

Addressing Childhood Obesity with Education

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Abstract

Background: Globally, childhood obesity is on the rise. It has more than quadrupled in adolescents since 1980. Childhood obesity has been linked with many chronic diseases. These diseases can decrease the life expectancy of the child. Our goal in nursing practice is to improve the care we provide, improve outcomes, and to educate the community on disease prevention. One way to positively impact the health of adolescents is by making an impression with our youth by teaching them how they can make healthy choices. Health education can be taught in the school systems targeting healthy lifestyle behaviors so adolescents will have a better knowledge base on choices to make and the repercussions of poor choices they make early in life. The purpose of this project is: Will high school student's age 18-19 years old identify healthy choices compared pre and post health education module. The pre and post-test will assess for knowledge gained from education.

Methods: The sample (n=15) consist of 8 males and 6 females and one who did not answer gender or ethnic group. The group is compiled of 6 Hispanic, 7 White, 1 Black, and 1 unknown of 18-19 years old. A pre-test was administered consisting of 16 questions related to healthy choices. A pre and post-test was administered to measure increased scores of knowledge on healthy behaviors. Then an educational lecture on health living and choices was delivered both with handouts and podium presentation. The pre-test and consent was done a week before the presentation and post-test. After the presentation, a post-test questionnaire was administered to the same group to determine if there were any changes in knowledge based on the pre-test findings. The purpose of the project: Will high school student's age 18-19 years old identify healthy choices compared pre and post health education module.

Education on the recommended nutrition and exercise per the American Heart Association (AHA) was taught emphasizing the importance of being healthy. The American Heart Association recommends a diet high in fiber, whole grains, fruits, vegetables, fish, and foods low in saturated fat, trans fat, cholesterol, salt (sodium), and added sugars. The AHA recommends 60 minutes of exercise every day. The recommendation from the American Heart Association what has been proven to be healthy and the reality of

adolescent's food and lifestyle choices. According to an older survey administered by the CDC in 2013, only 27.1% of high school students participated in 60 minutes of physical activity the week prior to the survey. The recommendation for 60 minutes of exercise remains the gold standard based on the current literature.

Findings: IBM SPSS® predictive analytics software version 24 was used to calculated frequency tables which displayed the differences in answers to the pre and post-test question responses. It was noted there was an increase in knowledge in 11 out of 16 questions. The questionnaire contained multiple choice questions pertaining to harm of smoking, development of cardiovascular disease, benefits of physical activity, and the recommendations related to diet and exercise. Each question was given an option to choose I do not know. It was noted that only two questions, number 8 and 11 had a significant increase based on the post test results. With a significance level <0.05, question number 8 had a significance level of ($p=0.016$) and question 11 had a significance level of ($p=0.002$). An assumption could be made that it was significant. Although P-value was 0.016 and 0.002 we can't assume there was significance because the sample size was small. Because of the small sample size a power analysis couldn't be done. This was a convenience sample.

Using a standard 80% as passing it was noted that the majority (n=8) failed 4 out of the 16 questions on the pre-test. Surprisingly, using 80% as passing score for the post-test, all of the participants scored a passing rate. Question number 11 was the most missed question with only 13.3% answering it correctly. In reference to Question number 11 which asked the following, how often should you eat fish (salmon, trout, and herring)? It was noted participants post-test answered question 11 with an increase of 66.7% in the post-test. Question number 8 (pre-test) was the second most missed question with only 46.7% answering it correctly. Question number 8 asked, the American Heart Association recommends that children and teenagers get at least-minutes of exercise per day. Post-test there was an increase of students answering question 8 correctly scoring 93%.

The small sample size may have contributed to the p value of <0.05. Another limitation was the possibility of students not answering questions honestly. Recommendations for future research would be to record the adolescent's lifestyle

pre and post education to evaluate for actual behavioral change. The length of the educational program could be extended with more concentration on each health behavior topic and address barriers that may exist for the families.

Conclusion: In conclusion, the participants had an overall improvement in test scores. It is assumed that an awareness of knowledge was evident based on the scores from the post-test grades. Empirical evidence demonstrates an improvement when education is combined with behavioral change. Cason-Wilkerson et al. concentrated on the low income families and found that the families made changes related to physical activity and dietary choices as a result of the educational program offered. Education may be a tool used to empower and challenge youth to take a stand to live healthier while preventing chronic diseases. This project could motivate future research related to education and behavioral change.

