants. In a comparison of six scales, the Tanita BF-684W received the highest quality rating of 73 with excellent weight accuracy, display, and very good weight repeatability (Step Right Up, 2016).

Thorough examination of cardiovascular, respiratory, and musculoskeletal was completed by the family nurse practitioner to assess for presence of any abnormalities, such as abnormal cardiac, respiratory, and/or musculoskeletal findings, and/or acanthosis nigricans (a physical sign of insulin resistance), which would have required further medical assessment by their primary care physician or a local clinical health care professional. However, the primary investigator did not find evidence of abnormal cardiac, respiratory, or musculoskeletal findings within the

participants. The anthropometric, demographic, and PACE + data were entered into SPSS 22 database for analyses. Data collected was entered into a password protected desktop computer with an additional security program called Norton Security with Backup for prevention of loss data.

Sampling Method with Inclusion and Exclusion Criteria

To obtain participants for this study, an information session and PowerPoint presentation was performed at Early College Georgia College. The primary investigator was allowed to speak with students about the program and answer questions from participants and parents/guardians before signing parental consent and minor assent forms. Letters were also sent home to the parents about the program. The inclusion criteria for this program included current enrollment at Early College, between the ages of 14 to 17, English literacy, possess the ability to participate in moderate physical activity, have no known sensitivity to nickel, and able to provide informed assent/consent. Participants were excluded from the study if they had pre-existing health conditions that limit participation in sports and physical activities or any pending disciplinary actions (suspension or expulsion) that would jeopardize the completion of the study.

Week 1

Week 1 consisted of an introduction to nutrition and incorporating physical activity into the students' daily routine. The participants explored personal concepts and perspectives related to nutrition and physical activity. This began the dialogue about health behaviors and allowed the family nurse practitioner to begin identifying gaps in knowledge base for each participant. Additional conversation included identifying barriers that prevent students from practicing healthy lifestyle behaviors. Also, motivators fro developing and practicing healthy behaviors

were explored. The students were introduced to the SuperTracker website, which provided resources to help students establish positive health behaviors. The participants were shown features, such as the SuperTracker scavenger hunt, site tour video, and user guide. The second session of the week consisted of the students participating in Fitness Personal Best, which evaluated their current fitness levels and allowed the students to set personal goals.

Week 2

Week 2 was entitled "Track Your Snack" and provided information about healthy snack choices. Lesson objective included identifying the importance of healthy snacking, nutritional content, and monitoring total calorie and sodium intake in each participant's diet. Students were able to engage in activities on the SuperTracker website and learn how to navigate through the information provided. Additional material, such as handouts and brochures, were given to reinforce learning. The second session for week two incorporated the iFreestyle Aerobics component of SPARK to improve aerobic capability, strength, and flexibility. The students were led by the family nurse practitioner through a series of seven different moves, which lasted 30 to 40 minutes. The activity began with a 10-minute warm-up and ended with a 10-minute cool down. At the end of the week 2, the students were provided with a homework assignment for the weekend requiring them to log in to the SuperTracker website to track their snacks to identify different components discussed during our classroom session.

Week 3

At Week 3 was entitled "What's Your Plan?" where the students were introduced to the role of the five food groups and how they meet our daily nutrient and caloric needs. Handouts were distributed and the ChooseMyPlate.gov website was explored during class. Students were shown how to create their profile on the SuperTracker website and how to save their data and

access their account on an ongoing basis. The second session for the week taught the students about cardio kickball to improve cardiovascular health. The kickball exercises were led by the family nurse practitioner and last for 45 minutes with a 10-minute warm-up and 10-minute cool-down period. The importance of performing these with caution was reinforced by the nurse practitioner for safety purposes. At the end of week 3, the students were given a homework assignment to create and personalize their account and complete information about their total caloric intake and nutritional value of food consumed.

Week 4

Week 4 included the Three-Day Food Record to reflect on their experience tracking and analyzing their foods. During this week, students received the opportunity to track and analyze their dietary intake and enter their daily food selections into the 3 day SuperTracker's Food Tracker feature on their website. Additionally, students were able to determine whether their meal selections meet their daily calorie allowance and food group targets.

Week 4 also incorporated the "Build Healthy Meals" lesson plan, which taught students how to plan a daily menu that meets all of their food group targets within their daily calorie allowance. Students were shown how to create daily meal plan using the SuperTracker's Food Tracker and complete the *Build Healthy Meals* handout as their homework assignment for the week. For the final week of the program, participants engaged in high intensity interval training (HIIT) outlined by SPARK physical education program. Additionally, the students performed Fitness Personal Best physical activity and compared their performance from baseline to completion to determine improvement of fitness level.

The final classroom session consisted of an overview of information provided during the previous weeks and the students were given the PACE + surveys to compare the pre- and post-

test data. After completion the surveys, students were provided with $10.00 Wal-Mart gift cards by the family nurse practitioner.

Feasibility

The cost of this study was estimated as $1,540.97. The three items with the greatest cost included the Jawbone UP Move activity trackers for each participant ($268.20 for 30 devices), fruit and vegetable snacks ($539.82 [$29.99 per session]) that were served after completion of each session, and the $10.00 gift cards ($300.00) after completion of the study. Additional costs include copy paper ($27.00), pens ($20.00), notebooks ($75.00 for 30 notebooks), staples ($4.29), business cards ($24.00), paper plates ($61.75), disposable utensils ($50.99), and water bottles ($169.92). The Annie Pettigrew Jones Endowed Nursing Grant and Marjorie G. Prentice Graduate Research Endowed Scholarship supported funding of this translational project.

CHAPTER IV

Results

The research findings of this translational project, which aimed to positively influence the outlook of rural Georgia adolescents regarding healthy lifestyle practices, are outlined in this section. Findings to be address include demographic information of the participants, parental educational background, reliability of the instruments, and data addressing the research questions.

The data collected was screened for discrepancies prior to performing statistical analyses. All continuous variables were examined to determine distribution using descriptive statistics for central tendency and Fisher's exact for skewness and kurtosis. Paired sample *t*-tests were performed to determine differences between pretest and posttest scores of each variable. Data was analyzed through the use of SPSS 22 statistical software. Statistical significant is reported using *p* values with .05 alpha level.

Further evaluation for missing data was performed. Three pre-test items from the Physical Activity Change Strategies were identified as missing four responses (n=16). Missing data was replaced by computing the sample mean of the missing variable as recommended by one of the creators of the instruments, Dr. Jim Sallis (J. Sallis, personal communication, June 1, 2016).

Sample Characteristics

The convenience sampling of study participants, as shown in Table 1, consisted of 13 females and 7 males that were interested after the information session was held at Early College at Georgia College. 75% of the study participants were African American (n= 15). Three

participants were Caucasian and two were Hispanic. 80% of the participants were in 11th grade (*n*= 16) with four students in 8th grade. Ages ranged from 14 to 17 (M= 16.2, SD= 1.01). Parental education level was examined and 60% of the mothers of the study participants obtained a high school diploma (*n*=12), 15% completed some college or technical school (*n*=3), 10% graduated from a technical school (*n*= 2), and 15% graduated from a college (*n*=3). 75% of the fathers of the study participants obtained a high school diploma (*n*=15) with the remainder consisting of some college or technical school or graduating from a technical school (Table 1).

The Fisher's exact skewness and kurtosis for the variable age, grade, and race were not normally distributed in this sample and are discussed in detail in the following sections (Munro, 2005). The Fisher's exact skewness statistic for age was 3.12 and kurtosis was 1.95. Due to this translational project consisting of convenience sampling, age was not used in the data analysis. Additionally, there were more 11th grade students than 8th grade students due to the convenience sampling method of this study. The Fisher's exact skewness statistic for grade levels was 3.17 and kurtosis was 0.84. For race the Fisher's exact skewness statistic was 3.59 and kurtosis was 1.38.

Table 1

Demographic Characteristics of the Participants

Variables	*N*	(%)	Mean *(SD)*	Range
			16.20 *(1.01)*	14 – 17
14	2	(10)		
15	2	(10)		
16	6	(30)		
17	10	(50)		
Ethnicity	20			
African American	15	(75)		
White	3	(15)		
Hispanic	2	(10)		

(Table 1 continues)

(Table 1 continues)

Variables	*N*	(%)	Mean *(SD)*	Range
				14 – 17
Gender				
Female	13	(65)		
Male	7	(35)		
Grade Level				
8th Grade	4	(20)		
11th Grade	16	(80)		
Maternal Education Level				
High School	12	(60)		
Some College or Technical School	3	(15)		
Graduated from a Technical School	2	(10)		
Graduated from a College	3	(15)		
Paternal Education Level				
High School	15	(75)		
Some College or Technical School	3	(15)		
Graduated from a Technical School	2	(10)		

Description of Research Instruments

This section outlines each study instrument, reliability in this sample, the mean scores and standard deviations (Table 2). The Flesch-Kincaid formula estimated the surveys to be at a seventh-grade reading level. A Cronbach alpha of greater than .70 was considered acceptable for this translational project (DeVellis, 2012).

Pearson Correlation

A Pearson correlation was computed to assess the relationship between all 70 variables

within this study. Moderate correlations were observed in the sedentary habits decisional balance cons posttest values and pretest dietary fat pros (r=.53, n=15, *p*=.04), posttest sedentary habits changes strategies (r= .62, n=15, *p*=.02), posttest dietary fat confidence (r=-.57, n=15, *p*=.03), posttest sedentary habits family support (r=.56, n=15, *p*= .03), and posttest sedentary habit friend support (r=.63, n=15, *p*=.01). Also, moderate correlation was shown in the pretest fruits and vegetables cons decisional balance values and pretest fruits and vegetables change strategies (r=.54, n=20, *p*= .01), posttest **dietary fat change strategies** (r=.54, n=15, *p*= .04), pretest physical activity environmental factors (r=-.45, n=20, *p*=.05), and pretest fruits and vegetables friend support (r=.47, n=20, *p*=.04). These findings are shown in Table 2.

Table 2

Pearson Correlation between Major Variables

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Weight	-																
2	BMI	.96**	-															
3	BMI Percentile	.70**	.74**	-														
4	SBP	.73**	.66**	.65**	-													
5	DBP	.58**	.56**	.56*	.79**	-												
6	Waist Circ	.94**	.91**	.75**	.67**	.57**	-											
7	Age	.03	-.04	-.13	.06	-.12	-.03	-										
8	Race	.29	.33	.10	.06	.19	.26	-.63**	-									
9	Gender	.013	.14	.09	-.18	.05	.10	.15	-.02	-								
10	May 23	-.19	-.17	-.31	-.35	-.10	-.19	.03	.05	.58**	-							
11	Post Int Height	-.14	-.07	-.29	-.38	-.05	-.23	-.14	.21	.36	.69**	-						
12	Post Int DBP	-.09	-.06	-.24	-.27	-.13	-.16	-.02	.40	.01	.40	.68**	-					

13	Post Int Weight	.39	.46	.12	.06	.13	.24	-.15	.43	.15	.22	.53*	.59*	-					
14	Post Int SBP	.15	.20	.06	.03	.08	-.02	-.12	.42	-.16	.23	.57*	.80**	.68**	-				
15	Post Int Waist Circ	.28	.34	.05	-.04	-.02	.18	-.23	.37	.24	.29	.55*	.57*	.94**	.55*	-			
16	Post Int BMI	.45	.51	.19	.15	.13	.31	-.12	.42	.05	.04	.27	.46	.96**	.59*	.89**	-		
17	Post Int BMI Percentile	.09	.11	.05	-.03	-.13	.08	-.40	.33	-.24	-.17	.10	.48	.65**	.45	.73**	.69**	-	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Change Strategy

The Physical Activity, Dietary Fat, Sedentary Habit, and Fruits and Vegetables surveys contain this 15-item subscale, which aimed to assess the participants' views on incorporating activities and daily behaviors that foster a healthy active lifestyle within a month timeframe. The response format determined frequency with a 5-point Likert scale ranging between 'Never', denoting a value of 1 to 'Many Times' corresponding to a value of 5. These values are used to determine the mean score. Each of these items is described in detail in the following sections.

Physical Activity Change Strategies. The 15-item evaluation of change strategies began by asking the participant how frequently they "look for information about physical activity or sports" (PACE, 2001). This is followed by performing task such as tracking the amount of physical activity and whether they "find ways to get around the things that get in the way of being physically active" (PACE, 2001). In attempt to determine how environment factors into frequency of physical activity the participant is asked whether they "think about how my surroundings affect the amount of physical activity I do", and "put reminders around my home to be physically active" (PACE, 2001). Analyzing how physical activity can be made more

pleasurable participants are asked if they "reward myself for being physically active", finding ways to "make physical activity more enjoyable", focusing on "the benefits I will get from being physically active", and "less about the hassles of being active" (PACE, 2001). The authors of this instrument incorporated a psychosocial component to this subscale by asking if participants "say positive things to myself about physical activity", and having a support system such as "friend or family member who encourages physical activity" (PACE, 2001). Lastly, the participants are asked if they "try different kinds of physical activity so [they] have more options to choose from", "set goals to do physical activity", and "make back-up plans" for physical activity (PACE, 2001).

