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A Lifestyle Modification Toolkit to Increase Physical Activity Among Young Adults

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This is to certify that the doctoral study

by

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has been found to be complete and satisfactory in all respects,

and that any and all revisions required by

the review committee have been made.

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Abstract

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BSN, Prairie View A&M University College of Nursing, 2008

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Project Submitted in Partial Fulfillment of the

Requirements for the Degree of

Doctor of Nursing Practice

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Abstract

Substantial decreases in physical activity have been observed between early to late adolescence in males and females, with decreases in levels of activity into adulthood. Physical inactivity among young adults leads to medical conditions such as Type 2 diabetes, stroke, ischemic heart disease, falls resulting in hip fractures, and depression later in life. Advanced Nurse Practitioners have a significant impact on the problem of physical inactivity among young adults through education to improve knowledge regarding physical activity participation. The focus of this project was to develop a toolkit on lifestyle modification as a resource for physical education teachers and nurses to increase physical activity participation and to decrease sedentary behaviors among young adults. The project practice question asked whether an evidence-based toolkit would address identified needs of improving lifestyle diet and physical activity in young adults. Pender's health promotion model guided the planning and development of the project. The Computer Attitude Questionnaire together with the 3-Day Physical Activity Recall was used during a needs assessment. Feedback from the survey was included in the development of the toolkit. A 5-item survey was given to 5 content experts who evaluated the toolkit. Data were analyzed using a descriptive statistics to obtain a content validity index score of 1.00. Findings show universal agreement about the content of the toolkit as a resource for physical education teachers and school nurses to encourage physical activity participation in young adults. The implications of project findings for positive social change include the potential to increase the involvement of young adults in activities that improve the lives of individual.

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Dedication

This is dedicated to all my young adult and adolescent patients. I have a sincere passion for providing them the best way to lead active lifestyle and decrease sedentary behaviors. May this staff education project help to improve their knowledge regarding lifestyle modifications and be effective in delivering intended behavior changes.

Acknowledgments

I am very grateful to God almighty that provided me with the wisdom and patience required to successfully complete the Doctor of Nursing Practice degree. Special thank you to my husband Chief Linus Nwanna, Chimereze 1 of Ijenwe; my children- Pride, Michelle, Christine, Jennifer and, Veronica Nwanna for their support, and the sacrifice they had to endure during this professional journey. Thank you for never losing faith or patience. God bless you all.

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Section 1: Nature of the Project

Introduction

Physical activity participation among young adults and adolescents is decreasing. Reported barriers to decline in the physical activity participation include a preference for indoor pastimes, low energy levels, a lack of motivation, a lack of resources, and insufficient social support from parents and peers. The World Health Organization has estimated that 3.3 million people die around the world each year due to physical inactivity, making it the fourth leading underlying cause of mortality (Pratt, Norris, Lobelo, Roux, & Wang, 2015). Time spent viewing television has been associated with behaviors such as increased consumption of high-fat, high-sugar, salty foods and other bad eating behaviors (Matheson, Killen, Wang, & Robinson, 2004).

Physical activity and eating habits may not seem related, but some correlations exist. There is a need to unravel the relationships between these risk behaviors (low physical activity and unhealthy eating habits) and their consequences to young adults overall health. Difference in time spent in physical activities compared with that spent viewing television/videotapes gives credence to the sedentary lifestyle nature of young adults and the need to encourage a habit of active living through the substitution of sedentary activities with physical activities.

According to Tussling-Humphreys, Fitzgibbon, Kong, & Odoms-Young (2013), there is a lack of knowledge concerning the benefits of physical activity among young adults as evidenced by the level of their physical inactivity and sedentary behavior. In populations identified at risk for physical inactivity such as young adults and adolescents,

education about diet, physical activity, its effects, and other lifestyle modifications need to begin at an early age. Among young adults between the ages of 12 to 18 years, lifestyle modifications including weight control, physical activity, increased fruit and vegetable consumption, reduced total fat, saturated fat intake, and a decrease in sedentary behaviors are critical and should be encouraged. Due to the increase in the prevalence of childhood obesity and diabetes mellitus during the past two decades, physical activity is an increasingly prominent role in disease prevention and health promotion efforts in the United States (Pate, Davis, Robinson, & Stone, 2006). Therefore, it is necessary to develop a lifestyle modification toolkit as a guide for physical education teachers and school nurses to interact with students to teach the benefit of a healthy diet and an active lifestyle. Involvement in physical activity and sport is imperative to the overall health and development of young adults.

Physical activity largely has been perceived as a broad term that encompasses all forms of muscle movement that can range from rigorous sporting activities (e.g., soccer, hockey, etc.) to more leisurely lifestyle activities (e.g., walking, hiking, water aerobics). Physical inactivity during childhood is a key risk factor for the development of overweight and obesity and chronic diseases including type 2 diabetes (Passmore et al., 2017). It is important for both physical education teachers and school nurses to guide young adults and adolescents to develop knowledge, skills, and confidence needed to adopt and maintain active lifestyles. School nurses and physical education teachers are in a unique position to educate and coordinate efforts to improve nutrition and physical activity among this population. They can interact well with students to increase their

knowledge about healthy eating habits as well as benefits of active lifestyle. According to research findings, schools as influential institutions could promote healthy behaviors, since young adults spend a lot of time at school, and a strong link exists between their health status and capacity to learn (Hill et al. 2015). Therefore, a staff education program on lifestyle modification toolkit may be necessary to better expand the knowledge of physical education teachers and school nurses on the use of toolkit. Furthermore, when physical education teachers and school nurses felt supported and gained more knowledge regarding lifestyle modification toolkit, they interact with their students better. Scott, Grimshaw, Klassen, Nettel-Aguirre, &Johnson (2011) discovered that there is not a universal method for educating staff on the use of the toolkit as they are modified to fit the institution.

Advanced Practice Nurses can have a significant impact on the problem of physical inactivity among the target population through education and management of risk factors to improve outcomes (Terry, 2012). During my practicum experience at a family practice, I had the opportunity to interact with many young adults and adolescents. I discovered the need for physical education teachers and for school nurses to address the problem of sedentary behaviors and encourage active lifestyle among young adults. Lifestyle changes need to be introduced at younger ages, reinforced, and monitored. The lifestyle modification toolkit provided a resource and holistic approach to meeting the diverse needs of young adults by bridging the gaps in knowledge regarding benefits of physical activity participation. The focus of this project was to develop a lifestyle

modification toolkit to increase physical activity participation and decrease sedentary behaviors among young adults.