Keywords: Childhood obesity; Lifestyle behaviors; Education; Nutrition

Introduction

Globally, childhood obesity is on the rise. It has more than quadrupled in adolescents since 1980 [1]. Childhood obesity has been linked with many chronic diseases. These diseases can decrease the life expectancy of the child. Our goal in nursing practice is to improve the care we provide, improve outcomes, and to educate the community on disease prevention. One way to positively impact the health of adolescents is by making an impression with our youth by teaching them how they can make healthy choices. Life style changes can be influenced by education and parental involvement [2]. Health education can be taught in the school systems targeting healthy lifestyle behaviors for adolescents to have a better knowledge base on choices to make and the repercussions of poor choices they make early in life. The purpose of this project is to evaluate the effects that education has on adolescent knowledge as it relates to healthy lifestyles. The pre-and post-test will assess for knowledge gained from education.

Rationale for Project

Behavioral change at any age can be difficult. Impacting the health of a child or adolescent is not only done through educating the child but the parents as well. The education that was provided was in the form of handouts and podium presentation. The students were encouraged to share the information with their parents or guardians. The PICO question is: Will high school student's age 18-19 years old identify healthy choices specific to nutrition and exercise compared pre-and post-health education module?

According to Basch, healthier students are better learners [3]. The family, social, physical, and financial setting in which youth live is strongly connected with academic achievement, health, and social mobility [3]. Inequalities in chronic disease risk factors such as smoking, obesity, physical inactivity, and poor diet have contributed greatly to the poor health statistics. Results from

the 2011-2012 National Health and Nutrition Examination Survey using measured heights and weights, indicate that an estimated 16.9% of children and adolescents 2-19 years of age are obese with higher rates among some subgroups, such as non-Hispanic black and Hispanic children [4]. There were 9120 participants in the survey with 5181 being 20 years and older. Poor health choices affect children and adolescent's ability to learn as well as negatively impacting the quality of life and their ability to contribute to society.

The benefit of the project to nursing practice will be for the youth to gain knowledge on the detrimental effects of poor health choices. Adopting healthy behaviors could improve the quality of life for most of the U.S. population and in turn decrease the economic burden to society. The expected outcome of educating the youth is to give them the knowledge to make better health related discussion and in turn influence their parents, grandparents, and siblings to also start living a healthier life.

There are gaps that exist from what research reports is healthy lifestyle practices and the reality of what America's lifestyle actually encompasses. The impact of poor health, as a child, follows through adulthood. The chronic disease statistics could be greatly diminished if there was a transformation to healthier lifestyles. Obese children are more likely to be obese adults. The number one way to combat childhood obesity is through lifestyle changes [5]. Lifestyle changes that can be influenced with education are sedentary lifestyles and poor nutrition.

Sedentary Behaviors

A sedentary lifestyle can be detrimental to your health for many reasons. Sedentary behavior has been linked with reduced bone density, obesity, cardiovascular and metabolic diseases, cancer, and psychosocial problems [6]. There is a 3-time greater chance of developing a metabolic disease with children who watched television at least 5 hours a day compared with those with 1 hour or less [6]. Obese children who are sedentary are about 3 times more likely to develop hypertension. The most sedentary groups in the U.S. are adolescents age 16-19 years old [6].

The American Academy of Pediatrics recommends school age children be limited to 2 hours a day of TV or any video games [7]. Limiting the amount of sedentary time, defined as waking hours that are spent lying or sitting, will aid in reaching the target activity requirements of school age children [7]. The national recommended guidelines are at least 60 minutes of moderate to vigorous physical activity every day for children and teens.

Background of Population Health

Non-Hispanic black and Hispanic children have higher rates of obesity than other ethnic group [4]. The Hispanic ethnicity was majority of the population at the high school that was studied. Hispanic children are at greater risk of unhealthy behaviors and are among the disparity population. Hispanics have a higher

incidence of obesity and comorbidities than other ethnic groups. In 2011-2014 Hispanics were ranked the top ethnic group at 21.9% being obese, non-Hispanic blacks was at 19.5%, and non-Hispanic whites 14.7% [8]. According to recent empirical literature, childhood obesity is most prevalent in the age group 12-19-year-old.