Each of these questions were followed by answer choices, which were 'never' denoting a value of 1, 'almost never' denoting a value of 2, 'sometimes' corresponding to a value of 3, 'often' indicating a value of 4, and 'many times' indicating a value of 5. The sum of these questions are calculated and divided by fifteen to create composite strategy score. Composite scores of less than three indicated minimal use of change strategies to facilitate involvement in physical activity. Alternatively, scores greater than three suggest the participant actively applied these ideas to assist with improving frequency of physical activity and foster healthy lifestyle practices.

The pretest Cronbach's alpha for the Physical Activity Change Strategies subscale was .95 and posttest Cronbach's alpha was .97. These results are displayed in Table 3. The Fisher's measure of skewness for the pretest Physical Activity Change Strategies was 0.92 and the kurtosis was 0.41. The posttest Fisher's measure of skewness was -0.69 and the kurtosis was 0.52

Dietary Fat Change Strategies. The 15-item Dietary Fat Change Strategies sub-survey was introduced to the participants as activities and perspectives used in the reduction of dietary fat consumption. The participants are asked if the following statements are similar to their own experiences in the past month. Aspects of organizing and planning a low-fat diet are examined with questions such as "I set goals to eat low-fat foods", "I put reminders around my home to eat low-fat foods", "I keep track of how much high fat food I eat", and "I make back-up plans to be sure I eat low-fat foods" (PACE, 2001). Psychosocial components are analyzed by asking whether participants "say positive things about eating low-fat foods", "do things to make low-fat foods more enjoyable", focus on "the benefits I will get from eating low-fat foods", and maintaining a support system such as "a friend or family member who encourages me to eat low-fat foods" (PACE, 2001). Lastly, adolescents were asked if they "look for information about eating low-fat foods", "try different kinds of low-fat foods", and consider how their surrounding affect consumption of high fat food (PACE, 2001).

Each statement was followed by answer choices with values of 1 through 5. The answer choice 'never' corresponded to a value of 1, 'almost never' denoted a value of 2, 'sometimes' corresponded to a value of 3, 'often' indicated a value of 4, and 'many times' denoted a value of 5. Calculating the mean of the items created a composite strategy score for each participant. Composite scores of less than three indicated minimal use of change strategies to decrease consumption of dietary fat. Scores greater than three signified use of these concepts to assist with a low-fat diet.

The pretest Cronbach's alpha for the Dietary Fat Change Strategies subscale was .94 and posttest Cronbach's alpha was .96. These results are displayed in Table 3. The pretest Fisher's measure of skewness was -0.76 and kurtosis was 0.71. The posttest Fisher's exact skewness

statistic was -2.56 and kurtosis was 1.56. Further inspection was conducted with a histogram and Q-Q normality plots, which was bell-shaped and normally distributed.

Sedentary Habits Change Strategies. This 15-item sub-survey asked each adolescent to consider whether they have utilized change strategies in the reduction of sedentary habits over the past month. These strategies include discerning how their environment affects the amount of time spent sedentary, identifying ways to reduce sedentary habits, and setting short- and long-term goals for reducing sedentary time. Statements such as "I keep track of how much time I spend being sedentary", "I think about the benefits I will get from reducing my sedentary time", and "I do things to make sedentary habits less enjoyable" are utilized in this subscale to analyze the application of methods that aid in the reduction of sedentary behavior.

Each of these statements was followed by answer choices ranging from 1 to 5. The answer selection of 'never' denoted a value of 1, 'almost never' signified a value of 2, 'sometimes' corresponded to a value of 3, 'often' indicated a value of 4, and 'many times' translated a value of 5. A composite strategy score was computed by determining the mean of this subscale. Composite scores of less than three signified limited use of change strategies to reduce sedentary behavior. Scores greater than three suggested the adolescent applied these ideas to lessen or eliminate sedentary habits.

The pretest Cronbach's alpha for the Sedentary Habits Change Strategies was .92 and the posttest Cronbach's alpha was .96. These results are depicted in Table 3. The pretest Fisher's exact skewness statistic was -1.04 and kurtosis was 0.89. The posttest Fisher's exact skewness statistic was -0.71 and kurtosis was 0.65.

Fruits and Vegetables Change Strategies. The 15-item sub-survey examined the use of activities and perspectives to help incorporate fruit and vegetable consumption during the past

month. The participant was about behaviors such as researching "information about ways to eat more fruits and vegetables" and creating strategies to "get around the things that get in the way of eating fruits and vegetables" (PACE, 2001). Their perspectives were assessed with statements such as "I say positive things to myself about eating fruits and vegetables", emphasizing the "benefits I will get from eating fruits and vegetables", and concentrating on "the benefits of eating fruits and vegetables and less about the hassles of healthy eating" (PACE, 2001).

These statements were followed by answer choices with values of 1 through 5. The answer choice 'never' corresponded to a value of 1, 'almost never' denoted a value of 2, 'sometimes' corresponded to a value of 3, 'often' indicated a value of 4, and 'many times' denoted a value of 5. The mean of the items created a composite strategy score for each participant. Composite scores of less than three indicated minimal use of strategies shown to increase fruit and vegetable consumption. Scores greater than three signified use of these concepts to assist with a healthy diet that incorporates fruits and vegetables.

The pretest Cronbach's alpha for the Fruits & Vegetable Change Strategies was .94 and the posttest Cronbach's alpha was .91. This information is displayed in Table 3. The pretest Fisher's exact skewness statistic was 0.6 and kurtosis was 0.61. The posttest Fisher's exact skewness statistics was -1.67 and kurtosis was 1.2.

Decisional Balance

The Physical Activity, Dietary Fat, Sedentary Habits, and Fruits and Vegetable surveys consisted of this subscale that primarily focused on two constructs labeled as "Pros" and "Cons" of change. Specifically, these addressed areas of negative and positive beliefs surrounding cognitive and motivational aspects of decision-making related to healthy lifestyle practices. These questions were categorized into the pros of change and the cons of change and the mean is

calculated.

***Physical Activity Decisional* Balance.** The Physical Activity Decisional Balance is divided into five 'pros' statements and five 'cons' statements. The adolescent is asked to rate how important each statement is to incorporate physical activity into their daily lives. The 'pros' statements focused on factors such as improving fitness level and self-esteem, pleasing family members, and enjoying sports with friends. The 'cons' emphasized concepts like embarrassment of partaking in physical activity, "too much to learn to do physical activity", discomfort involved in performing sports and exercise, and physical activity "takes time away from being with friends" (PACE, 2001).

The answer choices range from 'not important' to 'extremely important'. The answer selection of 'not important' was assigned a value of 1, 'slightly important' denoted a value of 2, 'moderately important' indicated a value of 3, 'very important' corresponded to a value of 4, and 'extremely important' was assigned a value of 5. The statements were separated by the 'pros' and 'cons' categories and a composite strategy score was calculated. Scoring of less than three indicated the individual did not identify with the set of statements and scores higher than three suggested the participant favored this perspective. The scores for the 'pros' and 'cons' were compared for each participant to analyze whether they identified with the positive or negative viewpoints of physical activity.

The pretest Cronbach's alpha for the Physical Activity Pros subscale was .94 and the posttest Cronbach's alpha was .82. The pretest Cronbach's alpha for the Physical Activity Cons subscale was .78 and the posttest Cronbach's alpha was .92. As mentioned previously, a Cronbach alpha of greater than .70 was considered acceptable for this translational project (DeVellis, 2012). The pretest Physical Activity Pros Fisher's exact skewness statistic was 1.07

and kurtosis was .86. The posttest Fisher's exact skewness was -1.22 and kurtosis was 0.26 for the Physical Activity Pros. The pretest Physical Activity Cons Fisher's exact skewness statistic was 1.7 and kurtosis was 0.38 with a posttest Fisher's exact skewness statistic of 1.58 and kurtosis of 0.85.

Dietary Fat Decisional Balance. The participants of the study were asked about different beliefs surrounding high-fat foods. This subscale consisted of three questions that focused on the 'pros', which motivate adolescents to reduce their dietary fat consumption and five questions that emphasized the 'cons' or beliefs often seen in individuals who have high-fat diets. The 'pros' statements focused on disapproval from others related to consuming high-fat foods and health problems associated with increased fat in their diet. The 'cons' statements highlighted the ease of consuming high fat foods due to availability and the enjoyment of a high-fat diet by suggesting the individual can be "happier and more fun to be around" (PACE, 2001).

The answer selections included 'not important', which has a value of 1, 'slightly important' indicating a value of 2, 'moderately important' denoting a value of 3, 'very important' indicating a value of 4, and 'extremely important' was assigned a value of 5. The three 'pros' statements and five 'cons' statements were calculated into separate composite strategy scores. Scoring of less than three signified the adolescent did not view these beliefs as important regarding dietary fat consumption. Scores higher than three indicated the participant favored this viewpoint. During analysis these scores were compared for each adolescent to determine whether they identified with the positive or negative viewpoints of dietary fat consumption.

The Cronbach's alpha for the pretest Dietary Fat Decisional Balance Pros was .77 and the posttest was .90. The Cronbach's alpha for the pretest Dietary Fat Decisional Balance Cons was .85 and posttest was .91. These results are displayed in Table 3. The Fisher's exact skewness

statistic for the pretest Dietary Fat Decisional Balance Pros was 1.25 and kurtosis was 1.07. The posttest Fisher's exact skewness statistic for Dietary Fat Decisional Balance Pros was -0.3 and kurtosis was 0.42. The Fisher's exact skewness statistic for the pretest Dietary Fat Decisional Balance Cons was 0.47 and kurtosis was 1.12. The posttest Fisher's exact skewness statistics for Dietary Fat Decisional Balance Cons was 2.84 and kurtosis was 1.81. This variable was further examined through the use of a histogram and Q-Q normality plots, which was bell-shaped and normally distributed.

Sedentary Habits Decisional Balance. This 12-item subscale examined contrasting beliefs related to sedentary habits. Four 'pros' statements concentrated on ideas that foster the reduction of sedentary behavior and eight 'cons' statements emphasized thoughts that promote sedentary habits. The 'pros' statements included items that focused on pleasing parents with "less time playing computer/video games", discomfort associated with television viewing such as headaches, and sedentary behavior "takes time away from doing other more important things" (PACE, 2001). The 'cons' statements highlighted psychosocial aspects of sedentary habits such as enjoyment, improved self-esteem "when I do well at my favorite computer games", and disappointment from peers if the individual spent "less time talking on the phone with them" (PACE, 2001).

Similar to the other decisional balance subscales, the adolescent was asked to rank the level of importance of each statement. The answer selections included 'not important' corresponded to a value of 1, 'slightly important' indicated a value of 2, 'moderately important' denoted a value of 3, 'very important' was assigned a value of 4, and 'extremely important' indicated a value of 5. These statements were separated by 'pros' and 'cons' categories and composite scores were calculated. Scoring of less than three indicated the adolescent did not

view these beliefs as important regarding reducing sedentary habits. Scores higher than three suggested the participant favored this viewpoint. These scores were compared for each adolescent to determine whether they identified with the positive or negative viewpoints of sedentary habits.

The pretest Cronbach's alpha for the Sedentary Habits Decisional Balance Pros subscale was .81 and the posttest Cronbach's alpha was .90. The pretest Cronbach's alpha for the Sedentary Habits Decisional Balance Cons subscale was .78 and the posttest Cronbach's alpha was .92. These findings are located in Table 3. The pretest Sedentary Habits Decisional Balance Pros Fisher's exact skewness statistic was 1.66 and kurtosis was 1.00. The posttest Fisher's exact skewness was 1.00 and kurtosis was 0.78 for the Sedentary Habits Decisional Balance Pros. The pretest Sedentary Habits Decisional Balance Cons Fisher's exact skewness statistic was 0.23 and kurtosis was 0.45 with a posttest Fisher's exact skewness statistic of 2.28 and kurtosis of 1.6. To assure normality of the posttest Sedentary Habits Cons variable, a histogram and Q-Q normality plots were constructed, which revealed a bell-shape and normal distribution.

Fruits and Vegetables Decisional Balance. This 15-item sub-survey analyzed the participants' thoughts and beliefs about fruit and vegetable intake. Statements that aid in consuming five or more serving of fruits and vegetables per day were called 'pros' and statements that hinder this recommended intake of fruits and vegetables were labeled 'cons'. The 'pros' included statements centered on increased energy, healthier lifestyle practices, and improving the start of each day through the intake of fruits and vegetables. The 'cons' statements involved the inconvenience of preparing fruits and vegetables and feeling of embarrassment "if other kids saw me eating fruits and vegetables" (PACE, 2001).