Problem Statement

Physical inactivity is an important and growing major health concern. World Health Organization(WHO) discovered that around 31% of young adults aged 15 years were insufficiently active in 2008 (male 28% and female 34%). The same report confirmed that approximately 3.2 million deaths each year have been attributed to insufficient physical activity (WHO, 2016). Many consequences of physical inactivity include reductions in insulin sensitivity of skeletal muscle and expansion of fat storage, development of obesity, metabolic syndrome and type 2 diabetes (Warden & Fuchs, 2008). Faith et al, (2011) reported that screen-based activities, such as watching television, playing video games and using computers are common sedentary behaviors among young people taking up to a total of 3 hours and 40 minutes per day, with a peak between the ages of 9 and 12 years, also, Thompson et al. (2016) confirmed that few adolescents in the United States engage in the recommended amounts of physical activity. The authors confirmed that 72.9% of high school students reported not participating in 60 or more minutes of physical activity each day. Substantial decreases in physical activity have been observed between early and late adolescence in both males and females, with continued decreases into adulthood.

Stone and Saxtone (2005) discovered that sedentary lifestyles impose a medical and economic toll on the United States. Despite the proven benefits of sports and physical activity (including blood pressure regulation, diabetes control, weight control, lower risk

of cardiovascular diseases, etc.), young adults in the U.S have not taken advantage of opportunities to engage in sporting events and physical activity. Instead they tend to spend excessive time viewing television and playing video games (Vilhjalmsson & Kristjansdottir, 2006). Thus, there is a public health urgency to identify effective methods to reverse this alarming trend.

According to WHO (2012), physical inactivity is increasingly being recognized as a major problem in global health. WHO estimated that less than one-third of young adults are sufficiently active to benefit their present and future health and well-being. Vital contributing factors to this decline in physical activity have included perceptions of low exercise efficacy; increased sedentary activities, such as television watching (Pender, 2006); and a lack of social support (Tergerson & King, 2007). Inactive young adults tend to weigh more than active adults and have higher blood pressure, which can lead to (a) an increased risk of premature mortality, (b) an increased likelihood of developing a chronic disease, and (c) a higher tendency to remain inactive as adults (Lifshay & Wolin, 2006). Faith, Berman, Heo, Pietroblli, Gallagher, and Epstein (2011), suggested that time spent in sedentary behaviors likely has displaced the time available for participation in some physical activity. Developing healthy eating and exercise habits in adolescence are foundations for good health in adulthood.

Healthy People 2020 (2017) evaluated the levels of obesity in the United States. since 2008 when the Federal Physical Activity Guides for Americans was released. The goal of this program was to increase the physical activity of young adults and monitor their dietary intake as a way of addressing the obesity epidemic. When this program was

reevaluated in 2014, no progress had been measured due to an overall decreased level of physical activity and little progress towards improving the dietary habits of this population. Center for Disease Control (2013) concluded that if a meaningful decline in chronic diseases among older adults is to occur, adults at younger ages, as well as the nation's adolescents and young adults, need to pursue health-promoting behaviors and get recommended preventive services. For a DNP-prepared nurse, issues such as this should attract careful attention and raise questions of what to do in response to the situation. Meanwhile, poor dietary practices and physical inactivity had been associated to many adverse health outcomes; young adults could benefit from interventions designed to improve their eating habits and increase their activity levels.

This project addressed: (a) gaps in knowledge regarding benefits of physical activity participation, (b) ways to engage students in health-promoting physical activity, and (c) promotion of strategies that lead to long-term adherence to a healthier and more active lifestyle. These can be achieved through the provision of before- and after-school extracurricular physical activity opportunities such as participation in physical activity clubs, intramural activities, and interscholastic sports. Stone and Saxtone (2005) discovered that behavioral components are important in acquiring and developing healthy habits as well as committing to long-term lifestyle change and recommended that young adults establish a healthy eating habit early in life and to maintain these behaviors throughout their lives. The lifestyle modification toolkit was designed to form a reference guide for school nurses and physical education teachers at schools to; (a) increase their awareness of physical inactivity among the target population; (b) include behavioral

components while providing education about health-promoting behaviors include; (c) strategies to avoid revising old, unhealthy habits. The more knowledge that nurses and teachers have regarding lifestyle modification, the better retention, and certainly a big key to better outcomes.

Hill et al. (2015) found that health-related topics can easily be marginalized when competing with conventional academic subjects or other extracurricular activities. The essential information in the lifestyle modification toolkit included educational materials (a) promote long-term adherence to a healthier, more active lifestyle; (b) address anticipated lapses in lifestyle change; (c) provide strategies to get back on track; and (d) identify various supports, such as psychologists and psychiatrists that promote behavioral changes if needed. This DNP project supports the American Heart Association (2006) recommendations to balance calorie intake and physical activity to reach a healthy body weight. Therefore, it became necessary to provide well-designed tools for physical education teachers and school nurses to address the problem of physical inactivity that leads to obesity, hypertension, and cardiovascular diseases. Lifestyle changes better introduced at younger ages, reinforced, and monitored.

Purpose Statement

The purpose of this project was to develop a lifestyle modification toolkit for physical education teachers and school nurses at a high school to encourage an active lifestyle among young adults. The financial consequences of physical inactivity among young adults later in life in the overall health care system will grow higher, and the quality of life from the complications may become a burden. The cost and poor outcomes

of many intervention strategies for chronic and lifestyle diseases have led to a focus on prevention as a strategy for adequate health care management among young adults. It is critical to developing lifestyle modification toolkit to address this burden of physical inactivity. The toolkit contained information on a dietary approach to encourage healthy eating habit (DASH--eating plan) and increased physical activities among young adults. It included resources on healthy dietary behaviors and the benefits associated with sports and other physical activity. This lifestyle modification toolkit could be used to promote active lifestyle and decrease sedentary lifestyle among young adults within the educational system as well as within the healthcare system. Because this scholarly project could also serve as a community-based project, nurses working in community health settings can use the toolkit as a framework for providing interventions for weight management and discouraging sedentary behaviors.

Definition of Terms

Below are the terms that could help the readers to understand and appreciate the content of the information from the toolkit.

Evidence-based practice: The implementation of current research when making decisions about health care in order to promote better outcomes.

Physical activity: Broad term that encompasses all forms of muscle movements which can range from sports to lifestyle activities

Lifestyle modifications: Health-promoting behaviors that can enhance one's quality of life and aid in the prevention of diseases such as hypertension (Hong, 2010).

Sedentary behavior: Sedentary behavior is defined as doing or requiring much sitting, not physically active or permanently attached to an object. For this project, sedentary behavior is defined as more than 2 hours of television viewing/video viewing/computer play a day.

Self-efficacy: Self-efficacy is defined as people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives.

Toolkit: The toolkit is a set of information designed to be used together or for a particular purpose.