Significance of the Problem

Preventing obesity, sedentary lifestyles, and poor nutrition could drastically improve the chronic disease incidence rates. They are the cause of many devastating disease like heart disease, cancer, diabetes, stroke, and hypertension. Heart disease is the number one killer in the U.S. and stroke is the number one cause of disability. Chronic diseases account for 7 in 10 deaths a year and accounts for about \$2.5 trillion spent on medical cost by Americans [9].

Russellville City School System received a grant for free school lunches for all the students for 2016-2017 because of the low socioeconomic status for majority of the students. Education and income are two measures that affect the opportunities of individuals. Income and education level are directly linked to poor health individuals. Low income families are less likely to have access to the healthcare and the healthier food options. Family income has the greatest impact on health-related quality of life as it relates to socioeconomic status [10].

Scope of the project

Everyone has the right as well as a necessity to be aware of the consequences to unhealthy choices. Many times, the consequences don't seem a reality at a young age. The goal is to make health a reality for all ages. The purpose is to improve the quality of life while positively impacting the health and economic burden of the nation.

This project may have the opportunity to positively impact adolescent health. Obesity is an epidemic nationwide. The project goal is to provide education to the adolescent population of age 18-19 years old and that education be used to identify healthy behaviors. One study showed significant correlation between nutritional knowledge by nutritional education and positive attitudes was found with nutritional knowledge and attitudes and behaviors [11].

Literature Review

Theoretical framework

Contributing factors to childhood obesity is sedentary lifestyle and poor nutrient. The theoretical framework serves as a guide when planning the direction of the research and topics to be researched. It gives key words that can be entered in the search engine to direct you to evidence based articles that will support the hypothesis of why childhood obesity is on the rise. The project is to address childhood obesity through education. The age range was 18-19 years old male and female high school students. The project took place at Russellville High School. The

participation is by choice and the students participating signed an informed consent.

Using Pender's Model, an educational module was incorporated in this project using the American Heart Association's recommendations for diet and exercise [12]. A pre-test and post-test was utilized measuring for knowledge gained. A descriptive analysis was used to describe the results using a frequency measure.

Pender's Health Promotion Model is a structured set of ideas that guide researchers to better understand what motivates people to participate in healthy behaviors. What is it that motivates change? The Health Promotion Model organizes health behavior elements into three detailed propositional groupings: (1) individual characteristics and experiences, (2) behavior specific cognitions and affects, and (3) situational/interpersonal influences [13]. The health promotion model looks at different behaviors and factors that contribute to decisions that are made. This model was developed to guide the researcher to exactly what is motivating people to take part in healthy behaviors [13]. Permission has been granted by the author to use this model.

The health behavior element addresses the issues that may be contributing to poor health choices. The adolescent population may be influenced by their family's choices or their resources, the adolescent's perception of how they should be living, and their social influences. There could be many different reasons for unhealthy choices. The lack of education on what a healthy lifestyle truly may be a barrier that exist.

Global epidemic

Childhood obesity is on the rise globally. Over the past three decades childhood obesity has doubled worldwide meaning that about 170 million children less than 18 years of age are obese or overweight [14]. Researchers have associated childhood obesity with poorer health as they approach adulthood. Obesity has been connected to higher risk for several serious health conditions, such as hypertension, type 2 diabetes, hypercholesterolemia, coronary heart disease (CHD), stroke, asthma, and arthritis [15]. Not only does it have a negative impact on the body but they are also more likely to be overweight or obese as adults.

Literature review is essential for building a strong foundation for any research. The internet has given us an unlimited amount of literature that is available at our finger tips. There are specific search engines that can assist in finding the research that is desired. The researcher needs to know what information is out there to support his or her hypothesis as to why a situation is occurring. The goal of conducting a literature review is to provide the reader with a broader understanding and multiple perspectives on the topic of concern [16].

A recent study looked at a randomized sample of 1105 children over a 3-year period. Major outcome measures include pre-post changes in child body mass index percentile and z score, fruit and vegetable and other nutritious food intake, amount of physical activity, and parental nutrition and physical activity knowledge, attitudes, and beliefs, defined by intentions

and behaviors [17]. All measures were administered at the beginning and end of the school year for year one and year two of the study for a total of 4 longitudinal time points for assessment [17].

Quality of life

Improving the quality of life is what health care providers strive to do. We do this by constantly looking at the care we provide while the patient is in our facility and even when they go home. How we provide care is driven by research. We teach and practice evidence based care. For obese children, improving their quality of life is a major concern as researchers see the impact it has on their health for the future as well as the impact it has at an early age.