The adolescents are asked to rank their responses to each statement based on importance

with 1 for ‘not important’ to 5 for ‘extremely important’. The answer selection of ‘slightly important’ had a value of 2, ‘moderately important’ was assigned a value of 3, and ‘very important’ had a value of 4. The statements were separated by ‘pros’ and ‘cons’ and the mean was calculated. The category with the higher mean score equated to the adolescent’s dominant perspective related to the consumption of fruits and vegetables.

The Cronbach’s alpha for the pretest Fruits and Vegetables Decisional Balance Pros was .89 and posttest was .71. The pretest Fruits and Vegetables Decisional Balance Cons was .70 and posttest was .77. This is displayed in Table 3. The pretest Fisher’s exact skewness for Fruits and Vegetables Decisional Balance Pros was -0.92 and kurtosis was 0.51. The posttest Fisher’s exact skewness for Fruits and Vegetables Decisional Balance Pros was -0.19 and kurtosis was 0.71. The Fisher’s exact skewness for Fruits and Vegetables Decisional Balance Cons pretest was 0.5 and kurtosis was 1.01. The posttest Decisional Balance Cons Fisher’s exact skewness was 0.88 and kurtosis was 1.03.

Self-Efficacy

Self-efficacy is measured in these four surveys through evaluating the participant’s confidence to meet a desired behavior in situations that present barriers such as weather and other obligations. Participants responds to these questions on a 5-point Likert scale with answer choices that include ‘I’m sure I can’t’ with a value of 1 to ‘I’m sure I can’ that has a value of 5. The mean is calculated with higher scores denoting the likelihood of incorporating the behavior despite barriers.

Physical Activity Self-Efficacy. The Physical Activity Self-Efficacy sub-survey consisted of six questions that examined the participant’s ability to incorporate physical activity into daily lifestyle practices despite barriers. These barriers include depressed mood, family or peer

obligations, school activities, and weather disturbances (rain, extreme heat, etc.). Additionally, the adolescent is asked about designating "time for physical activity on most days of the week" as well as arising early "even on weekends to do physical activity" (PACE, 2001).

After reading each question, the students were asked to how confident they are at participating in physical activity in each scenario. The answer choices included 'I'm sure I can't' indicating a value of 1, 'I probably can't' denoting a value of 2, 'neutral' corresponding to a value of 3, 'I probably can' indicating a value of 4, and 'I'm sure I can' corresponding to a value of 5. The composite score was calculated and scores higher than three suggest self-efficacy for incorporating physical activity. Scores of three or lower translate to low self-efficacy related to physical activity.

The Cronbach's alpha for the Physical Activity Self-Efficacy pretest was .87 and the posttest was .97. The Fisher's measure of skewness for the pretest was -0.01 and kurtosis was 0.63. The Fisher's measure of skewness for the Physical Activity Self-Efficacy posttest was -0.72 and kurtosis was 0.14.

Dietary Fat Self-Efficacy. The Dietary Fat Self-Efficacy subscale contained eight questions that aimed to evaluate the participants' ability to select low-fat foods while encountering obstacles such as dining at restaurant. Examples of these questions included, "choosing low fat foods when others around are eating high fat foods" and consuming "low fat foods when craving high fat foods" (PACE, 2001).

The participants were asked to evaluate their ability to perform these behaviors. The answer choices included 'I'm sure I can't' indicating a value of 1, 'I probably can't' signifying a value of 2, 'neutral' indicating a value of 3, 'I probably can' corresponding to a value of 4, and 'I'm sure I can' indicating a value of 5. The mean was calculated and a score of greater than

three suggesting self-efficacy for reducing dietary fat. Scores of three or less implied low confidence in their ability prevent obstacles from influencing their dietary habits.

The Cronbach's alpha for the Dietary Fat Self-Efficacy pretest was .95 and the posttest was .95. The Fisher's measure of skewness for the pretest was 1.08 and kurtosis was 0.3. The Fisher's measure of skewness for the Dietary Fat Self-Efficacy posttest was 1.17 and kurtosis was 0.21.

Sedentary Habits Self-Efficacy. This seven-item sub-survey evaluated the participants' ability to reduce the amount of time spent sedentary in various situations. These included two-hour limitations on television viewing, establishing time limits on telephone conversation with peers, and setting a one-hour limit on computer games. Additional questions included "planning ahead of time what TV shows you will watch during the week" and "listening to music while you are being active" (PACE, 2001).

The answer choices ranged from 'I'm sure I can't', which was assigned a value of 1, 'I probably can't' indicated a value of 2, 'Neutral' corresponded to a value of 3, 'I probably can' indicated a value of 4, and 'I'm sure I can' denoting a value of 5. The composite score was calculated for each participant and scores greater than three indicated confidence related to reducing the amount of time spent sedentary. Scoring of three or less indicated low self-efficacy for limiting sedentary habits.

The pretest Cronbach's alpha for this subscale was .88 and posttest was .96. These findings are depicted in Table 3. The Fisher's measure of skewness for the pretest Sedentary Habits Self-Efficacy subscale was 1.16 and kurtosis was 0.28. The posttest Fisher's measure of skewness was -0.48 and kurtosis was 0.57.

Fruits and Vegetables Self-Efficacy. This sub-survey consisted on seven questions that

examined the participant's confidence related to incorporate fruit and vegetable intake. Situations were described to participants, such as asking a family member to purchase fruits and vegetables and consuming fruits and vegetables while dining at restaurants, and they were asked to select the ability to perform the task.

Choices for each questions included 'I'm sure I can't', which was assigned a value of 1, to 'I'm sure I can' corresponding to a value of 5. Additional answer selections were 'I probably can't' denoting a value of 2, 'Neutral' indicating a value of 3, and 'I probably can' corresponding to a value of 4. The composite score was calculated for each participant. Scores greater than three signified high self-efficacy for the consumption of fruits and vegetables. Scores of three or less suggested poor confidence related to the intake of fruits and vegetables.

Family Support

Each of the surveys examined the relationship of family influence in the target behavior. Adolescents were asked about family support during a typical week. This included encouragement and participation from the family members. Responses ranged between 'Never' indicating a value of 1 to 'Every day' with a value of 5. The higher composite score indicated considerable family support and a lower score signified little or no family support.

Physical Activity Family Support. The Physical Activity Family Support sub-survey consisted of four questions that evaluated the level of encouragement and participation the adolescent receive from their family during a typical week. In addition, the participant was asked if a member of their family provided "transportation to a place where you can do physical activity or play sports" (PACE, 2001). Also, this measure inquires about whether family members have "watched you participate in physical activity or play sports" (PACE, 2001).

Answer choices included 'Never' with the value of 1, '1-2 days' indicating the value of 2,

‘3-4 days’ corresponding to the value of 3, ‘5-6 days’ with the value of 4, and ‘every day’ indicating the value of 5. The mean was calculated for each participant with scoring of greater than three indicating family support that facilitates participation in physical activity. Scores of three or less signified lack of family involvement regarding sports and exercise.

The pretest Cronbach’s alpha for Physical Activity Family Support was .95 and posttest was .87. This is display in Table 3. The Fisher’s measure of skewness for the pretest Physical Activity Family Support was 0.94 and kurtosis was 1.13. The posttest Fisher’s measure of skewness was -0.23 and kurtosis was 0.68.

Dietary Fat Family Support. This four-question measure aimed to determine family involvement in facilitating a low-fat diet and healthy lifestyle. These questions asked whether members of the adolescent’s household encourage the consumption of low-fat foods and incorporate low-fat items into meals and snacks served in the home. Lastly, participants were asked about encouragement related to the intake of low-fat foods and family members applauding efforts.

The answer selections for this item included ‘Never’ with a value of 1, ‘1-2 days’ with a value of 2, ‘3-4 days’ indicating a value of 3, ‘5-6 days’ corresponding to a value of 4, and ‘Every day’ with a value of 5. The composite score was calculated for each participant. Scores greater than three implied family support for reducing dietary fat consumption. Scores of three or less denoted lack of family support related to establishing and maintaining a low-fat diet.

The pretest Cronbach’s alpha for this subscale was .96 and the posttest Cronbach’s alpha was .97. The Fisher’s exact measure of skewness for the pretest Dietary Fat Family Support subscale was 2.69 and kurtosis was 1.58. The posttest Fisher’s exact measure of skewness for this measure was -0.31 and kurtosis was 0.46. To ensure normality of the pretest Dietary Fat

Family Support subscale, the histogram and Q-Q plots were examined and revealed a bell-shape and normal distribution.

Sedentary Habits Family Support. The Sedentary Habits Family Support sub-survey questioned family support related to decreasing sedentary behavior. This four-question measure asked the participant about encouragement received from members of their household related to reducing the amount of time spent sedentary. Also, adolescents were asked whether family members discuss "how sedentary habits can be unhealthy" and helped create "ways to reduce the time you spend on sedentary habits" (PACE, 2001).

Answer choices for this sub-survey included 'Never' with the value of 1, '1-2 days' with the value of 2, '3-4 days' indicating the value of 3, '5-6 days' with the value of 4, and 'every day' corresponding to the value of 5. The composite strategy score was calculated for each participant. Scores greater than three indicated family support for reducing sedentary habits. Scores of three or less signified lack of family involvement related to sedentary behaviors.

The pretest Cronbach's alpha for this subscale was .70 and the posttest Cronbach's alpha was .92. Table 3 displays these findings. The pretest Fisher's exact measure of skewness was 0.79 and kurtosis was 0.68. The posttest Fisher's exact measure of skewness for the Sedentary Habits Family Support was -0.23 and kurtosis was 0.68.

Fruits and Vegetables Family Support. This four-item measure asked the participants about family involvement throughout a typical week that fosters the consumption of fruits and vegetables. Encouragement received from family members and incorporating "fruits and vegetables as a snack or part of a meal" are examples of questions asked to the adolescents in this study. Lastly, the students were asked if members of their household consume fruits and vegetables with them throughout the week.

The answer selection included ‘Never’ with the value of 1, ‘1-2 days’ with the value of 2, ‘3-4 days’ indicating the value of 3, ‘5-6 days’ with the value of 4, and ‘every day’ corresponding to the value of 5. The composite strategy score was calculated for each participant. Scores greater than three indicated family support for incorporating fruits and vegetables into their daily routine. Scores of three or less suggest limited family support related to adequate intake of fruits and vegetables.

The pretest Cronbach’s alpha for Fruits and Vegetables Family Support was .74 and posttest was .90. This is display in Table 3. The Fisher’s measure of skewness for the pretest Fruits and Vegetables Family Support was 0.04 and kurtosis was 0.81. The posttest Fisher’s measure of skewness was 1.33 and kurtosis was 0.51.

Friend Support

Similar to the family support section, this subscale assessed the individual’s friend support surround healthy lifestyle habits. In addition to encouragement and participation, this section inquired specifically about bullying during physical activity, healthy dietary practices, and reducing sedentary behaviors. The question regarding bullying was removed after consulting with Georgia College Early College Director, Dr. Runee Sallad, who confirmed the presence of anti-bullying school policies. Additionally, the school’s culture fosters each student’s social development skills to understand individual differences and establish mutual respect for others. Answer choices are ‘Never’ indicating a value of 1 to ‘Every day’ with a value of 5. Higher composite scoring shows adequate friend support and lower score display little or no friend support.

Physical Activity Friend Support. This four-question subscale aimed to evaluate how support received by peers influences participation in physical activity throughout the week.

Specific questions related to encouragement and participation of sports and exercise with friends were asked. Examples include, "do your friends ask you to walk or bike to school" and "do your friends tell you that you are doing well in physical activities" (PACE, 2001).

The answer selection for the Physical Activity Friend Support included 'Never' with the value of 1, '1-2 days' with the value of 2, '3-4 days' indicating the value of 3, '5-6 days' with the value of 4, and 'every day' corresponding to the value of 5. The mean was calculated for each participant. Scores greater than three indicated adequate friend support related to incorporating physical activity throughout the week. Scores of three or less suggested limited peer support related to exercise and sports participation.

The pretest Cronbach's alpha for this subscale was .82 and posttest was .93. This is display in Table 3. The Fisher's measure of skewness for the pretest Physical Activity Friend Support was 1.88 and kurtosis was 0.08. The posttest Fisher's measure of skewness was 0.4 and kurtosis was 1.04.