Program Objective

Increasing the awareness and knowledge regarding lifestyle modification strategies may help physical education teachers and school nurses interact well with young adults. The toolkit provided a resource to encourage young adults to participate in lifestyle modification strategies using a DASH eating plan as well as the need for increased physical activities. Program objectives included in this project: (a) developing a lifestyle modification toolkit for physical education teachers and school nurses as a guide to encourage physical activity participation among young adults, and (b) evaluating the lifestyle modification toolkit prior implementation. Lifestyle interventions should be implemented that focus on weight loss, incorporation of a healthy diet, and promoting physical activity (Rawal et al., 2012). I searched current literature to identify an education model to present the implementation of the lifestyle modification toolkit to physical education teachers and school nurses. Since the literature supported this evidence, the

information in the toolkit was constructed using the health promotion model to acknowledge the values and beliefs of the target population. Findings from the literature suggested that setting goals, outlining methods for achieving these goals, and monitoring the target population progress are also critical to the success of lifestyle modification strategies (Barnes & Kimbro, 2012).

Summary

In this section, physical inactivity and sedentary behaviors were recognized as a global public health issue with young adults and adolescents having the highest prevalence. According to the American Heart Association (2012) lack of knowledge of preventive strategies among the target population is critical. As a DNP trained practitioner who could function in any setting, an evidenced-based project is important for quality health care. Sedentary behaviors and physical inactivity are modifiable risk factors through lifestyle modifications. Identifying interventions that are cost effective at the school is imperative. Therefore, it was important to develop a toolkit on lifestyle modification as a guide for school nurses and physical education teachers so they can interact with students to teach healthy eating habits as well as active lifestyle.

Section 2: Background and Context for the Doctoral Project

Introduction

Engaging in regular physical activity not only decreases the risk of heart disease, hypertension, obesity, and diabetes but also helps to improve the burning of calories (Buchholz & Artinnian, 2009). Evidence-based data are strong for beneficial effects of physical activity on musculoskeletal health, several components of cardiovascular health, adiposity in overweight youth, and blood pressure in mildly hypertensive adolescents (Strong et el., 2005). Among young adults, physical activity can reduce or improve obesity-related comorbidities such as hypertension, dyslipidemia, and glucose intolerance (Dietz, 2005). A recent Cochrane Review of 55 child obesity prevention studies found that increasing physical activity sessions and developing physical activity skills during the school week were among the promising strategies for obesity prevention (Ding et al., 2011). Education and awareness campaigns about diet, physical activity, its effects, and lifestyle modifications need to begin at an early age (Pate et al., 2006). Therefore, it was necessary for a well-designed tool such as the lifestyle modification toolkit to be developed for this population to help address the burden of sedentary behavior.

Lifestyle Modifications

Lifestyle modifications are health-promoting behaviors that can enhance one's quality of life and aid in the prevention of unhealthy eating habits and sedentary behaviors. According to research findings, poor diet and physical inactivity caused 310,000 to 580,000 deaths per year and are significant contributors to disabilities that result from diabetes, osteoporosis, obesity, and stroke (Madera, 2010). In a descriptive

study conducted by Rigsby (2011) on the effectiveness of healthy lifestyle modifications on blood pressure control, 36 participants were recruited in the 12-week project, with a 67% retention rate. Weekly sessions included interactive educational and walking components. Overall, researchers revealed that participants experienced an increase in healthy lifestyle modification adoption resulting in blood pressure control improvement. Rigsby (2011) concluded that the implementation of healthy lifestyle modifications is crucial in providing quality patient care to hypertensive individuals.

Gortmaker, Peterson, and Wiecha (2008) examined the effects of the 2-year Planet Health curriculum that focused on decreasing television viewing as well as decreasing high-fat food intake, increasing fruit and vegetable intake, and increasing moderate and vigorous physical activity among students in grades 6 to 8. In a 10-school randomized trial, boys and girls in the intervention schools reported reducing their television viewing more than the control group. The authors claimed that prevalence of obesity (defined by age-specific and sex-specific thresholds using a combination of basic metabolic index and triceps skin fold thickness) decreased significantly among intervention girls, but no significant effects observed in boys (Gortmaker, Peterson,& Wiecha (2008). No significant changes occurred in self-reported physical activity. Although the authors could not test the effects of reducing screen viewing behaviors alone, reductions in television viewing were associated with changes in obesity and were found to “mediate” the intervention effect in a regression analysis.

In another study conducted by Yates et al. (2012) involving young adults at risk of developing diabetes, the authors discovered that chances of progressing to Type 2

diabetes can be reduced by up to 60% with lifestyle interventions aimed at promoting a healthy diet, moderate-vigorous intensity physical activity, and weight loss or weight maintenance. This suggests that there is a positive relationship between weight reduction, physical activity, and diabetes prevention.

Dietary Approaches to Stop Hypertension is a carbohydrate-rich eating plan that emphasizes increasing consumption of fruits, vegetables, and low-fat dairy products and reducing the use of saturated fat, total fat, and cholesterol by decreasing consumption of red meat, sweets, and added sugars. DASH diet was initially developed for patients with high blood pressure. Recently, the DASH diet can be served as a heart-healthy eating plan. A randomized controlled trial (RCT) showed DASH to be effective in lowering blood pressure among the target population (Rigsby, 2011). The best example of clinical evidence improving lifestyle in this population is increased physical activities and the DASH that established the importance of a heart-healthy eating plan among the target population (Spencer, Jablonski, & Loeb, 2012). By helping young adults manage their sodium intake, eat more fiber and potassium, and maintain a healthy weight, the DASH eating plan may even help young adults who are predisposed to diabetes avoid or delay the onset of this condition (Yates et al., 2012).

Toolkit

The purpose of the developing lifestyle modification toolkit was to provide physical education teachers and school nurses a structured method for modifying EBPs to meet better the needs of the groups the target population. Kriemler (2010) assessed the effectiveness of a school-based physical activity program during one school year on

physical and psychological health in the young adult population. Twenty-eight classes from 15 schools totaling 540 students were randomly selected and assigned in a 4:3 ratio to an intervention or control group, from August 2005 to June 2006. Students in the intervention group received a multi-component of the physical activity program that included structuring the three existing physical education lessons each week and adding two additional lessons a week, daily short activity breaks, and physical activity homework. Kriemler concluded that a school-based multicomponent physical activity intervention including compulsory elements improved physical activity and fitness and reduced adiposity among participants.

The activities and healthy diet options contained within the toolkit were easy to use and implement. This approach proved to be effective in delivering behavior change interventions among the target population. In the past, behavioral components and nursing involvement were limited in the development of toolkits. This gap provided an opportunity for a DNP student to develop lifestyle modification toolkit.