Overweight and obesity are associated with many severe medical consequences even at a young age but the most common short-term consequences of pediatric obesity are psychosocial in nature such as psychological problems like discrimination or teasing [18]. One study conducted on middle school and high school kids in China showed that overweight and obese students reported lower total scores, self, social and environment scores than their peers who were normal weight [19]. The scores of students with educated parents were better respectively than the students of less educated parents [19]. This result shows the influence that socioeconomic status has on health outcomes and behaviors.

Socioeconomic factors related to obesity

Studies show there is an increase of childhood obesity among lower socioeconomic groups [20]. While reviewing the literature, there is a CHIP (Children's Health Insurance Program) program that was created to help this lower socioeconomic groups. The CHIP program specifically enrolls children who have been identified as high risk based on family income as well as minority children and adolescents who are disproportionately burdened by obesity [20]. The CHIP program is one example of efforts that are being done to prevent obesity in the high-risk population related to disparities.

There are many factors that play into obesity in general. Lifestyle choice is the number one cause for obesity. There are many different factors that play into why bad choices are made. Financial resources or the lack of is one reason that is thought to impact obesity. Children that live in lower socioeconomic areas report a lack of safe areas for their children to get exercise. People report this as being a reason their kids are staying inside instead of going outside to play.

Lack of education may contribute to poor food choices. A large body of epidemiologic data show that diet quality follows a socioeconomic gradient [21]. While reviewing the literature, studies show that obese parents are more likely to have obese children. What this suggest is the children are subject to their environment. Parents are instilling their poor choices into the children. Therefore, obese and overweight children are more likely to be obese as adults. They are carrying their behaviors they have learned into adulthood as their own.

The Center for Disease Control (CDC) has funded a multisetting, multilevel (MSML) program to support both children and their families to promote supportive environments in settings where children spend time, such as schools and child care centers [20]. These programs are being created in hopes to decrease obesity while addressing the lower socioeconomic burdens that children face. There is a team that communicates and works together to bring all the resources available together to provide the most optimal outcomes. They do this by bringing healthcare providers and community health workers in to work together. This is a way to support the children and their families or even provide hands-on instruction on how to make healthier choices in the community [20].

A research was done in Germany on how promoting drinking water in schools would decrease or prevent obesity. This program proved to be successful. The conclusion was that the environmental and educational, school-based intervention proved to be effective in the prevention of overweight among children in elementary school, even in a population from socially deprived areas [22]. Based on the literature review regarding school based programs, there is proven success demonstrating a significant impact from addressing obesity from this angle.

Team approach

Childhood obesity can be tackled by education, prevention and sustainable interventions related to healthy nutrition practices and physical activity promotion per a recent study. Inequalities in chronic disease risk factors such as smoking, obesity, physical inactivity, and poor diet have contributed greatly to the persistence and/or widening of the health gradients [23]. Results from the 2011-2012 National Health and Nutrition Examination Survey, using measured heights and weights, indicate that an estimated 16.9% of children and adolescents 2-19 years of age are obese with higher rates among some subgroups, such as non-Hispanic black and Hispanic children [20]. There is not just one reason for the increase in childhood obesity throughout the world. Childhood obesity has many different reasons for the issue which gives great reason to tackle this problem using a team approach. The team approach could consist of angles such as clinic programs, school programs, and community programs. These different programs would tackle obesity at different angles. Using a team approach, research can find a way to change behaviors and health around to impact the future health of the U.S. A team can look at all different reasons for the epidemic and offer different solutions.

An ongoing research is looking at the effectiveness of a community based program (CBP). The community based program is a family-based approach with an active involvement of the parents and the children to actively produce change with adults and children. The main goal is to actively involve both the child/adolescent and the two parents to mobilize family resources to improve the effectiveness of the program [24]. This is an excellent way to approach childhood obesity because of the dynamics. Research shows most obese parents have obese children. Children are subject to the environment they are provided. This study should provide great evidence on how a community program working with parents and children is

effective and the researchers believe if it is successful could mean a breakthrough in combating the obesity epidemic. The scope of the project was to educate the adolescent age group so they can make healthier choices to improve their quality of life. The goal is to not only impact their lives but hopefully they will continue to share what they have learned with others.