Dietary Fat Friend Support. The Dietary Fat Friend Support evaluated peer support for limiting the consumption of dietary fat. The subscale consisted three questions that discussed low-fat foods and encouragement received from peers that reinforce this positive behavior. Also, the participants were asked if "friends eat low-fat foods with you" (PACE, 2001).

Answer choices for this item included 'Never' with a value of 1, '1-2 days' with a value of 2, '3-4 days' indicated a value of 3, '5-6 days' corresponded to a value of 4, and 'Every day' with a value of 5. The composite score was calculated for each participant. Scores greater than three suggest peer support for reducing dietary fat consumption. Scores of three or less denoted lack of friend support related to establishing and maintaining a low-fat diet.

The pretest Cronbach's alpha for this subscale was .81 and the posttest Cronbach's alpha

was .96. The Fisher's exact measure of skewness for the pretest Dietary Fat Friend Support subscale was 1.63 and kurtosis was 0.58. The posttest Fisher's exact measure of skewness for this measure was 1.29 and kurtosis was 0.52.

Sedentary Habits Friend Support. The Sedentary Habits Friend Support measure assessed peer support regarding reducing sedentary behaviors, such as television viewing. The three-item subscale asked whether "friends do sedentary habits like watch TV or play computer/video games with you" (PACE, 2001). Also, participants were asked if they receive encouragement from peers to limit time spent sedentary.

The answer choices for this sub-survey included 'Never' with the value of 1, '1-2 days' with the value of 2, '3-4 days' indicating the value of 3, '5-6 days' with the value of 4, and 'every day' corresponding to the value of 5. The mean was calculated for each participant. Scores greater than three indicated peer support for reducing sedentary habits. Scores of three or less signified lack of friend support related to sedentary behaviors.

The pretest Cronbach's alpha for the Sedentary Habits Friend Support was .82 and the posttest Cronbach's alpha was .74. Table 3 displays these findings. The pretest Fisher's exact measure of skewness was -0.54 and kurtosis was 0.85 for the Sedentary Habits Friend Support sub-survey. The posttest Fisher's exact measure of skewness was 1.02 and kurtosis was 1.34.

Fruits and Vegetables Friend Support. The Fruits and Vegetable Friend Support inquired about peer influence related to the consumption of fruits and vegetables throughout the week. This three-item subscale examined encouragement received from peers. Additionally, the participants were asked if "friends eat fruits and vegetables with you" (PACE, 2001).

Answer choices included 'Never' with the value of 1, '1-2 days' with the value of 2, '3-4 days' indicating the value of 3, '5-6 days' with the value of 4, and 'every day' corresponding to

the value of 5. The composite strategy score was calculated for each participant. Scores greater than three indicated peer support that facilitates fruits and vegetables consumption. Scores of three or less suggest limited friend support related to the intake of fruits and vegetables.

The pretest Cronbach's alpha for Fruits and Vegetables Friend Support was .76 and posttest was .81. This is display in Table 3. The Fisher's measure of skewness for the pretest Fruits and Vegetables Friend Support was 0.77 and kurtosis was 0.40. The posttest Fisher's measure of skewness was 0.47 and kurtosis was 0.90.

Environmental Factors

Tricia 1/11/2017 10:43 PM
Comment [1]: Same thoughts…..

This four-item sub-survey is located within the Physical Activity set of measures. This subscale evaluated environmental factors and their influence on sports and exercise participation. The participants were asked about the availability of equipment for sports and parks within their neighborhood. This also included a question about the safety of the neighborhood evaluating the presence of "traffic, no sidewalks, dogs, gangs, and so on" (PACE, 2001).

There were five answer choices, which include 'Strongly disagree' with a value of 1 to 'Strongly agree' with a value of 5. Additional answer selections included 'somewhat disagree' with a value of 2, 'neutral' with a value of 3, and 'somewhat agree' corresponding to a value of 4. Composite scores greater than three indicate an environment that is conducive to outdoor activity. Scores of three or lower suggest an environment that limits the participation of physical activity and exercise.

The pretest Cronbach's alphas were 0.80 and the posttest Cronbach's alpha was 0.81. The Fisher's exact measure of skewness for the pretest Environmental Factors was 2.36 and kurtosis was 1.52. The posttest Fisher's exact measure of skewness was -1.43 and kurtosis was 0.82. The pretest Environment Factors subscale was examined for normality through the use of a

histogram and Q-Q plot, which confirmed a bell-shaped curve and normal distribution.

Jawbone UP Move Activity Tracker

The Jawbone UP Move Activity Tracker were provided for each participant. Downloading data from each activity tracker to the Jawbone UP Move application throughout the study facilitated examining the number of steps for participants. The Cronbach's alpha for data collected for day one through day thirty was .96. Fisher's exact measure of skewness and kurtosis were analyzed on day one, day five, day ten, day fifteen, day twenty, day twenty-five, and day thirty. The day one Fisher's exact measure of skewness was 1.26 and kurtosis was 1.1. Day five Fisher's exact measure of skewness was -1.75 and kurtosis was 1.29. The Fisher's exact measure of skewness for day ten was -1.75 and kurtosis was 1.31. Day fifteen showed a Fisher's exact skewness statistic of -1.46 and kurtosis of 0.55. Day twenty revealed a Fisher's exact skewness statistic of 0.10 and kurtosis of 0.91. The Fisher's exact measure of skewness on day twenty-five was -0.28 and kurtosis of 1.27. Lastly, the Fisher's exact skewness statistic was 0.17 and the kurtosis was 1.34 for day thirty.

Weight

Participants' weight was gathered prior to initiating this translational project and upon completion of the program. Pretest Fisher's measure of exact skewness for weight of this sample was 2.7 and the kurtosis was 1.33. The posttest Fisher's measure of skewness statistic was 1.79 and the kurtosis was 0.83.

Height

The height was collected at the beginning of the study and upon completion on day 30. The pretest Fisher's measure of exact skewness for height was 0.25 with a kurtosis of 1.04. The

posttest Fisher's measure of skewness statistic was 0.25 with a kurtosis of 1.06.

Body Mass Index (BMI)

After gathering each participant's height and weight, the body mass index (BMI) was calculated. The pretest Fisher's measure of exact skewness was 2.9 and the kurtosis was 1.62. The posttest Fisher's measure of exact skewness was 2.1 and the kurtosis was 1.31. Both of these variables were analyzed for normality with a histogram and Q-Q plot, which confirmed a bell-shaped curve and normal distribution.

Body Mass Index (BMI) Percentile

Body mass index percentile for age and gender was determined for each adolescent based on information gathered during the pre- and post-test examination. Fisher's exact skewness statistic for the pretest BMI percentile was -1.28 and the kurtosis was 1.21. The posttest Fisher's exact skewness statistic for BMI percentile was 2.75 and the kurtosis was 1.13. The posttest BMI percentile was assessed for normality with a histogram and Q-Q plot. The histogram displayed a bell-shaped curve and normal distribution. Analysis of the data revealed one outlier who weighed fifty pounds more than the next closest student in weight. Testing was conducted by removing this outlier, which resulted in no significant change in the findings. Because removing this data would decrease the power of the analysis and no other significant differences between the groups on any variables were observed, these variables were retained.

Waist Circumference

Each adolescent's waist circumference was gathered at the beginning of the study and upon completion. The Fisher's exact measure of skewness for pre-test waist circumference data was 1.76 and the kurtosis was 0.29. The Fisher's exact measure of skewness for post-test waist

circumference data was 0.74 and the kurtosis was 0.80.

Blood Pressure

The primary investigator collected blood pressure readings before beginning the study and upon completion. The Fisher's exact measure of skewness for pretest systolic blood pressure was -0.62 and the kurtosis was 0.81. The Fisher's exact skewness statistic for posttest systolic blood pressure was -1.81 with a kurtosis of 0.88. Pretest diastolic blood pressure revealed a Fisher's exact measure of skewness at 1.5 and a kurtosis of 1.31. The Fisher's exact skewness statistic for posttest diastolic blood pressure was 0.57 and the kurtosis was 0.67.

Table 3
Mean, Standard Deviation, Range, and Cronbach's Alphas for each Variable

Variable	M*(SD)*	Observed Range	Possible Range	Cronbach's Alpha
Physical Activity				
Change Strategies				
Pretest	42.98*(15.47)*	2.30 – 3.50	1 – 5	.95
Posttest	43.60*(14.02)*	2.47 – 3.40	1 – 5	.97
Decisional Balance Pros				
Pretest	17.20*(6.55)*	3.35 – 3.65	1 – 5	.94
Posttest	14.20*(4.89)*	2.67 – 3.20	1 – 5	.82
Cons				
Pretest	11.15*(5.49)*	1.55 – 2.80	1 – 5	.78
Posttest	9.73*(4.28)*	1.60 – 2.27	1 – 5	.92
Self-Efficacy				
Pretest	17.80*(6.08)*	2.75 – 3.40	1 – 5	.87
Posttest	18.80*(7.21)*	2.93 – 3.47	1 – 5	.97
Family Support				
Pretest	10.70*(5.83)*	2.30 – 3.05	1 – 5	.95
Posttest	10.13*(3.68)*	2.40 – 2.80	1 – 5	.87

(Table 3 continues.)

(Table 3 continues.)

Variable	M*(SD)*	Observed Range	Possible Range	Cronbach's Alpha
Friend Support				
Pretest	8.90*(4.48)*	1.70 – 2.50	1 – 5	.82
Posttest	9.00*(4.17)*	2.07 – 2.47	1 – 5	.93
Physical Activity Environmental Factors				
Pretest	12.40*(2.80)*	2.95 – 3.35	1 – 5	.80
Posttest	12.13*(3.50)*	2.87 – 3.27	1 – 5	.81
Dietary Fat Change Strategies				
Pretest	35.75 *(12.27)*	2.05 – 2.80	1 – 5	.94
Posttest	49.07 *(12.54)*	2.73 – 3.67	1 – 5	.96
Decisional Balance Pros				
Pretest	8.45*(3.31)*	1.60 – 2.75	1 – 5	.77
Posttest	9.33*(3.27)*	2.93 – 3.47	1 – 5	.90
Cons				
Pretest	11.30*(4.82)*	2.00 – 2.50	1 – 5	.85
Posttest	8.93*(3.94)*	1.53 – 2.00	1 – 5	.91
Self-Efficacy				
Pretest	25.30*(8.24)*	2.90 – 3.40	1 – 5	.95
Posttest	30.53*(5.13)*	3.47 – 4.07	1 – 5	.95
Family Support				
Pretest	7.90*(4.15)*	1.80 – 2.05	1 – 5	.96
Posttest	12.47*(4.27)*	3.00 – 3.20	1 – 5	.97
Friend Support				
Pretest	4.85*(2.08)*	1.45 – 1.90	1 – 5	.81
Posttest	6.20*(3.10)*	2.00 – 2.13	1 – 5	.96
Sedentary Habits Change Strategies				
Pretest	36.45*(11.21)*	1.80 – 3.00	1 – 5	.92
Posttest	41.93*(12.55)*	2.60 – 3.20	1 – 5	.96
Decisional Balance Pros				
Pretest	8.70*(3.91)*	1.65 – 2.50	1 – 5	.81
Posttest	9.80*(3.93)*	2.20 – 2.67	1 – 5	.90

(Table 3 continues.)

(Table 3 continues.)

Variable	M*(SD)*	Observed Range	Possible Range	Cronbach's Alpha
Cons				
Pretest	13.85*(5.12)*	1.85 – 2.75	1 – 5	.80
Posttest	12.60*(5.67)*	1.93 – 2.27	1 – 5	.94
Self-Efficacy				
Pretest	20.05*(6.25)*	2.55 – 3.10	1 – 5	.88
Posttest	22.73*(7.65)*	3.00 – 3.40	1 – 5	.96
Family Support				
Pretest	8.35*(2.70)*	1.85 – 2.40	1 – 5	.70
Posttest	10.47*(4.52)*	2.27 – 2.80	1 – 5	.92
Friend Support				
Pretest	11.90*(3.60)*	1.40 – 4.00	1 – 5	.82
Posttest	9.33*(3.52)*	1.73 – 2.80	1 – 5	.74
Fruits & Vegetable Change Strategies				
Pretest	36.10*(12.90)*	1.13 – 4.33	1 – 5	.94
Posttest	47.93*(9.46)*	2.80 – 3.53	1 – 5	.91
Decisional Balance Pros				
Pretest	15.30*(5.52)*	2.85 – 3.25	1 – 5	.89
Posttest	14.53*(3.48)*	2.73 – 3.07	1 – 5	.71
Cons				
Pretest	9.90*(3.68)*	1.35 – 2.60	1 – 5	.70
Posttest	11.27(*3.71)*	1.80 – 2.60	1 – 5	.77
Self-Efficacy				
Pretest	20.60*(7.74)*	2.55 – 3.20	1 – 5	.94
Posttest	25.67*(6.34)*	3.47 – 3.87	1 – 5	.95
Family Support				
Pretest	10.90*(3.91)*	2.25 – 3.30	1 – 5	.74
Posttest	11.47*(3.89)*	2.73 – 3.00	1 – 5	.90
Friend Support				
Pretest	6.10*(2.99)*	1.85 – 2.25	1 – 5	.76
Posttest	6.27*(2.52)*	1.87 – 2.53	1 – 5	.81

Results for Research Question 1

Research question 1: Is there a statistically significant improvement between the self-efficacy, activity level, and eating habits in rural adolescents age 14 - 17 who undergo a family nurse practitioner led wellness intervention in their school over a 4-week period? A paired sample *t*-test was used to evaluate the self-efficacy subscale for Physical Activity, Dietary Fat, Sedentary Habits, and Fruits and Vegetables. These results are displayed in Table 4.