Physical Activity

The United States Department of Health and Human Services (DHHS) 2008 guidelines on physical activity recommended that young adults should engage in minimal of 60 minutes of moderate to intense aerobic activity per week. The same report suggested that young adults should also engage in strength training activity that involves all major muscles groups at least twice a week. Physical activity has been discovered to be beneficial to the musculoskeletal system, increases energy, and allows people to cope more easily with stress hence, should be promoted among young adults (Buchholz &

Artinnian, 2009). Engaging in regular physical activity not only decreases the risk of heart disease, hypertension, obesity, and diabetes but also helps to improve the burning of calories. Schneider, Dunton, and Cooper (2008) investigated the impact on self-concept of a 9-month physical activity intervention among sedentary adolescent females. Measures of self-concept were obtained before, during, and following a 9-month school-based intervention to promote physical activity in sedentary adolescent females. Changes among the intervention group were analyzed relative to changes among a non-random comparison group. Intervention participants engaged in supervised activity 4 times/week and received didactic instruction one day/week promoting activity outside of school. Self-concept, physical activity participation, and cardiovascular fitness were assessed before, midway through, and after the 9-month intervention. Researchers found that intervention had a significant positive impact on participation in the vigorous activity and cardiovascular fitness.

Hill (2010) studied the development of American young adults across the country. He had an exciting experience by tracking the same group of children, over 1,000 kids, from their birth in 1991 through high school. The aim of the study was to find out how that population was faring with the obesity epidemic and the limited opportunities available for physical activity during the school day, not to discover how to improve their thinking skills. Having tracked the physical development of the children for some time, the author discovered that Basic Metabolic Index (BMI) of most target population did increase over the years to unhealthy levels. Data also showed that physical activity decreases significantly for boys and girls in the U.S. between the ages of nine and 15

years. Information supports the notion that children are potentially at risk for negative outcomes that result from inactivity. Other research studies have shown that it's not physical health alone that suffers from inactivity, cognitive and achievement outcomes decline as well. Vigorous physical activity for school-age children has been associated with better grades and higher academic achievement (Hill, 2010).

Leung, Agaranov, Grytsenko, and Yeh (2011) assessed the effectiveness of interventions that focus on reducing sedentary behavior among school-age youth and on identifying elements associated with interventions' potential for translation into practice settings. The randomized trials, which lasted for 12 weeks, aimed at decreasing sedentary behaviors among children aged 6 to 19 years. Twelve studies were included; three focused only on sedentary behaviors, one focused on a physical activity, six were combined sedentary behaviors and physical activity interventions, and two studies targeted sedentary behavior, physical activity, and diet. Overall, interventions that focused on decreasing sedentary behavior, whether alone or in combination with other strategies, such as increasing physical activity and improving diet, were associated with a reduction in time spent on sedentary behaviors and improvements in anthropometric measurements related to childhood obesity. These research studies provided encouraging findings of the effects of lifestyle modifications among young adults. Most studies confirmed that there is a clear connection between altering behaviors and positive outcomes for youths involved in physical activity programs.

Robinson (2006) completed a school-based randomized controlled school-based trial specifically designed to examine the causal relationship between reducing screen

time and body fatness. Over time, the curriculum was successful at significantly decreasing children's television viewing and video game use. Notwithstanding the lack of clear outcomes of school-based screen time–reduction curricula on physical exercise, some results from other contexts suggest that reducing screen time may play a role in promoting physical activity among young adults. The research study concluded that overcoming television, videotape, and video game use could be a promising, population-based approach to prevent childhood obesity. The percentage of participants who achieved long term weight-loss maintenance reported various dietary and physical activity strategies, motivations for and social-cognitive influences on weight loss and maintenance, current eating patterns, and self-monitoring practices compared to those who did not participate.

Salmon, Owen, Crawford, Bauman, and Sallis (2006), studied the reduction of sedentary behavior and increasing physical activity among the young adult population. The aim of the randomized controlled trial was to prevent unhealthy weight gain among the group and to report the findings of the process evaluation. Children from three government primary schools were randomized by class to one of four conditions: a behavioral modification group (n = 69); a fundamental motor skills group (n = 73); a combined behavioral and modification group (n = 90); or a control (usual classroom lessons) group (n = 61). Children in the behavioral modification group participated in 19 sessions that encouraged them to reduce screen-based behaviors, and identified physical activity alternatives. The fundamental motor skill group participated in 19 lessons that focused on mastery of six skills: run, throw, dodge, strike, vertical jump and kick. The

combined group participated in all the behavioral modification and fundamental motor skill activities. The intervention specialist teacher reported that the children showed high enjoyment and engagement (88% lessons attended) in most aspects of the program others reported reducing their Television viewing; however, less than half reported increasing their physical activity (Salmon, Owen, Crawford, Bauman, & Sallis, 2006). The literature review conducted established the relationship between lifestyle modifications and a reduction in sedentary behaviors among young adults and adolescents. The development of effective evidence-based strategies to decrease sedentary behaviors and prevent childhood obesity through dietary changes remains a high priority (Marcera, 2010).

Models and Theories

The HPM proposed by Nola Pender (1996) was the framework that guided the planning and development of the project. This model has been used previously in health promotion programs for weight management and lifestyle modification programs among the target population and has shown success (Buchholz, & Artinian, 2009). As a framework, Health Promotion Model acted as a building block by guiding the planning and development of the lifestyle modification toolkit project to address sedentary lifestyle and encourage an active lifestyle among young adults and adolescents. The theoretical prepositions of the health promotion model summarized that people will commit to performing behaviors in which they anticipate will benefit them, based on their behavior-specific cognitions, perceived barriers, perceived competence, and emotions (Pender, Murdaugh, & Parsons, 2010). Health promotion model has been utilized in the past to promote behaviors among young adults.

Relevance to Nursing Practice

Lifestyle modification is an evidence-based strategy to decrease sedentary lifestyle, prevent and manage hypertension among the at-risk population (Barnes & Kimbro, 2012). Iughetti, China, Berri & Predieri (2010) discovered that obesity among young adults could be successfully managed through lifestyle modifications and weight reduction, provided they stick to their weight loss goals and maintain a steady state of health after reaching those goals. The evidence-based nursing practice guideline developed from this project act as a resource to other nurses and physical education teachers to encourage an active lifestyle and discourage unhealthy behaviors among young adults and adolescents. It will also encourage nurses to be aware of this population and be able to educate them on health-promoting behaviors that can help to reduce their risk, especially on how to shop and plan their diet. According to Zaccaginin & White, (2011), DNP practitioners can work in any health care setting impacting positive changes.