Importance of healthy behaviors

Educating on the epidemic of obesity in adults and children is not enough. People need to know the difference between healthy behaviors and unhealthy behaviors. Unhealthy behaviors are behind the obesity epidemic. The better the evidence, the stronger the benefits of applying the indicators in terms of reduced morbidity and mortality or improved quality of care [25]. While reviewing the literature on childhood obesity, one study stood out proving that dieting and unhealthy weight control behaviors, as reported by adolescents, predict significant weight gain over time [26]. It is not exactly clear as to why these individuals using these dieting techniques are more likely to be obese adults. There are a few thoughts on why this may be occurring.

Dieting may be used short term and not a lifestyle change of eating healthy and being physically active. If the behaviors consist of diet pills, no eating or very little food intake, there may be binge eating in that diagram as well. These behaviors are not considered healthy even though initially you may get the weight loss results you desire.

Literature keeps pointing to healthy choices and making that lifestyle change a permanent one. Research also recognizes the childhood obesity epidemic as a unique issue to conquer. There is not just one approach to be taken. Adults should be considered in the paradigm that is to be used. Educating children and offering community projects is a piece to the puzzle but should be followed up with the support of the parents or guardians. Children and adolescents need the support of their caregivers to make it a lifestyle and behavioral change that last through their lifespan.

Providing nutritional information to children and adolescents is important for optimal nutritional choices and building healthy habits [27]. The purpose of the study was to determine if providing education to students is effective in changing knowledge of health behaviors. The theory of planned behavior proves that the strongest relationship exists between intention, attitude, and change [28].

The result of a recent research proposes that the Theory of Planned Behavior is an effective way to address nutrition related behaviors in youth [28]. One study found that the child nutrition questionnaire is a valid and reliable tool to simultaneously assess dietary patterns associated with positive energy balance, and food behaviors, attitudes and environments in Australian school children aged 10–12 years [29].

Methods

Approach/design

The sample ($n=15$) consist of 8 males and 6 females and one who did not answer gender or ethnic group. The group is compiled of 6 Hispanic, 7 White, 1 Black, and 1 unknown of 18-19 years old. A pre-test was administered consisting of 16 questions related to healthy choices. A pre-and post-test was administered to measure increased scores of knowledge on healthy behaviors. Then an educational lecture on health living and choices was delivered both with handouts and podium presentation. The pre-test and consent was done a week before the presentation and post-test. After the presentation, a post-test questionnaire was administered to the same group to determine if there were any changes in knowledge based on the pre-test findings. The purpose of the project: Will high school student's age 18-19 years old identify healthy choices compared pre-and post-health education module.

Education on the recommended nutrition and exercise per the American Heart Association (AHA) was taught emphasizing the importance of being healthy. The American Heart Association recommends a diet high in fiber, whole grains, fruits, vegetables, fish, and foods low in saturated fat, trans fat, cholesterol, salt (sodium), and added sugars [12]. The AHA recommends 60 minutes of exercise every day. The recommendation from the American Heart Association [12] what has been proven to be healthy and the reality of adolescent's food and lifestyle choices. According to an older survey administered by the CDC in 2013, only 27.1% of high school students participated in 60 minutes of physical activity the week prior to the survey [30]. The recommendation for 60 minutes of exercise remains the gold standard based on the current literature.

The purpose of the project is to assess for knowledge gained from education. Efforts to combat obesity can be achieved with diet and exercise [5]. Exercise throughout life will help avoid osteopenia, osteoporosis, sarcopenia, benefits with metabolism and cardiovascular function [31]. Exercise is one of the topics the project covered and utilizing The American Heart Association's recommendations. The anticipation of educating the youth about the effects of obesity and results of an unhealthy lifestyle will change the behaviors.

The benefit of the project to nursing practice will be for the public to gain knowledge on the detrimental effects of obesity while changing their behavior which will improve the quality of life for most of the U.S. population and in turn decrease the economic burden to society. The expected outcome of educating the youth is that not only will we be able to change their behavior but they will in turn influence their parents, grandparents, and siblings to also start living a healthier life. If we can change the behavior of these generations then we have a much better chance of the upcoming generation being healthier. The desire is that our money can start to be spent on preventative medicine instead of all the preventable disease and health conditions people are at risk for and developing because of unhealthy lifestyles.

The objective for centering a project on childhood obesity is to improve the quality of life. Health-risk behaviors such as early sexual initiation, violence, and physical inactivity are consistently linked to poor grades and test scores and lower educational attainment [32]. The goal to improve the health of children will also be a benefit for them later in life as it prevents chronic diseases. The objective is to change unhealthy behaviors in the adolescent population through educational intervention. Research also has shown that school health programs can reduce the occurrence of health risk behaviors among young people while having a positive effect on academic performance [32].