Table 4
Results of Research Question 1 – Self-Efficacy

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Physical Activity	3.09	*1.05*	3.13	*1.20*	15	.91	-.12	14
Dietary Fat	3.33	*1.12*	*3.82*	*.64*	15	.22	-1.30	14
Sedentary Habits	2.88	*1.01*	3.25	*1.09*	15	.33	-1.00	14
Fruits & Vegetables	3.17	*1.18*	3.67	*.91*	15	.12	-1.66	14

The subscales of the Physical Activity and Sedentary Habits instruments were examined for improvement in activity level. Additionally, activity level of each participant was evaluated by comparing the number of steps from Jawbone UP Move from day one to day thirty. A significant increase in the number of steps was demonstrated from baseline (M= 1480, SD = 2250.87) to 4 weeks (M= 4412, SD= 3968.8) t(14)= -3.11, *p*= .006. Also, participants' Decisional Balance related to Physical Activity pros displayed statistical significance from baseline (M= 3.73, SD= 1.25) to completion of the study (M= 2.84, SD= .98) t(14)= 2.37, *p*= .03. These results are found in Table 5.

Table 5
Results of Research Question 1 – Activity Level

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Physical Activity								
Change Strategies	2.98	*1.01*	2.91	*.93*	15	.85	.20	14
Pros	3.73	*1.25*	2.84	*.98*	15	.03	2.37	14
Cons	2.23	*1.03*	1.95	*.86*	15	.424	.82	14
Family Support	2.85	*1.45*	2.53	*.92*	15	.38	.90	14
Friend Support	2.25	*1.11*	2.25	*1.04*	15	1.00	.00	14
Environ. Factors	3.02	*.70*	3.03	*.88*	15	.95	-.06	14
Sedentary Habits								
Change Strategies	2.55	*.79*	2.61	*.80*	15	.83	-.22	14
Pros	2.27	*1.05*	2.45	*.98*	15	.65	-.46	14
Cons	2.36	*.98*	2.10	*.94*	15	.49	.71	14
Family Support	2.15	*.60*	2.62	*1.13*	15	.16	-1.50	14
Friend Support	2.75	*.99*	2.24	*.98*	15	.09	1.80	14
Jawbone UP Move								
Steps	1480	*2250.87*	4412	*3968.8*	15	.006	-3.11	14

The subscales for both Dietary Fat and Fruits and Vegetables were evaluated for statistically significant improvement in eating habits. Table 6 displays the findings for these variables. Decisional balance related to dietary fat cons improved significantly from baseline (M= 2.48, SD= .93) to 4 weeks (M= 1.79, SD= .86), t(14)= 3.27, *p*= .006. Fruits and vegetables change strategies was displayed improvement when comparing baseline findings (M= 2.60, SD= .88) to completion (M= 3.20, SD= .63), t(14)= -2.14, *p*= .05; however, it did not reach statistical significance.

Table 6
Results of Research Question 1 – Eating Habits

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Dietary Fat								
Change Strategies	2.59	*.76*	3.27	*.84*	15	.23	-2.53	14
Pros	2.13	*.68*	3.11	*1.09*	15	.42	-2.57	14

(Table 6 continues.)

(Table 6 continues.)

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Cons	2.48	*.93*	1.79	*.79*	15	.006	3.27	14
Family Support	2.30	*1.01*	3.12	*1.07*	15	.13	-2.43	14
Friend Support	1.76	*.71*	2.07	*1.03*	15	.33	-1.01	14
Fruits & Vegetables								
Change Strategies	2.60	*.88*	3.20	*.63*	15	.05	-2.14	14
Pros	3.48	*.89*	2.91	*.70*	15	.09	1.80	14
Cons	2.13	*.75*	2.25	*.74*	15	.69	-.41	14
Family Support	2.73	*1.05*	2.87	*.97*	15	.68	-.42	14
Friend Support	2.36	*.92*	2.09	*.84*	15	.34	.99	14

Results for Research Question 2

Research question 2: Is there a statistically significant improvement in the rural adolescent participants on weight, blood pressure, and waist circumference? Data gathered at the beginning of the study was compared to the values obtained at the end of the program. Diastolic blood pressure readings decreased significantly from baseline (M= 76.53, SD= 10.54) to 4 weeks (M= 68.13, SD= 7.35), t(14)= 2.39, *p*= .03. Table 7 displays these results.

Table 7
Results of Research Question 2 – Weight, Blood Pressure, & Waist Circumference

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Weight (lb)	177.15	*65.65*	186.32	*60.37*	15	.62	-.510	14
Waist Circumference	34.27	*8.08*	34.87	*7.64*	15	.82	-.23	14
Systolic BP	122.27	*12.37*	118.40	*9.20*	15	.34	.98	14
Diastolic BP	76.53	*10.54*	68.13	*7.35*	15	.03	2.39	14
BMI	29.85	*10.09*	31.69	*8.97*	15	.47	-.748	14
BMI Percentile	82.26	*18.94*	88.75	*15.57*	15	.31	-1.05	14

Conclusion

The convenience sample of 15 students from Early College Georgia College participated in the pre- and post-test data collection. The results indicated the nurse practitioner led school-based wellness program was associated with a significant improvement in physical activity through analysis of Jawbone UP Move activity tracker, improvement in perspective related to dietary fat consumption, and a significant reduction in their diastolic blood pressure readings. Additionally, participants significantly improved their perspectives related to participation in physical activity.

CHAPTER V

Discussion

This section will discuss the translational research findings and results. Each of the components of the clinical questions will be reviewed. In addition, existing research findings will be compared to the findings of this translational project. This section will conclude with a discussion of the limitations, strengths of the study, implications for practice and future research. This translational project is one of the first to investigate the use of family nurse practitioners in school settings to facilitate prevention of childhood obesity through education provided. Additionally, these findings can expand the incorporation of family nurse practitioners into school systems to produce positive health outcomes in the adolescent population.

Theoretical Framework Application

Dorothea Orem's Self-Care Deficit theory was used as the theoretical framework for this family nurse practitioner-led childhood obesity wellness program to facilitate positive health behaviors in this adolescent population. As indicated in this nursing theory, Basic Conditioning Factors (BCFs), such as age and developmental stage, were considered while formatting of each educational session. These BCFs are believed to greatly influence a person's initiative towards performing healthy self-care behaviors (Wong, Ip, Choi, & Lam, 2015). Specific self-care operations comprised in Orem's Self-Care Deficit theory were intertwined within the structure of this childhood obesity initiative. Self-care operations refer to an intellectual or psychomotor action directed towards a goal (Moore et al., 2005). Examples of self-care operations as it related to this study included new acquisition of knowledge related to nutrition and physical activity that focused on reducing health disparities in the adolescent population.

Estimative self-care operations involve gathering information, acquiring knowledge, and identifying alternatives (Moore et al., 2005). This component was address through the use educational material from both the SPARK physical education program and SuperTracker nutrition and diet lesson plans in this study. This nurse practitioner-led wellness program consisted of eight educational sessions that presented new information regarding nutrition and physical activity. Classroom discussions facilitated the acquisition of this knowledge in order to identify alternative health behaviors.

Translational self-care operations are behaviors that present alternatives, practice decision-making, and plan according (Moore et al., 2005). This family nurse practitioner-led wellness program presented information related to nutrition, alternatives to non-nutrient rich foods, and incorporating physical activity regularly. The participants created meal plans through the use of the SuperTracker website and fulfill physical activity recommendations as outlined by the SPARK physical education program. This fostered the development of self-care behaviors needed to create healthy lifestyle habits.

Production self-care operations are behaviors that initiate action, identify resources, and evaluate behaviors acquired to meet self-care needs (Moore, et al., 2005). Class discussions focused on incorporating the nutritional and physical activity knowledge into daily practice. Engaging in exercise and explore dietary changes that promote healthy development for this age group allowed participants to begin integrating these behaviors into their daily lives.

Estimative Self-Care Operations. Estimative self-care operations acted as the foundation of this translational project. An example of this pillar of the Self-Care Deficit Theory included the nutrition educational sessions, which examined the nutritional value of food. The participants were provided guidance related to selecting dietary items based on sustenance rather

than convenience or taste. This was facilitated through the use of the SuperTracker nutrition website. Each participant was assigned the task of utilizing the "Food-A-Pedia" component of the SuperTracker website to explore some of their favorite foods. Concepts, including saturated fats, unsaturated fats, sugar, and sodium intake, were explored prior to the use of the "Food-A-Pedia" to enable the participants to critically analyze the nutritional value of their food preferences.

Translational Self-Care Operations. Participants were able to explore nutritional options in order to plan healthy diets and incorporate exercise regularly. Specifically, week 2 involved participants utilizing the SuperTracker website to view the nutritional facts of their typical meal choices. Each student was able to identify an unhealthy dietary item and also an alternative choice through the use of SuperTracker. The following week, students were asked if they were able to incorporate the dietary suggestions from the SuperTracker website and provide examples. This illustrated the participants' ability to practice decision-making and their capability to plan based on knowledge acquired during this translational project.

Production Self-Care Operations. The participants were given resources, such as the SuperTracker website and Jawbone UP Move mobile application, to assist with integrating this knowledge in their daily routine. Evaluation of behaviors and knowledge acquired to meet these self-care needs was conducted through the use of pre- and post-test data collection with the PACE+: Counseling Adolescents for Exercise and Nutrition surveys, weight, blood pressure readings, BMI, BMI percentile, and Jawbone UP Move data.

Self-Efficacy

Self-efficacy supports the acquisition of self-care behaviors and provides a comprehensive analysis for behavior change. Bandura (1994) defined self-efficacy as an

individual's belief about their ability to perform specific behaviors that influence their lives and wellbeing. Bandura (1994) observed that perceived self-efficacy influences self-care operations because an individual must believe in their ability to learn and adhere to health-promoting behaviors to support efforts necessary to succeed (Bandura, 1994; Lenz & Shortridge-Baggett, 2002).

Self-efficacy was evaluated through the use of the subscale questions that revealed the adolescent's confidence to maintain healthy lifestyle practices regardless of situational obstacles (Norman et al., 2005). Findings for self-efficacy were not statistically significant in this study; however, the mean for each variable improved when compared to their baseline data (see table 8). This demonstrates participants' overall improvement in their ability to perform these positive health behaviors related to physical activity and dietary habits.

Table 8
Results of Research Question 1 – Self-Efficacy

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Physical Activity	3.09	*1.05*	3.13	*1.20*	15	.91	-.12	14
Dietary Fat	3.33	*1.12*	*3.82*	*.64*	15	.22	-1.30	14
Sedentary Habits	2.88	*1.01*	3.25	*1.09*	15	.33	-1.00	14
Fruits & Vegetables	3.17	*1.18*	3.67	*.91*	15	.12	-1.66	14

One question within this subscale included requesting family members to partake in these healthy lifestyle practices. Scoring for this question was lower than other items within the same subscale. Incorporating family members or guardians into school-based wellness initiatives could potentially improve the participants' self-efficacy for performing these self-care practices. Pajares and Urdan's book entitled *Self-Efficacy Beliefs of Adolescents* (2006) supports this assumption by stating that parents who convey specific expectations to adolescents conversely affect the children's expectation of themselves (Pajares & Urdan, 2006). Parental involvement

influences adolescent self-regulatory strategies and facilitates self-efficacious behavior (Pajares & Urdan, 2006).

Marked improvement in self-efficacy has been demonstrated in other research studies. Russell-Mayhew, Arthur, & Ewashen (2007) conducted a 7-week randomized control study with 1,095 students that displayed statistically significant improvement in self-efficacy among 12 to 14 year old participants in the intervention group. Demographic information was not collected during the 2007 study. Notably, the intervention group consisted of parental involvement during each educational session with the students (Russell-Mayhew et al., 2007). This suggests seeking parental participation in school-based wellness programs improves self-efficacy in participants. This translational project did not incorporate parental involvement. Incorporating parental involvement within the present study may have resulted in statistically significance results in this fruit and vegetable self-efficacy subscale.