Local Background and Context

Over the years, many public health, medical, and educational authorities have called on schools to give greater attention to the provision of physical activity to students (Pate, Davis, Robinson, & Stone, 2006). The Institute of Medicine recently issued a report on the prevention of childhood obesity that placed major emphasis on the potential role of schools. Pate, Davis, Robinson, & Stone (2006), also recommended that schools adopt policies that require daily physical exercise opportunities before, during, and after school. Schools were also recognized in that same study as an important setting for health promotion and education for young adults between 12 and 18 years of age (2006). This is

important because young adults spend a substantial proportion of their waking hours at school, and the schools setting provide opportunities for them to increase physical activity as well as for teachers to educate them about the importance of healthy dietary habits and physical activity. A range of school-based interventions are effective in increasing physical activity among students (Passmore, Donato-Hunt, Maher, Havrlant, Hennessey, &. Milat, 2017). School nurses needed to be updated with the latest evidence practice on the benefits of physical activity participation, and the only way to achieve this is through education. An evidence-based review of global school nutrition interventions found that a nutrition-based curriculum, equipping teachers with nutrition knowledge, usually improved behavioral outcomes of learners (Hill, Draper, De Villiers, Fourier, Mohamed, Parker, &, Steyn, (2015). Also, the American Society of Hypertension (2012), recommended that one way to address public health issue is access to resources such as the lifestyle modification toolkit. The reasons mentioned suggest that a reconsideration of the role of the physical education teachers at various schools in addressing this problem is necessary and appropriate.

As a DNP prepared nurse, I am uniquely positioned to lead efforts to integrate this information related to nutrition, physical activity, and obesity prevention among young adults and adolescents through the staff education.

Role of the DNP Student

The DNP education provided me with the training, knowledge, skills, and expertise required being a change agent in the health care environment. The role of DNP during this project included: (a) developing the toolkit for the project and (b) role of

analyzing results and outcome measures, while also reporting results on survey questions. With the increasing demands to improve the lifestyle changes among young adults and adolescents, developing toolkit was critical.

Role of the Project Team

The project team consisted of healthcare providers, assistant principal, physical education teachers and school nurses at a high school. The team was be led by the DNP student to ensure that the project proceeded within the specified time frame while achieving the objectives of the project. During this project, the DNP student requested approval through the Walden Institutional Review Board (IRB) application process following the human subject's criteria necessary for programs where nurses and teachers were involved at the site. The committee and the school board reviewed the educational project plan to ensure that the requirements met the standards for ethical research. These activities and procedures that were carried out during this project were executed following all appropriate ethical guidelines designed to protect participants.

Summary

Regular physical activity is essential for a healthy life. The strongest evidence supports direct effects of physical activity on cognition. The literature reviewed recognized the benefits and more education were needed to ensure that young adults and adolescents engage in adequate amounts of physical activity each day. The toolkit provided evidence-based materials to support the design and development of health behavior change strategies for the target groups (Davidson et al., 2013). Schools were referenced as potentially attractive settings in which to promote positive health behaviors

for young adults and adolescents since they spend large amounts of time in the school environment. Besides, schools typically provide extracurricular programs that can promote health (Pate et al., 2006). Pender's Health Promotion Model was identified as the framework that guided with the planning and development of the project. It was noted that HPM would be most beneficial in providing best practice to this particular group. The role of DNP student and project team identified. Relevance and importance to the project also identified and described from previous studies.

Section 3: Collection and Analysis of Evidence

Introduction

The proposed practice approach for this project was to develop a toolkit as a resource for nurses and physical education teachers to guide young adults increase their physical activity, decrease sedentary behaviors, and also encourage dietary changes. The initial approach was to conduct a need assessment through questionnaire and interviews with assistant principal, teachers and school nurses at the school. This helped to identify gaps in knowledge, strengths, as well as the resources to include in the toolkit. The need assessment helped to direct the development of the educational materials and resources to address gaps. The toolkit was developed with the above information in mind while providing the target population with important information, content, and essential resources to encourage an active lifestyle and decrease sedentary behaviors.

Practice-Focused Question

Based on existing research studies, accomplishing and maintaining lifestyle dietary modifications, behavioral modifications, and physical activity have remained challenging within lifestyle modification programs (Pritchett et al., 2005). The following was the practice-focused question developed for this project: Can an evidence-based toolkit be developed to address identified needs of improving lifestyle diet and physical activity in young adults? Developing a lifestyle modification for the physical education teachers and school nurses may help to decrease sedentary behaviors, and promote an active lifestyle among the target population.

Sources of Evidence

The search of the literature was conducted using key words such as physical inactivity, adolescents and young adults, dietary habits, exercise, sedentary behaviors, lifestyle modifications, health-promoting, behavioral modifications, and toolkit development. The databases that were used to conduct the searches were the Walden University library using the Cumulative Index of Nursing and Allied Health Literature (CINHAL), PubMed/Medline, and Google Scholar. Internet searches using the same keywords were conducted on the AHA, CDC, and the WHO. Simply providing young adults with information without emphasizing behavioral components, such as self-monitoring, goal setting, and maintaining lifestyle changes is insufficient to bring about the expected lifestyle changes. Recognizing the benefits of and addressing the barriers to participation in physical activity and sporting events have been critical in developing interventions that increase participation rates among adolescents and young adults (Halpern, 2007). Increasing physical activity has been reported to reduce the risk of developing diabetes, reduce the risk of high blood pressure (i.e., hypertension), and reduce high blood pressure among individuals who already have high blood pressure (CDC, 2010).

Analysis and Synthesis

A need assessment questionnaire for three Day Physical Activity Recall (3DPR), television/computer use questionnaire data were analyzed using descriptive statistics. This method of analysis is important because it allows the researcher to organize the data

in ways that give meaning and facilitate insight such as frequency distributions and measures of central tendencies and dispersion (Grove, Burns, & Gray, 2009).

Participants Demographic

A panel of content experts were invited to evaluate the content of the toolkit. The committee consisted of 5 members; two content experts, two physical education teachers with significant experience on physical activity participation among young adults, a school nurse and one member from the target population. These committee members helped to make recommendations and also provided key information contained in the toolkit. One of the content experts is a family medicine doctor and has been in practice for more than 20 years. She devoted much time in her practice as a health educator, had promoted healthy lifestyle throughout her entire practice. The other was a mid-level provider who has worked as a pediatrician for over 15years. I had two clinical rotations at her clinic. Both healthcare providers were knowledgeable about young adults' population and physical activity participation. The two physical education teachers worked with young adults at the high school for over 6 years. Besides being knowledgeable about physical activity, they also licensed physical education teachers. They were invited to make recommendations during the development of the toolkit to help assure that the content of the toolkit addressed the needs of the target population as well as report on the validity, appropriateness, and relevance of the toolkit.

Summary

In this section, the practice-focused questions, a method of collection and analysis of evidence reviewed. This scholarly project could help to address the

disquieting trends in other aspect of sedentary behaviors, such as increased screen time and decreased reliance on physically active transport, indicate that the schools should assume a leadership role in ensuring that young adults engage in adequate amounts of physical activity each day (Pate, Davis, Robinson, & Stone, 2006). This project was approved by Walden University Institutional Research Board May 2019. The IRB approval number for this staff education project is 05-13-19-0498512.