Limitations

This study used a convenience sample. The students had to be 18-19 years of age and sign a consent to participate. Limitations that existed: need a larger sample size, willing participants that were 18-19 years old, were the students answering questions honestly and not guessing, and high school students are subject to the environment that is provided for them which may inhibit behavioral change.

Site and sample

The site of the project is Russellville High School. The age of students that are included in the study was 18-19-year-old male and females. A convenience sample was used for the study. There was a possibility of 115 participants. There were 18 students consented with 15 following through the entire study.

Table 1: Questions for the pre-and post-test.

Circle One Please			
Male	Female		
Hispanic	White	Black	Other
Life's Simple 7 Questions			
1. Having good health will decrease your chances of developing many types of diseases, like cancer and type 2 diabetes.			
A. T			
B. F			
C. I do not know			
2. Most people develop cardiovascular disease as a result of:			
A. Poor lifestyle habits, such as eating unhealthy foods, not getting enough exercise or using tobacco.			
B. They are born with cardiovascular disease			
C. It is based on genetics			
D. I do not know			
3. Older people are the only ones at risk for having a stroke.			
A. T			
B. F			
C. I do not know			
4. Using smokeless tobacco is a safe alternative to smoking.			

A. T
B. F
C. I do not know
5. When is the chemicals from smoking getting into your body?
A. When you can smell it
B. Only when you are the one smoking
C. Chemicals do not get in your body from smoking
D. I do not know
6. What helps keep your heart, muscles, bones, and joints healthy and strong?
A. Calcium and vitamins
B. Regular physical exercise
C. Eating a diet high in sugar and carbohydrates and drinking 8 glasses of water a day
D. I do not know
7. Physical activity can raise self-esteem, improve your mood, help you sleep better and give you more energy.
A. T
B. F
C. I do not know
8. The American Heart Association recommends that children and teenagers get at least- minutes of moderate to vigorous physical activity every day.
A. 30 minutes
B. 20 minutes
C. 60 minutes
D. I do not know
9. A healthy diet includes:
A. whole wheat, fruits, dairy products, sugary foods and beverages, and red meat
B. whole grain, fruits, vegetables, low-fat dairy products, poultry, fish, and nuts while limiting sodium, sugary foods and beverages, and red meat
C. limit whole grains, limit dairy, and eat red meat for protein
D. I do not know
10. Whole-grain foods can be a good source of dietary fiber.
A. T
B. F
C. I do not know
11. How often should you eat fish (like salmon, trout, herring),
A. At least three times a week.
B. At least twice a week
C. Once a week
D. I do not know
12. It is important to limit the amount of red meat you eat and choose lean meats and skinless poultry
A. T
B. F

C. I do not know
13. You should always try to limit your intake of beverages and foods with added sugars.
A. T
B. F
C. I do not know
14. Gaining too much weight at any point in your life can be dangerous to your health.
A. T
B. F
C. I do not know
15. Being overweight or obese can increase your risk for:
A. Diabetes, heart disease, high blood pressure, asthma or other breathing problems and even some types of cancer.
B. Obesity does not increase risk for diseases
C. Skin and blood disorders
D. I do not know
16. How can you help to control your blood pressure and keep it in a normal range?
A. Eat a diet high in sodium and calcium and exercising 2-3 times a week
B. Maintain a healthy weight, regular physical activity, low sodium diet
C. Do not worry about blood pressure. It does not affect your overall health
D. I do not know

Data collection

Data collection allows a way for researchers to gain feedback, evaluate an intervention, measure outcomes, and compare different measures. The project was announced in many senior functions, fliers posted throughout the school grounds, emails sent out to the students, announced overhead before the event, and they were encouraged to participate by many of the teachers.

A pre-test (test 1) was given to test the healthy lifestyle knowledge of the study participants. The educational module and post-test followed the pre-test about a week later. The post-test (test 2) was given immediately following the education module. The inclusion criteria consisted of: age of 18 or 19 years old, willingness to participate, must be able to read and understand English, and signed consent from the students. Exclusion criteria consist of unwillingness to participate and inability to read and write English.

Data analysis

The pre-test (test 1) and post-test consisted of 16 questions. The test were identical and asked questions specific to health, nutrition, and exercise. The post-test (test 2) was given after the educational presentation to assess for knowledge gained by education.