Rosemond et al. (2014) explored self-efficacy for healthy eating behaviors in a school-based health promotion program with predominately minority students between the ages of 9 to 12 and determined the male participants in the intervention group displayed statistically significant improvement in self-efficacy for consuming of vegetables and dairy products. The researchers determined female participants improved self-efficacy with the consumption of vegetables and dairy products; however, these findings were not statistically significant (Rosemond et al., 2014). The authors noted 24.6% of the participants in the intervention group had prior exposure to the nutrition promotion program, which contributed to the study findings and suggest increased exposure generates positive effects on self-efficacy and dietary intake (Rosemond et al., 2014). Similarities between this translational project and Rosemond et al. (2014) study include the demonstration of improvement self-efficacy among participants.

However, the self-efficacy findings for this translational project were not statistically significant. By establishing a long-term nurse practitioner-led wellness initiative, participants are more likely to generate and retain knowledge related to nutrition and adhere to healthy eating practices.

The findings of this translational study support the need for further investigation of improving self-efficacy in adolescent through school-based wellness programs. The intervention of this translational study differs from these previous studies by incorporating a family nurse practitioner, emphasizing the participants' nutrition and physical activity routine, and exploring alternative nutrition and exercise practices. Participants were able to explore healthy nutrition and exercise practices through classroom discussion and through the use of resources, such as SuperTracker and SPARK physical education material. Existing research studies showed improvement in nutrition and physical activity through the incorporation of these resources in elementary and middle school students (Sallis et al., 1997; Ling et al., 2014). The use of parental involvement in future studies that incorporate family nurse practitioners in school-based wellness programs should be explored to forge new pathways to significantly improve self-efficacy for our adolescent population.

Activity Level

Activity level for each participant was examined through the Sedentary Habits and Physical Activity PACE + surveys. Also, activity level was assessed through the use of Jawbone UP Move data collection. The participants' perspectives in favor of incorporating physical activity regularly (referred to as Decisional Balance Physical Activity Pros) displayed statistical significant change when compared to baseline data. Notably, the participants' perspectives against incorporating physical activity (referred to as Decisional Balance Physical Activity Cons) decreased from 2.23 at baseline to 1.95 on day 30; however, these findings were not statistically

significant. Additionally, participants demonstrated a significant improvement in number of steps when comparing baseline finding to completion of study (see table 9 below). These findings suggest the incorporation of a family nurse practitioner-led wellness initiative promotes an increase in physical activity levels in the adolescent participants. Also, adolescents' outlook regarding the advantages and disadvantages of regular exercise has shown improvement but these were not statistically significant. Results of similar research studies with predominately minority students demonstrated significant improvement in physical activity (Covelli, 2006; McCreary et al., 2012).

Table 9
Results of Research Question 1 – Activity Level

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Physical Activity								
Change Strategies	2.98	*1.01*	2.91	*.93*	15	.85	.20	14
Pros	3.73	*1.25*	2.84	*.98*	15	.03	2.37	14
Cons	2.23	*1.03*	1.95	*.86*	15	.424	.82	14
Family Support	2.85	*1.45*	2.53	*.92*	15	.38	.90	14
Friend Support	2.25	*1.11*	2.25	*1.04*	15	1.00	.00	14
Environ. Factors	3.02	*.70*	3.03	*.88*	15	.95	-.06	14
Sedentary Habits								
Change Strategies	2.55	*.79*	2.61	*.80*	15	.83	-.22	14
Pros	2.27	*1.05*	2.45	*.98*	15	.65	-.46	14
Cons	2.36	*.98*	2.10	*.94*	15	.49	.71	14
Family Support	2.15	*.60*	2.62	*1.13*	15	.16	-1.50	14
Friend Support	2.75	*.99*	2.24	*.98*	15	.09	1.80	14
Jawbone UP Move								
Steps	1480	*2250.87*	4412	*3968.8*	15	.006	-3.11	14

Improving physical activity knowledge and providing resources for engagement in exercise were emphasized throughout the program. The first week consisted of students participating in "Fitness Personal Best", which required participants to perform activities such as sit-ups and push-ups within a given timeframe. This allowed students to evaluate their current

fitness level and establish personal goals aimed to improve their overall fitness level by the end of the study. The number of push-up (with both knees resting on the ground) accomplished within two minutes ranged from 10 to 17 for the female participants. The male participants completed 12 to 25 push-ups within a two-minute timeframe. Participants who were female completed 8 to 13 sit-ups and male participants completed 15 to 21 sit-ups within two minutes. Students set their goal to increase the number of push-ups by 3 and the number of sit-ups by 5 at the end of the translational study. Each participant was able to accomplish these goals by the end of this translational project. This was helped each student to understand how regular exercise and activity improves physical strength and endurance.

The "Fitness Personal Best" activity acted as a benchmark for the following weeks, which incorporated aerobic and strength training activities to improve their cardiovascular capabilities. Examples of these activities included kickball, high intensity interval training, and fitness jigsaw strength training. Participants were encouraged to engage in exercise activities throughout the week and were provided with supplemental activity information to support these efforts. During physical activity sessions, participants were asked how they could improve their physical fitness throughout the week. Participants expressed their ability to perform strength-training activities, such as sit-ups, push-ups, at home and engaged in aerobic activities, such as walking and jogging, at a local park in Baldwin County.

The participants' perspectives regarding regular exercise and improving physical activity levels are consistent with existing research findings. Ling et al. (2014) demonstrated a significant improvement in the percentage of students who met the physical activity recommendations established by *Healthy People 2020*. Similar to this translational project, Ling et al. (2014) utilized a pedometer to log steps for each participant. However, Ling et al. (2014) only collected

step data during four consecutive days and these findings were not statistically significant. Participants of this translational project utilized their Jawbone UP Move activity trackers throughout the entire study and comparison from day 1 steps to day 30 steps were statistically significant.

Ling et al. (2014) also incorporated SPARK physical education curriculum into their school-based wellness program. Ling and colleagues (2014) incorporated parental and family involvement through the use of family fitness fun nights at each school (Ling et al., 2014). Additionally, both Ling et al. (2014) and this translational project received support from school administrators related to implementing SPARK physical education curriculum. Ling et al. (2014) integrated SPARK physical education curriculum into the participating schools' wellness policy. This should be explored in future childhood obesity translational projects to foster increased physical activity participation in this population.

In this translational project, participants improved their perspective related to advantages of regular exercise as shown through the statistically significant improvement in Decisional Balance Physical Activity Pros (see table 9). Other school-based wellness programs have successed in demonstrating statistical significance regarding the improvement of exercise and physical activity perspectives in participants (McCreary et al., 2012; Covelli, 2006). McCreary et al. (2012) demonstrated a statistically significant improvement in physical activity knowledge among the participants of their longitundal school-based wellness program. Notably, the McCreary et al. (2012) study collaborated with school administrators and faculty to establish the "Wellness Council", which expanded their wellness program and supported sustainability. Researchers accomplished this by engaging school educators and staff to participate and seeking their input regarding the program structure. Input related to the structure of this nurse

practitioner-led wellness initiative was received from Dr. Runee Sallad, who is the Director of Early College Georgia College. Future nurse practitioner led school wellness programs should seek input from each school educator and create strategies that will incorporate school educator and administrator throughout the wellness initiative. This would facilitate interprofessional collaboration aimed to address the health needs of this adolescent population.

This translational study lacked statistical significance from both the Sedentary Habits and Physical Activity PACE + surveys, which may be related to underestimation of physical activity by the participants. Junior, Barbosa, Mendes, & Mendonca (2016) examined the PACE+ Physical Activity survey and the QAFA – Physical Activity Questionnaire for Adolescents to determine sufficient physical activity levels in the adolescent population. No existing research was found that specifically aimed to evaluate marked discrepancies in sufficient physical activity level by comparing simplified and detailed questionnaires in the adolescent population prior to their study. Junior et al. (2016) found the prevalence of sufficient activity levels were lower with the use of the PACE+ Physical Activity survey compared to the more detailed QAFA questionnaire (Junior et al., 2016). Additionally, Junior et al. (2016) found the PACE+ Physical Activity survey underestimated activity levels from 10 to 30 percent (Junior et al., 2016). According to the researchers adolescents often perform physical activity in short bouts (<10 minutes) with varying intensities throughout the course of a week, which may be difficult to interpret as exercise for this age group. This provides an explanation of the significant improvement of data gathered from the Jawbone UP Move but lack of improvement from the PACE+ Physical Activity survey in this translational project. Participants in this research project may have underestimated their activity level when completing the PACE + Physical Activity surveys despite performing an adequate amount of physical activity in short sessions.

Eating Habits – Dietary Fats

Eating habits were analyzed through the use of the Dietary Fat and Fruits & Vegetables PACE+ surveys. The participants' perspective related to decreasing their consumption of dietary fats (referred to as Decisional Balance Dietary Fat Cons) displayed statistical significant change when compared to baseline data (see table 10 below). Also, the other Dietary Fat subscales showed an improvement from baseline to completion of study; however, these findings were not statistically significant.

Table 10
Results of Research Question 1 – Eating Habits

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Dietary Fat								
Change Strategies	2.59	*.76*	3.27	*.84*	15	.23	-2.53	14
Pros	2.13	*.68*	3.11	*1.09*	15	.42	-2.57	14
Cons	2.48	*.93*	1.79	*.79*	15	.006	3.27	14
Family Support	2.30	*1.01*	3.12	*1.07*	15	.13	-2.43	14
Friend Support	1.76	*.71*	2.07	*1.03*	15	.33	-1.01	14

During the second week of the wellness initiative, emphasis regarding the importance of reviewing saturated fat and unsaturated fat content was stressed to each participant and how dietary fats directly impacted health problems such as hyperlipidemia and weight gain. Week two introduced the concept of dietary fat to the participants. Participants explored the nutritional content of their diet and the importance of monitoring total calories, empty calories, and sodium intake were encouraged. Each week participants gained additional knowledge about saturated and unsaturated fats through the use of the SuperTracker's lesson plans and ChooseMyPlate.gov. One helpful suggestion for choosing healthy fats to incorporate into their diet included perceiving fats that are solid at room temperature as unhealthy. Examples of this include butter

and shortening. Alternatives resources of healthy dietary fats were presented to students, which included olive oil and foods such as nuts, olives, and avocados. At the end of the nutrition session, the participants were asked how they could utilize this information to change their eating habits. The majority of the students conveyed the ability to choose healthy snacking options, such as nuts, to incorporate healthy fats. When asked about specific dietary fats, such as margarine and butter, each participant expressed willingness to ask family members to explore healthier alternatives like olive oil for preparation of food.

The following weeks involved expanding knowledge about unhealthy dietary fats and what types of food to avoid to reduce consumption of saturated fats. Examples of these unhealthy food choices included 75% to 85% lean ground beef and luncheon meats such as regular bologna and salami. Participants were instructed to review the nutrition facts of these products because there are low-fat and healthier versions of the examples mentioned. Cholesterol was also discussed as it relates to healthy lifestyle practices. Participants were educated about how cholesterol is only found in animal sources. Examples of dietary choices high in cholesterol included egg yolks and organ meats such as liver. Participants were encouraged to limit their consumption of these foods to avoid consuming excessive calories. Each participant was asking to identify healthy alternatives to non-nutrient rich dietary choices. Several students expressed the need to reduce fat consumption through eating leaner ground meat. Other students were about to identify low-fat versions of their favorite luncheon meats. Each participant conveyed willingness to ask family members to purchase these alternative dietary selections.

Information regarding saturated fats and their effects on the body was discussed. Classroom discussion involved how saturated fats increase the level of low-density lipoprotein (LDL) that circulates in the bloodstream. Participants were educated about the correlation

between high LDLs and health conditions such as obesity and coronary heart disease. Furthermore, participants were able to verbalize understanding by providing examples of unhealthy foods high in saturated fats and alternative food choices. The majority of the participants expressed consuming food from fast food establishments 4-5 times per week. Items commonly selected by the participants included French fries, cheeseburgers with condiments, and soft drinks. The participants were asked to explore healthier alternatives to these choices and encouraged to utilize the Super Tracker to compare nutrition facts of each item. Some of the participants identified items at fast food restaurants with better nutritional value than their previous selections, which included items like grilled chicken salad with light vinaigrette dressing and water. Some participants stated they were ask family members to cook healthier meal options at home, such as baked tilapia and chicken. This contributed to the significant improvement in the participants' views related to the consumption of dietary fats (see table 10).