Section 4: Discussion and Implications

Introduction

Researchers have found that every type of physical activity has been associated with longer life expectancy compared with being sedentary (Bartol, 2019). Meanwhile, a large proportion of youth is insufficiently physically active. This decline in physical activity among young adults is of special concern. According to CDC (2011), only 29 percent of all high school-aged nationwide can be classified as physically active, meaning that they had participated in 60 minutes or more of moderate or vigorous physical activity daily. A school environment that motivates and enables young adults to be physically active can serve to promote physical activity. Other recommendations for appropriate amounts of physical activity for the school-age youth have been developed by several organizations and agencies but more effective strategies for delivering these recommendations to yield beneficial health and behavioral outcomes needed to be addressed. Pate et al. (2003) suggested that in order to implement successful community programs for young adults, staff and healthcare professional should be highly trained in the philosophy of the program enabling them to convey the philosophy of the program to others.

The focus of the DNP project was to develop a lifestyle modification toolkit to increase physical activity participation among young adults. Despite the benefits of physical activity, this population continues to lead sedentary lifestyle. This project addressed; (a) gaps in knowledge regarding benefits of physical activity participation; (b) ways to engage students in health-promoting physical activity; and (c) promotion of

strategies that lead to long-term adherence to a healthier, more active lifestyle. As a resource toolkit, the content was constructed to address the identified need to improve physical activity participation among young adults. The HPM proposed by Nola Pender (1996) guided the planning and development of the project. Health promotion interventions encompass problem definition, identification of the mode of delivery and components of the intervention. The articles reviewed for this project studied lifestyle modification as an evidence-based strategy to promote active lifestyle and decrease sedentary behaviors among young adults. The studies consisted of evidence evaluating the effect of physical activity participation and importance of promoting a healthy lifestyle among young adults.

Project Findings

Developing the lifestyle modification toolkit involved multiple revisions for accuracy. Five content experts were invited to evaluate the content and validity of the toolkit. After being invited to participate via an email, the five survey questions (see Appendix C) were sent to the content experts via an electronic link provided for evaluation correspondences. Samples of survey questions retrieved from the CDC website (2012) were sent out. The responses were analyzed using CVI. According to Polit and Beck (2006), the CVI scale is valid to assess the construct of the toolkit based on the following criteria: it is recommended that for a scale to be judged as having excellent content validity, it would be composed of items with three to five experts (1-CVI=1.0) and a minimum of (1-CVI of .78) for six to 10 experts. All survey questions were received, Question 1 and 2 which asked about the content and how relevant the

information contained in the toolkit, received the highest response indicating universal agreement to the survey questions. No other changes in the toolkit were made after the final review by the advisory committee.

The CVI universal approach method recommended by Polite and Beck (2006) was utilized to obtain the validity score. This method required dividing the number of advisory committee members who considered that the item corresponded to the intended goal by the total number of items provided (S-CVI/UA). Using this method, the CVI score was (n = 5) and divided by the number for all the items surveyed (n = 5), resulting in a CVI score of 1.00, indicating universal agreement.

Table 1

Content Expert Report (*N* = 5)

Item	A	B	C	D	E	Rating 3 or 4	1- CVI	Pc	K*
	Total Number of Experts								
	n	*n*	*n*	*n*	*n*	*n*			
Content of the toolkit is interesting	4	4	4	4	4	5	1.0	0.016	1.0
Relevant information in the toolkit	4	4	4	4	4	5	1.0	0.016	1.0
Current information contained in the toolkit	4	4	3	4	4	5	1.0	0.016	1.0
Appropriate information for the young adults	3	3	3	4	3	5	1.0	0.016	1.0
How easy is the web-based toolkit to navigate	3	3	3	2	3	5	0.83	0.094	0.81

The Core Values Index ™ (CVI). 1 means not relevant. 2 means somewhat relevant. 3 means quite relevant, and 4 means highly relevant. N represents the number of experts and A represents the number of experts who agrees that item is highly relevance.The content validity index includes 1 – CV1, S-CV1/UA. The level content validity index (1-CV1, 0.83-1) is the number of experts who gave a grade of 3 or 4/total number of experts. The scale level content validity /universal agreement (S-CV1/UA)=0.83 (number of items with experts grading 3 or 4 (N = 4/number of items. N =5)

Implications

Starting in 9th grade, adolescent exercise less every year and this is especially evident in girls (CDC, 2008). Understanding trends to physical activity participation among young adults and the related disparities helped inform efforts that can help to reduce sedentary time among youths. These findings lend further support to the growing evidence that young adults need to improve their physical activity participation. While other research studies have looked at sedentary behaviors, physical inactivity and unhealthy eating behaviors and other risk factors in the general population, this project focused only on young adults and ways to encourage active lifestyle. The toolkit contained information that could be used to motivate young adults to increase their participation in physical activities.

For the past two decades, the World Cancer Research Fund (WCRF) and the American Institute for Cancer Research (AICR) have issued cancer prevention guidelines for weight management, diet, and physical activity. Lifestyle modification remains an evidence-based strategy to increase physical activity and discourage sedentary behaviors among the target population. As a resource toolkit, lifestyle modification toolkit was developed based on current physical activity guidelines and evidenced based recommendations. The focus is on long-term sustainable lifestyle changes. In order for the physical education teachers and school nurses to properly implement the toolkit, they will need to be familiar with the content of the toolkit. The evidenced-based toolkit was designed to provide information on a good balance between healthy diet and physical activity but not intended to be a comprehensive source of information. The information in

the toolkit is current, relevant, and applicable to young adults and schools can provide an excellent arena for reaching large segments of the target population and their teachers.

Recommendations

To prevent obesity and promote health among children, the American Academy of Pediatrics and other experts recommend a nutritious diet, regular physical activity, and limits on screen time, including television viewing, video games, leisure-time computer use, and other screen-based activities that contribute to sedentary behaviors (Luo, 2014). A structured multidisciplinary approach to increase physical activity among young adults should be put into place at various communities especially during summer holidays in order to increase physical activity participation and decrease sedentary behaviors. Physical education teachers as well as school nurses need to be educated on this lifestyle modification toolkit for young adults as they are closest to the target population and will be the ones to implement the toolkit. Lastly, after-school or community-based settings (i.e, YMCA or Boys & Girls Clubs) are conducive to implementing lifestyle changes because they provide structured environments in which youths learn lifestyle habits (Huberty, Balluff, Beighle, & Sun, 2011).

Limitations, Strengths and Recommendations

Limitations

The major limitation of this education project was time in relation to location needs as the teachers' run on a very strict schedule since the staff education program was scheduled towards the end of school year. Staff members took time out of their daily schedule in order to participate in the educational portion of the project. The lifestyle

modification toolkit aimed at providing information on a good balance between healthy diet and physical activity. It was not intended to be a comprehensive source of information. Furthermore, the physical education teachers and school nurses delivering interventions were assumed to have basic knowledge about diet and physical activity, and about the support needed for behavioral changes.