The data was analyzed utilizing IBM SPSS predictive analytics software version 24 [35]. Descriptive statistics was used to look at the frequencies. This information pulled out the percentage of how many participants answered the question correct and incorrect. The results indicate some improvements from the educational intervention when compared pre-and post-test.

Below is a table that was created with the information obtained from using the frequency statistics. This information is composed of how many students correctly answered each question on the pre-test and then on the post-test. The percentages are given to reflect an overall understanding of the group's knowledge as it relates to the questions asked from the test.

Table 2 below shows N=15 as being 15 students measured. The pre-test percentage are based on questions answered correctly. The post test is based on questions answered correctly after the education intervention. The percent change looks at did we increase knowledge, stay the same, or was there a negative result.

There was an increase in knowledge in 11 out of 16 questions. Three questions were answered correctly 100% of the time pre-and post-test. One question stayed the same at 93.3%, and question number 16 had a decrease of 13.3%.

When a disease, issue, or topic of interest is studied, the entire population affected by the topic cannot be looked at. For example, when addressing adolescent obesity and health issues,

it would be unrealistic to include every adolescent in the U.S. or globally. However, it is realistic to take a sample group and study to represent the population.

Table 2: Test score percentages (Results).

	N	Pre-Test Correct	Post-Test Correct	Percent Change
Question 1	15	80%	100%	20%
Question 2	15	86.70%	100%	13.30%
Question 3	15	100%	100%	
Question 4	15	80%	100%	20%
Question 5	15	80%	93.30%	13.30%
Question 6	15	66.70%	86.70%	20%
Question 7	15	100%	100%	
Question 8	15	46.70%	93.30%	46.60%
Question 9	15	73.30%	100%	26.70%
Question 10	15	66.70%	80%	13.30%
Question 11	15	13.30%	80%	66.70%
Question 12	15	80%	86.70%	6.70%
Question 13	15	86.70%	100%	13.30%
Question 14	15	100%	100%	
Question 15	15	93.30%	93.30%	
Question 16	15	93.30%	80%	-13.30%

Findings

IBM SPSS® predictive analytics software version 24 was used to calculate frequency tables which displayed the differences in answers to the pre and post-test question responses. It was noted there was an increase in knowledge in 11 out of 16 questions. The questionnaire contained multiple choice questions pertaining to harm of smoking, development of cardiovascular disease, benefits of physical activity, and the recommendations related to diet and exercise. Each question was given an option to choose I do not know. It was noted that only two questions, number 8 and 11 had a significant increase based on the post test results. With a significance level <0.05 , question number 8 had a significance level of ($p=0.016$) and question 11 had a significance level of ($p=0.002$). An assumption could be made that it was significant. Although P-value was 0.016 and 0.002 we can't assume there was significance because the sample size was small. Because of the small sample size a power analysis couldn't be done. This was a convenience sample.

Using a standard 80% as passing it was noted that the majority ($n=8$) failed 4 out of the 16 questions on the pre-test. Surprisingly, using 80% as passing score for the post-test, all of the participants scored a passing rate. Question number 11 was the most missed question with only 13.3% answering it correctly. In reference to Question number 11 which asked the following, how often should you eat fish (salmon, trout, and

herring)? It was noted participants post-test answered question 11 with an increase of 66.7% in the post-test. Question number 8 (pre-test) was the second most missed question with only 46.7% answering it correctly. Question number 8 asked, the American Heart Association recommends that children and teenagers get at least-minutes of exercise per day. Post-test there was an increase of students answering question 8 correctly scoring 93%.

The small sample size may have contributed to the p value of <0.05 . Another limitation was the possibility of students not answering questions honestly. Recommendations for future research would be to record the adolescent's lifestyle pre-and post-education to evaluate for actual behavioral change. The length of the educational program could be extended with more concentration on each health behavior topic and address barriers that may exist for the families.

Conclusion

In conclusion, the participants had an overall improvement in test scores. It is assumed that an awareness of knowledge was evident based on the scores from the post-test grades. Empirical evidence demonstrates an improvement when education is combined with behavioral change. Cason-Wilkeron et al. [36] concentrated on the low-income families and found that the families made changes related to physical activity and dietary choices as a result of the educational program offered [36].

Education may be a tool used to empower and challenge youth to take a stand to live healthier while preventing chronic diseases. This project could motivate future research related to education and behavioral change.

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