Similarly to this translational project, Frenn et al. (2005) eight-session school-based health promotion program significantly decreased consumption of dietary fats with 13 to 16 year old minority participants through computer-tailored interventions. This demonstrates the success of wellness programs that allow participants to engage in nutrition-based classes through an Internet format and limited guidance from researchers and school facility. This translational project explored concepts related to dietary fat through the use of SuperTracker, which is a computer-based intervention program. This translational project combined classroom discussion and the SuperTracker website to facilitate improvement of healthy dietary habits with each participant; however, Frenn et al. (2005) school-based intervention was conducted primarily through computer-guided education sessions with minimal guidance and instruction from researchers, teachers, or other school administrators. Future nurse practitioner school-based

childhood obesity programs should explore structuring class sessions with more internet-based lesson plans to facilitate significant improvement in reducing dietary fat consumption.

Despite the vast amount of research related to school-based childhood obesity programs, there is limited number of studies that specifically evaluate dietary fat consumption with its participants. Only one school-based wellness study within the past decade has assessed dietary fat consumption as an outcome variable (Frenn et al., 2005). This reveals a gap in current research that should be explored in future research studies.

Eating Habits – Fruits & Vegetables

Change strategies related to fruit and vegetable intake displayed improvement when comparing baseline findings to completion and was approaching statistical significance (p=.05). Additionally, the Fruits & Vegetables subscales showed an improvement from baseline to completion of study; however, these findings were not statistically significant (see table 11 below). Students were provided fresh fruits and vegetables platters during each educational session, which may have factored into this improvement. Fresh fruits and vegetables trays include strawberries, apples slices, carrot sticks, grapes, oranges, and watermelon. These items were kept cool in a portable cooler with ice to ensure freshness. Also, each classroom session involved exploring components of nutrition needed for healthy growth and development.

Table 11
Results of Research Question 1 – Eating Habits

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Fruits & Vegetables								
Change Strategies	2.60	*.88*	3.20	*.63*	15	.05	-2.14	14
Pros	3.48	*.89*	2.91	*.70*	15	.09	1.80	14
Cons	2.13	*.75*	2.25	*.74*	15	.69	-.41	14
Family Support	2.73	*1.05*	2.87	*.97*	15	.68	-.42	14
Friend Support	2.36	*.92*	2.09	*.84*	15	.34	.99	14

Beginning in week two, participants engaged in classroom discussions about healthy snacking. The five food groups were introduced to the students, which included fruits and vegetables. Examples of healthy snacking and portion sizes were provided along with strategies for meeting daily food group targets. The following weeks expanded on this knowledge by challenging the participants to perform meal planning that included all five-food groups. Resources such as the SuperTracker website and ChooseMyPlate.gov were provided to assist students with planning their meals for the week. Participants were given the *10 Tips for Healthy Meals* handout, which provided further guidance on building healthy dietary habits. This handout focused on promoting positive health behaviors by encouraging participants to "make half your plate veggies and fruits" (SuperTracker Nutrition Lesson Plans for High School Students, 2014). By the completion of this study, each participant was able to verbalize examples of fruits and vegetables integrated into their nutritional choices.

Similar research supports the use of school-based wellness programs to improve fruit and vegetable intake with adolescent participants. Tucker et al. (2010) used the SuperTracker program to foster healthy behaviors in the participants, which demonstrated significant improvement in daily consumption of fruits and vegetables. They incorporated senior nursing students of two schools of nursing to provide coaching for each participant in their research study, which was viewed favorably amongst educators and school administrators due to the study's flexibility and creativity (Tucker et al., 2010). Researchers also engaged school educators throughout the study to establish 'buy-in', which supported sustainability of their wellness program (Tucker et al, 2010). In another study, incorporated registered dietitians to assist with promoting healthy dietary practices with their adolescent participants (Gillis et al., 2009). Seeking involvement of registered dietitians in school-based wellness program furthered

efforts to promote fruits and vegetable consumption, such as establishing menu planning that incorporates at least two servings of fruits and vegetables per student during lunch (Gillis et al., 2009). No other healthcare provider was used in this translational project; however, future initiatives should consider collaborating with other providers, such as dietitians and nutritionists, to improve fruit and vegetable intake. The lack of statistical significance related to the consumption of fruits and vegetables suggest the need to explore these additional strategies employed by existing research studies to enhance future translational projects.

Anthropometric Measures

Weight was collected from each participant at the beginning of the nurse practitioner-led wellness program and upon completion. The Tanita BF-648W digital calibrated portable scale was used, which has demonstrated the high quality rating with excellent weight accuracy, display, and very good weight repeatability (Step Right Up, 2016). The primary investigator, a family nurse practitioner, collected each participant's weight, height, body mass index (BMI), and waist circumference. Each participant's privacy was maintained to prevent stigmatization and embarrassment. The participants were weighed wearing their daily attire (shirt, pants, or skirts). Participants removed footwear, coats, and jackets prior to collecting weight and waist circumference. Participants' height was measured using a portable stadiometer and each participant removed footwear. Waist circumference was obtained using a gulick tape and measured above the child's bare iliac crest.

Weight and Body Mass Index (BMI). There was no statistically significant difference in the participants' weight and body mass index (BMI) when comparing baseline data to completion of study (see table 12 below). Other studies have recommended considering weight and body mass index (BMI) as part of the overall assessment of health instead of a single

determinant of wellbeing (Berg, Buechner, & Parham, 2003). References commonly used, such as BMI, account for healthy weight with consideration of the child's height and the assumption is gathered that higher weight is equivalent to higher fat but this is misleading (Berg et al., 2003). Additionally, an increase in body fat is seen prior to a child's growth spurt and special consideration should be given to the participant's weight for height in relation to their growth history (Berg et al., 2003). With this consideration, data was evaluated for significance in weight and BMI by removing the youngest participants and conducting further examination. The youngest participants, ages 14 and 16, were removed and weight and BMI were analyzed. These findings were not statistically significant. Additionally, participants were divided by gender and evaluated for significant changes in weight and BMI, which were not statistically significant.

Table 12
Results of Research Question 2 – Weight, BMI, & BMI Percentile

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Weight (lb)	177.15	*65.65*	186.32	*60.37*	15	.62	-.510	14
BMI	29.85	*10.09*	31.69	*8.97*	15	.47	-.748	14
BMI Percentile	82.26	*18.94*	88.75	*15.57*	15	.31	-1.05	14

Du, Song, Esperat, & Black (2016) found no statistical significance decrease in weight or BMI after completion of a 18-month quasi-experimental school-based nutrition and exercise study with 525 predominantly Hispanic students. They suggested lack of parental education related to nutrition and how it related to childhood obesity contributed to their research findings (Du et al., 2016). Parental knowledge related to adolescent nutrition and physical activity was not explored during this translational project. By providing parental education regarding healthy

nutrition and exercise promotion, participants may have experienced a significant reduction in weight and BMI upon completion of this translational study.

However, existing research has demonstrated a significant reduction in weight and BMI in the adolescent population (Bryars et al., 2012). Bryars and colleagues (2012) demonstrated statistically significant decrease in BMI percentile for participants in their school-based wellness program (Bryars et al., 2012). Similar to this translational project, these researchers incorporated the SPARK program to promote physical activity with the students (Bryars et al., 2012). Additionally, they partnered with a registered dietitian to assist with implementation of the school wellness program. Bryars and colleagues (2012) provided nutritional counseling to parents and collaborated with a registered dietitian to improve outcome measures for the participants (Bryars et al., 2012). This translational project did not collaborate with other healthcare professionals, such as registered dietitians, due to the limited length of this study. Future nurse practitioner childhood obesity initiatives should be considered to improve participant outcomes.

Waist Circumference. Similar to findings related to weight and BMI, there was no statistically significant change in participants' waist when comparing baseline data to data gathered upon completion of this wellness initiative (see table 13 below). Waist circumference has been shown to correlate with BMI when measured simultaneously in adolescents (Spolidoro et al., 2013). The waist circumference during the adolescent stage is comprised of subcutaneous fat deposits, which often decline as the individual ages; however, the accumulation of visceral fat increases as children and adolescents become adults (Spolidoro et al., 2013). Elevated visceral fat correlates with metabolic syndrome and poor health outcomes (Spolidoro et al., 2013).

Therefore, children and adolescents with high waist circumference should be monitored closely to ensure healthy dietary practices and participation in physical activity (Spolidoro et al. 2013).

Table 13
Results of Research Question 2 – Waist Circumference

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Waist Circumference	34.27	*8.08*	34.87	*7.64*	15	.82	-.23	14

Abdominal fat distribution varies depending on cultural background (Spolidoro et al., 2013). Black adolescents have higher levels of subcutaneous fat compared to white and Asian adolescents (Spolidoro et al., 2013). 75% of the participants in this study were black. Gender also plays a significant role in fat deposits during the adolescence stage of development (Spolidoro et al., 2013). Abdominal fat correlates more strongly in adolescent females during the early and middle adolescent developmental stages (Spolidoro et al., 2013). 65% of the adolescents in this translational project were female, which may have been a contributing factor to the higher waist circumference measurements in this sample. Further examination of the data was performed to evaluate signficant changes in waist circumstance. Younger participants were removed and waist circumference data was analyzed; however, findings were not statistically significant. Data was separated by gender and race. Waist circumference data was analyzed for statistical signficant with female and male only. These results were not statistically significant. Lastly, participants were analyzed by race for significant change in waist circumference, which was not statistically significant.

However, school-based childhood obesity programs have demonstrated success in reducing waist circumference. Elizondo-Montemayor et al. (2013) conducted a 10-month cross-sectional study aimed to reduce childhood obesity and the prevalence of metabolic syndrome.

Their research participants displayed a statistically significant reduction in waist circumference measurements and BMI (Elizondo-Montemayor et al., 2013). Individualized nutrition plans and parental involvement that were cited by the researchers as a major contributor to the successful results of their study (Elizondo-Montemayor et al., 2013). This translational project provided participants with resources in order to customized nutrition plans, such as the SuperTracker website, and participants were encouraged to prepare their nutrition plan based on information discussed during each nutrition session. Future nurse practitioner school wellness programs should consider featuring customized dietary programs for each participant to aid in improving dietary habits and reduce BMI and weight.

Blood Pressure

Both systolic and diastolic blood pressure readings were collected upon initiation and completion of this translational project by the primary investigator who is a family nurse practitioner. Each participant's blood pressure was taken manually with participants' feet flat on the surface of the floor. Participants were allowed to sit for five minutes prior to performing blood pressure reading. Appropriate-sized cuffs were utilized and all blood pressure measurements were taken on each participant's bare skin of the left arm (Lewis, 2014).

Participants demonstrated a statistically significant reduction in diastolic blood pressure from baseline to completion of the translational project. Systolic blood pressure readings decreased when comparing baseline data to 4-week data collection; however, these findings were not statistically significant (see table 14 below).

Table 14
Results of Research Question 2 –Systolic and Diastolic Blood Pressure

Variable	Pretest		Posttest					
	M	*SD*	M	*SD*	n	*p*	t	df
Systolic BP	122.27	*12.37*	118.40	*9.20*	15	.34	.98	14
Diastolic BP	76.53	*10.54*	68.13	*7.35*	15	.03	2.39	14

The significant reduction in diastolic blood pressure differs from existing research (Wright et al., 2012; Covelli, 2008; Eagle et al., 2013). Wright et al. (2012) conducted a 6-week nurse-directed school wellness program with physical activity lesson plans and nutrition education classes for parents and students from urban, low-income backgrounds. They found the participants' systolic and diastolic blood pressure readings were not statistically significant upon completion of their study (Wright et al., 2012). Additionally, Covelli (2008) implemented a 9-week school nutrition and physical activity intervention program in 48 black adolescents, which demonstrated a reduction in systolic and diastolic blood pressures when compared to baseline readings; however, these findings were not statistically signficant. A 10-week school-based wellness program conducted with sixth grade students demonstrated a significant reduction in mean systolic and diastolic blood pressure readings (Eagle et al., 2013). Researchers implemented environmental changes, such as modifying school food services to incorporate salad bars, replacing fried chips with baked chips, and implementing field days and open gym nights, to aid in reducing blood pressure for participants. Similarly, this translational project encouraged participants to seeking alternative dietary options for non-nutritious foods and provided resources to aid in discovering new healthy foods choices. The emphasis on limiting the consumption of dietary fat throughout this nurse practitioner-led translational project may have contributed to the successful reduction in diastolic blood pressure. Collaborating with food

services vendors to reduce dietary fat and introduce more nutritional options should be investigated in future translational projects.

Strengths

This translational program demonstrated several strengths. The present study showed that family nurse practitioners play an essential role in childhood obesity prevention efforts. Furthermore, advanced practice nurses possess the knowledge and expertise to address the needs of the pediatric population through education, support, and advocacy to promote healthy lifestyles and positive health outcomes. The improvement in key variables, such as activity level, support the need for further evaluation of nurse practitioner-led wellness programs in the school setting to aid in improving the health of today's youth.