Strengths

The biggest strength of this project was that it can be used in other schools and community clinics to encourage active lifestyle among young adults. Also, the survey questions given to participants strictly evaluates the projects intended changes. And I thought that was a very interesting method that would help to improve the health of the target population. Another strength to the project was the setting for the project. Schools are the most common setting for delivering educational messages intended to reduce time students spend watching television at home (Luo, 2014). Physical education teachers and nurses needed to be informed with the most up to date evidence based practice knowledge on the health benefits of physical activity participation in order to successfully implement the lifestyle modification toolkit. The project would advance nursing practice because nurses in clinical settings require the most current and complete evidence of effective approaches to guide their decision-making as well as practice (Zaccagnini & White, 2011).

Summary

The lifestyle modification toolkit was developed for physical education teachers and nurses to encourage active lifestyle among young adults. The health promotion model guided the planning and development of the Toolkit by integrating the values of young adults. The key finding in the questionnaire/ computer use were analyzed. Key findings result in educational needs for both staff and target population. The information contained in the toolkit was evidenced based. As a resource toolkit, the content was constructed to address the identified need to improve physical activity participation among young adults.

Section 5: Scholarly Product for Dissemination

Introduction

The development of the lifestyle modification toolkit was planned with a goal to improve physical activity participation among young adults. When properly implemented, it will lead to increase physical activity participation and decrease sedentary behaviors among the target population. To affect better patient outcomes, new knowledge must be transformed into clinically useful forms, effectively implemented across the entire care team within a systems context, and measured in terms of meaningful impact on performance and health outcomes (Stevens, 2013). A PowerPoint was created to include important information in the evidenced-based toolkit (see Appendix B). The design of the educational program answered the question: Can an evidence-based toolkit be developed to address identified needs of improving lifestyle diet and physical activity in young adults? The lifestyle modification toolkit handouts remain with the physical education teachers as a reference guide for future use.

Project Purpose and Outcomes

The purpose of this project was to develop a lifestyle modification toolkit for school nurses and physical education teachers to guide young adults increase their physical activity participation. The objectives were: (a) develop the lifestyle modification toolkit, (b) provide the school nurses and physical education teachers with the information contained in the toolkit using PowerPoint and handouts, and (c) evaluating the toolkit on the validity, appropriateness, and relevance. This toolkit has not yet been implemented. Currently, the school nurses and physical education teachers received the content of the

toolkit in handouts and PowerPoint slides. Subsequent interventions will incorporate activities that include educational programs, then interventions. Since evaluation is an ongoing process, follow-up as well as accurate feedback is critical.

Plan for Dissemination

Disseminating the outcomes of an evidence-based project is important to inform other facilities of the value of the toolkit and to improve health of the target population. According to Zaccagnini and White (2011), APNs with doctoral education have the core role of impacting changes to improve outcomes through dissemination of evidence-based practice initiatives. This scholarly product is intended to be published in the Journal the Archives of Pediatric Adolescent Medicine. A Microsoft Word version of the toolkit was placed under Appendix B of this document.

Analysis of Self

The DNP experience gave me the opportunity to expand on my passion as a primary care provider. While at my clinical rotations, I had the opportunity to interact with many young adults and educated them on their diet and physical activities. I learned so much from them, and so much about myself as a Family Nurse Practitioner. I was able to gain different experiences from each of the clinical rotations, while learning something new about myself and the profession from each experience. In the beginning I felt that this program would be easier, turned out that it was far much more than I thought. The entire DNP timeline was longer than I expected. I found myself becoming more aware of how to critically analyze the literature in order to properly educate those around me and

promote social change. My overall experience with the DNP program was a pleasing experience for me but took a lot of family time away.

Summary and Conclusion

The findings of the DNP project show that young adults lack knowledge regarding the benefits of physical activity participation and such issue should be addressed by school nurses and physical education teachers to improve their active lifestyle. Health care providers such as school nurses should continue to assess physical activity patterns among young people, counsel them about physical activity, refer them to appropriate programs, and advocate for physical activity instruction and program (CDC, 2008). The developed toolkit provided resources to physical education teachers and school nurses to help decrease sedentary behaviors among young adults. Further research studies may be needed to examine the long-term effects of health-related physical inactivity among young adults. Finally, a few recommendations on the benefits of physical activity participation, toolkit and healthy eating habits attached appendix D.

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Appendix A: 3-Day Physical Activity Record (3-DPAR)

Questionnaire Report

Figure 1.1 Student Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	26	26.0	26.0	26.0
	Male	34	34.0	34.0	60.0
	Female	40	40.0	40.0	100.0
	Total	100	100.0	100.0	

Figure 1.2 Grade Level

		Frequency	Percent	Valid Percent	Cumulative Percent
	N/A	26	26.0	26.0	26.0
	9th grade	55	55.0	55.0	81.0
	10th Grade	6	6.0	6.0	87.0
	11th Grade	8	8.0	8.0	95.0
	12th Grade	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

Figure 2.1 Hours of computer use at school

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	26	26.0	26.0	26.0
	0 Hours	5	5.0	5.0	31.0
	1-4 Hours	43	43.0	43.0	74.0
	5-10 hours	17	17.0	17.0	91.0
	10+ Hours	9	9.0	9.0	100.0
	Total	100	100.0	100.0	

Figure 2.2 **Hours of computer use at home**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	26	26.0	26.0	26.0
	0 Hours	38	38.0	38.0	64.0
	1-4 Hours	31	31.0	31.0	95.0
	5-10 Hours	5	5.0	5.0	100.0
	Total	100	100.0	100.0	