An additional strength was the ease of integrating the wellness program into the participants' daily routine at Georgia College Early College. Each educational session was held after lunch, which allowed participants to transition from formal classroom setting to the open dialogue format of the wellness program. Future researchers should consider this timeframe for school-based healthy lifestyle intervention design.

The objective measure for physical activity through the activity trackers provided useful information regarding the effectiveness of the initiative. Participants were able to demonstrate an improvement regarding dietary habits and physical activity. Additionally, participants were able to engage with a healthcare provider outside of a clinical setting.

Limitations

Several limitations existed in this translational project. The prospective, quantitative convenience sample design of this study limits the generalizability compared to a randomized controlled trial. Due to the lack of a control group, interpretations of the findings are limited.

Confounding factors may have influenced the effectiveness of the nurse practitioner-led intervention. 9 of the participants worked after-school jobs at fast-food establishments, which may have negatively impacted their dietary choices. Also, the project was implemented during the end of the school year with fewer options for sports participation. Celebratory events, such as the Junior Gala, were held during the same time frame of the wellness initiative. These events provided limited nutritional choices for students and may have negatively impacted the participants' views of dietary practices.

Lack of an objective measure for diet, such as a food diary, also introduced a confounding factor to this study. Diet and components of physical activity were determined through self-report. This presents variation in meaning and interpretations depending on the individual and their ethnic group. Other researchers have criticized the use of these measures and encouraged additional measures, such as body fat assessments, to determine adiposity in this age range (Greening, Harrell, Low, Fielder, 2011; Demerath et al., 2006).

Implications for Nursing and Future Research

The findings from this school-based translational project suggested that nurse practitioner should consider collaborating with schools to promote nutrition and physical activity aimed to reduce the incidence of childhood obesity throughout our country. Considering the negative impact of childhood obesity on quality of life, advanced practice nurses should collaborate with school educators, school administrations, registered dieticians, schools of nursing, and legislators to advocates for further research of school based nurse practitioner led wellness programs for our youth. This can facilitate engagement of stakeholders, such as state legislators, to increase school system financial resources, modify school wellness policies, and eliminate childhood health disparities.

The childhood obesity epidemic brings urgency to the need to forge new methods of addressing this problem. The use of nurse practitioner led wellness intervention program with children between the ages of 14 to 17 in the school setting was the main focus of this clinical project. Information gathered through literature searches supported the need for further evaluation of this method to reduce the incidence and prevalence of childhood obesity. Expanding upon findings from this study will support the development of more effective interventions for reducing the risk of obesity in this population. The findings from this translational project provided initial steps towards achieving this goal. Lastly, seeking involvement from family members or guardians in future school-based childhood obesity wellness programs should be performed to potentially improve outcome measures. Parental or guardian involvement aimed towards encouraging physical activity and healthy eating reinforces behavior change interventions within the school settings. The collaboration of parents, school authorities, and advanced practice nurses in future initiatives will produce more effective outcomes for the adolescent population.

Collectively, the analysis of existing research studies and the finding of this translational research study provide guidance for future research. Incorporating family involvement in school based physical activity programs show positive outcomes in existing research studies (Elizondo-Montemayor et al., 2013; Ling et al., 2014; Du et al., 2016). Additionally, engaging support from school administrators and faculty members has contributed to successful implementation and incorporation into school policies and curriculum (Frenn et al. 2005; McCreary et al., 2012; Tucker et al, 2010). The use of a detailed questionnaire, such as the QAFA – Physical Activity Questionnaire for Adolescents, to evaluate physical activity levels facilitate better comprehension by participants as compared to a simplified questionnaire, such as the PACE+

Physical Activity survey (Junior et al., 2016). Lastly, the use of multimodal measures that include self-report, observation, and activity monitor may provide better analysis of physical activity levels for each participant (Berg et al., 2003; Du et al., 2016).

Conclusion

The family nurse practitioner-led school-based childhood obesity wellness initiative has beneficial effects on improving physical activity and perspectives on healthy diet among rural Georgia adolescents. The results from this study support incorporating nurse practitioners into wellness programs in a school system to aid in improving healthy behaviors for the adolescent population; however, the data suggest the need for further studies on evaluating the long-term effects on preventing and controlling childhood obesity through nurse practitioner-led school programs. The findings of this translational project provide the foundation for future research and applications. Additionally, further research studies need to examine the effects of the intervention related to other ethnic groups, ages, and geographical locations.

Human Subjects Approval Statement

The Georgia College and State University Institutional Review Board (IRB) approved this translational project on April 20, 2016. Informed parental/guardian consents and minor assents were received prior to initiation of this study.

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Appendix A:

Translational Project Parental Consent Form
Georgia College & State University

Dear Parent/Guardian:

My name is Joy King-Mark and I am a Family Nurse Practitioner from the Department of Nursing at Georgia College & State University. My contact information is located at the bottom of this letter.

We are conducting a research study on preventing childhood obesity in high school student in rural Georgia. We would like to include your child in our research study. Your child was selected as a possible participant because he/she is a student at Early College. The study will take place on the campus of Early College in the classroom. If your child takes part in this project, it should take approximately 6 weeks to complete the research study.

If your child takes part in this project, he or she will be asked to do the following activities:
-Participate in classroom discussion about health and nutrition
-Participate in physical activity outside on the campus of Early College

This research has the following risks: Physical injury related to the fitness, strength, and conditioning activities from exercise incorporated in the study. Through this risk is minimal, it must be outline as a potential complication of the study.

The research has the following benefits: Improving in concept of nutrition and physical activity, improving of self-esteem, reduce the risk for the developing childhood obesity, reduce the risk of developing chronic diseases such as diabetes and high blood pressure, reinforce the importance of physical activity and nutrition, and add to the growing body of knowledge regarding childhood obesity prevention measures.

Your child will receive the following payment/reimbursement: Each participant will receive a $10.00 gift card.

The information in this research will be kept confidential. Data will be collected at the beginning and end of the study. Data will be encrypted on a computer for security purposes. Research data will be stored in a secure location. The location will only be known to the researcher and securely locked in the undisclosed location. The data will be made available only to the person conducting the research. No reference will be made in oral or written reports that could link your child to the research.

Your child's participation in this project is completely voluntary. Your decision whether or not to allow our child to participate will not affect your or your child’s relationship with Early College or Georgia College and State University. In addition to your permission, your child will also be asked if he or she would like to take part in this project. Only those children who have parental permission and who want to participate will do so, and any child may stop taking part at any time. You are free to withdraw your permission for your child's participation at any time and for any reason without penalty.

You may keep a copy of this document for your records.

If you have any questions about this project, please contact us using the information below. If you have any questions about your or your child's rights as a participant, contact the Georgia College IRB (contact information at the bottom of the page).

Sincerely,

Joy L. King-Mark, APRN, MSN, FNP-C
(404)375-8044
joy.king@bobcats.gcsu.edu

Sallie Coke, PhD, APRN, C-PNP, C-FNP
(478)752-1074
sallie.coke@gcsu.edu

****

I DO / DO NOT (circle one) give permission for my child _____
(name of child)

to participate in the research project described above.

_____
(Print) Parent's name

_____ _____
Parent's signature Date

Appendix B:

Minor Assent Form

Project Title: Combating Childhood Obesity Through Nurse Practitioner Led School-Based Initiatives

Investigator and Contact Information:
Joy L. King-Mark, MSN, APRN, FNP-C, DNP-S
Email: joy.king@bobcats.gcsu.edu
(404) 375-8044

Research Committee Members:
Committee Chair: Dr. Sallie Coke, PhD, APRN, C-PNP, C-FNP
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Second Committee Chair: Dr. Krystal Canady, DNP, MSN, APRN, FNP-C
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Community Chair: Dr. Runee Sallad, Ed.D.
Director of Georgia College Early College
(478)445-3105
runee.sallad@gcsu.edu

1. What is this study about? What will I do in this study?

My name is Joy King-Mark and I am a nurse practitioner who is a student at Georgia College & State University. I'm doing a research study about good eating habits and exercise. A research study is a way to learn more about students your age and how you feel about food and physical activity. In the program you will learn about different types of foods and participate in indoor/outdoor physical exercise. If you decide that you want to be part of this study, you will be asked to meet with a group of your peers and a nurse practitioner for 30 to 60 minutes twice a week.

2. Could anything bad happen to me?

We will be doing some exercises indoors or outside at Early College and there is a risk of injury because we will be doing activities like running and push-ups. Your teacher will be with you during the entire study and you will be able to take breaks when you need to. You can also stop participating at any time after we start.

3. Can anything good happen to me?

I think this study has some benefits. A benefit means that something good happens to you. I think these benefits might include you being able to learn more about good eating habits, using the computer to learn more about food, playing sports you may not have participated in before, and helping other learn more about food and exercise in students your age. You will get to wear an activity tracker during the study and have a sports physical done before starting the program. If you have any allergy to nickel, please let me know. The activity tracker has a small amount of nickel in the battery.

4. Will anyone know I am in the study?

When I finish this study, I will write a report about what I learned by working with you and your peers. This report will not include your name or that you were in this study.

5. What if I don't want to be in the study?
You do not have to be in this study if you do not want to be. If you decide to stop after we begin, that's okay too. Your parents know about the study, too. Please feel free to ask me any questions you think of by calling or emailing me. My contact number and email are listed above.

If you decide you DO want to be in this study, please write and sign your name in the blank below.

I, _____, want to be in this research study.
(Write your name here)

_____ _____
(Sign your name here) (Date)

Research at Georgia College involving human participants is carried out under the oversight of the Institutional Review Board. Address questions or problems regarding these activities to Dr. Tsu-Ming Chiang, GC IRB Chair, CBX 090, GC, email: irb@gcsu.edu; phone: (478) 445-0863.

Appendix C:

Translational Project Weekly Schedule

Georgia College Early College
Family Nurse Practitioner Led Wellness Program Weekly Schedule

Week 1

-Day One (Wednesday: 11:26 am – 12:49 pm)
- -Students will be given PACE+ surveys to complete
- -Blood pressure, weight, height, and waist circumference will be obtained
- -Introduction to nutrition and physical activity
  - -Explore what nutrition and exercise means to each participant
  - -Open dialogue about health behaviors
  - -Introduction of the SuperTracker Website

-Day Two (Friday: 1:30 pm – 2:30 pm)
- -Introduction to SPARK
  - -Fitness Personal Best
    - -Evaluate their current fitness level and set personal goals
    - -Groups of 2-3 students
    - -Four assessment stations
      - -Curl-up
      - -Push-up
      - -Sit & Reach
      - -12-minute run

Week 2

-Day Three (Wednesday: 11:26 am – 12:49 pm)
- -"Track Your Snack"
  - -Objective: Identify the importance of healthy snacking, nutritional content, monitoring calories, and sodium intake
  - -Learn how to navigate through the SuperTracker website
  - -Additional information via handouts will be provided
- -Homework Assignment to Reinforce Learning
  - -Use the SuperTracker website to track their snacks
  - -Identify different components discussed during our session

-Day Four (Friday: 1:30 pm – 2:30 pm)
- -iFreestyle Aerobics
  - -Warm-up (10 minutes)
  - -Main aerobic activity (7 different moves – 30 – 40 minutes)
  - -Cool-down (10 minutes)

Week 3

-Day Five (Wednesday: 11:26 am – 12:49 pm)
- -"What's Your Plan"?

-Introduced to the five food groups
-How to meet daily nutrient and calorie needs
-Create their own profile on SuperTracker website
-Save their dietary information
-Access their account on an ongoing basis
-"Build Healthy Meals"
-How to incorporate food groups into planning a daily menu
-Create daily meal plan using SuperTracker's Food Tracker
-Incorporate video demonstration of using the food tracker

-Homework Assignment
-Customize SuperTracker account
-Begin tracking nutrition of food consumed
-Day Six (Friday: 1:30 pm – 2:30 pm)
-iCardio Kickboxing
-Learn about cardio kickboxing
-Warm-up (10 minutes)
-Kickboxing – 30 – 40 minutes
-Cool-down – 10 minutes
-Improve aerobic capacity, strength, and flexibility
-The importance of performing these only for exercise purposes will be reinforced during group activity

Week 4

-Day Seven (Wednesday: 11:26 am – 12:49 pm)
-Three-Day Food Record
-Reflect on their experience tracking and analyzing their foods
-Introduced to the 3 Day Food Tracker feature on the SuperTracker website
-Determine whether their meal selections meet their daily calorie allowance and food group targets
-Day Eight (Friday: 1:30 pm – 2:30 pm)
-Fitness Personal Best
-Students will compare their performance from day two to day twelve
-Students will be given $10.00 gift cards