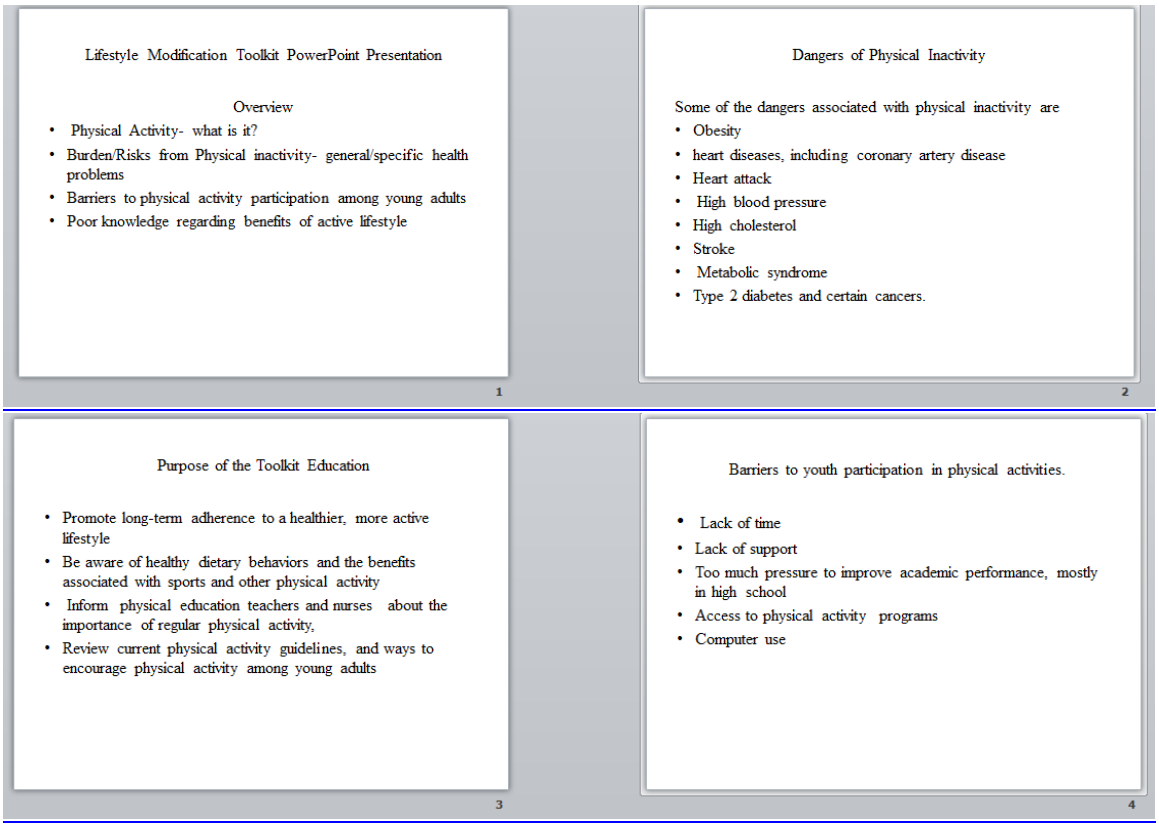
Figure 3.1 **Physical activity during school**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	26	26.0	26.0	26.0
	Yes	16	16.0	16.0	42.0
	No	58	58.0	58.0	100.0
	Total	100	100.0	100.0	

Figure 3.2 **Physical activity after school**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N/A	26	26.0	26.0	26.0
	Yes	25	25.0	25.0	51.0
	No	49	49.0	49.0	100.0
	Total	100	100.0	100.0	

Appendix B: Lifestyle Modification



Why Promote Physical Activity?

- Active youths are more likely to grow up as active adult
- Reduces asthma symptoms and severity
- Lower healthcare costs
- Compared to those who are inactive, physically active youth have higher levels of cardiorespiratory fitness and stronger muscles.
- Increased physical activity equal to positive health outcomes
- Lessens risk of diabetes and some cancers

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Interventions on Diet and Physical Activity: What Works?

- Participate in 60 minutes or more of moderate to vigorous physical activity daily
- Muscle- and bone-strengthening activities should be a part of the 60 minutes
- Note: Some physical activity is better than none
- http://www.cdc.gov/HealthyYouth/physicalactivity/guidelines.htm

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Lifestyle Modification Toolkit contains the following information:

Dietary Guidelines into action

Do You Know?

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Helpful Web Resources:

- http://www.healthykidshub.org/sports
- http://naaweb.org/images/NAA_HEPA_Standards_new_look_2015.pdf
- http://www.cdc.gov/HealthyYouth/physicalactivity/guidelines.htm
- Resources can also include the following internet web sites: AHA, CDC, and WHO

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Appendix C: Survey Questions

Toolkit Content Review Survey Questions Retrieved From the CDC Website

1. How easy is the web-based toolkit to navigate?
   - ☐ 1 Not Easy
   - ☐ 2 Somewhat Easy
   - ☐ 3 Quite Easy
   - ☐ 4 Very Easy

2. How interesting did you find the content of the toolkit?
   - ☐ 1 Not Interesting
   - ☐ 2 Somewhat Interesting
   - ☐ 3 Quite Interesting
   - ☐ 4 Highly Interesting

3. How relevant did you find the information in the toolkit?
   - 1 Not Relevant
   - 2 Somewhat Relevant
   - 3 Quite Relevant
   - 4 Highly Relevant

4. How appropriate is the information for young adults between the ages of 12-18 years?
   - ☐ 1 Not Appropriate
   - ☐ 2 Somewhat Appropriate
   - ☐ 3 Quite Appropriate
   - ☐ 4 Highly Appropriate

5. How current is the information contained in the toolkit?
   - ☐ 1 Is not current
   - ☐ 2 Somewhat Current
   - ☐ 3 Quite Current
   - ☐ 4 Highly Current

Appendix D: More Information About Toolkit

The toolkit gives the core goals of lifestyles (physical activity and diet) and gives practical guidelines into action with helpful web resources. Other behavioral aspects to consider in lifestyle modifications include, decrease sedentary behaviors stress/depression, and improve sleeping pattern. Engaging in regular physical activity has been shown to reduce the risk of chronic disease and premature death and improve quality of life and overall well-being.

Dangers of Physical Inactivity

Some of the dangers associated with physical inactivity are obesity, heart diseases, including coronary artery disease and heart attack, high blood pressure, high cholesterol, stroke, metabolic syndrome, Type 2 diabetes and certain cancers.

New Evidence of Physical Activity Benefits

Evidence for the benefits of physical activity has continued to grow since the 2008 Guidelines were published. Here are recently identified benefits:

- Improved cognitive function for youth ages 6 to 13 years.
- Reduced risk of cancer at a greater number of sites.
- Brain health benefits, including possible improved cognitive function reduced anxiety and depression risk, and improved sleep and quality of life. Physical activity is a leading example of how lifestyle choices have a profound effect on health (U.S. Department of Health and Human Services, 2018).

Lifestyle Modifications and Recommendations

• Adopt a DASH eating plan--Consume a diet rich in fruits, vegetables, and low-fat dairy products with a reduced content of saturated and total fat.

- Dietary sodium reduction--Reduce dietary sodium intake to no more than 100mmol per day (2.4g sodium or 6g sodium chloride).
- Physical activity--Engage in regular aerobic physical activity such as brisk walking (at least 30 min. per day, 3-4 days in a week).
- Weight reduction--Maintain normal body weight (body mass index 18.5-24.9kg/m2

Diet: Diets rich in fruits, vegetables, whole grains, low-fat dairy products, and unsaturated fats are recommended for primary and secondary prevention of multiple diseases, particularly cardiovascular disease and type 2 diabetes (National Health and Medical Research Council, 2005).