

Childhood Obesity Prevention in Adolescents

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Abstract Childhood obesity is a significant health concern and has become a global health problem. The problem of childhood obesity is a public health challenge that requires prompt intervention. The estimated number of overweight children is over 42 million with a continuous increase in the number of cases and has tripled since the 1970s [1]. The prevalence of obesity is high among children of low socioeconomic background and is a risk factor for cardiovascular diseases, diabetes, metabolic syndrome, and certain cancers [2]. Adolescents who are obese often develop a tendency to participate in sedentary activities and are disengaged from high levels of physical activity. Childhood obesity places a considerable amount of pressure on the national health budget [3]. A literature review was conducted on childhood obesity and factors that could impact the growing problem. The findings from the literature review revealed that decreasing the amount of food consumption, increasing physical activity, and reducing the number of hours spent engaged in sedentary activities such as playing video games or watching television contributes to obesity prevention. The implementation of interventions by educating adolescents on healthy eating and engaging in physical activity is critical to obesity prevention. The results of the study revealed that a decrease in caloric intake and an increase in physical activity are significant to obesity prevention. A paired t-test was performed to compare the weight of the adolescents before and after the activities. The results showed that there is a significant difference in weight loss ($p=0.001$) after the interventions. This project is an evidence-based practice proposal on developing strategies to promote adherence to behavioral changes for childhood obesity prevention in adolescents.

Keywords: *obesity, overweight, childhood obesity, obesity prevention, obesity in adolescents, overweight and obesity management, and terms such as how to manage obesity in children and adolescents and ways to reduce the risk of obesity*

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1. Introduction

Childhood obesity is a severe public health challenge that affects children and adolescents and has become a global health problem. The number of overweight children is estimated to be over 42 million, with approximately 35 million of those overweight children living in under-developed countries [1]. Factors such as sedentary lifestyle, unhealthy diets, and high caloric foods contribute to the problem of obesity [3]. Hereditary factors can also contribute to childhood obesity. According to the CDC [4], obesity among children and adolescents in the United States has more than tripled since the 1970s and that approximately 1 in 5 school-aged are obese. Obesity increases the risk of developing heart disease, diabetes, metabolic syndrome, and certain cancers. Children and adolescents who are obese tend to be obese in adulthood [4]. The prevalence of childhood obesity places a considerable amount of pressure on the national health budget and requires further studies and immediate interventions [3].

1.1. Background and Significance of the Problem

Obesity refers to the accumulation of excess body fat, which is measured by body mass index (BMI). BMI provides an estimated measure of adiposity and is the accepted clinical standard measure for excess weight gain and obesity. Obesity occurs as a result of social, economic, environmental, cultural, and lifestyle factors, mainly of the children of low socio-economic background [5]. Obesity varies by ethnic, racial, and socioeconomic factors and is more common in American Indians, African Americans, Mexican American Indians, and non-Hispanic whites [6]. Chronic obesity may result in complications such as metabolic disorders and cardiovascular disease. Consuming foods and beverages that are high in calories will contribute to obesity. Adolescents who are obese experience decreased levels of physical activity and participate in sedentary activities such as playing video games or watching television [5]. Young individuals who are overweight or obese often experience less satisfaction in friendships or social connections and are poor scholars,

have more absences from school, and encounter problems in adulthood that limit the types of jobs and earning potential [7].

Weight categories are used to determine obesity status in children and adolescents. The body mass index (BMI) is used for this determination through the comparison of children and adolescents of the same age and sex. BMI guidelines are set by various organizations to monitor the weight status of children and adolescents. A BMI that is between the 85th and 94th percentile is categorized as overweight while a BMI that is in the 95th percentile or greater reflects obesity. The BMI comparison charts for children and adolescents are easy-to-use tools that are essential for identifying and monitoring weight status [8]. Other means of comparing the results of BMI computations among children and adolescents include measuring waist or hip circumference, circulating waist- or hip-height ratio, and skinfold thickness.

Bioelectrical impedance analysis and dual-energy x-ray absorptiometry (DXA) are techniques that are effective for body fat assessment but are costlier than the simpler methods. The bioelectrical impedance analysis is a non-invasive procedure that scans the muscle fat, bone, and water components of the body [8]. The DXA scan was originally used for the measurement of bone density and body composition but, with recent software improvements, the scan is now utilized to determine abdominal fat mass. The DXA scan is a reliable, accurate, and provides an efficient, low-cost means of screening bones. The DXA can be used for varied numbers of individuals ranging from small to large numbers [9].

According to Healthy People 2020 [10], adolescent obesity rates decrease in families with increasing income. Healthy People 2020 utilize growth charts to determine the proportion of children and adolescents who are obese [10]. In the last two decades, the prevalence of childhood obesity in the United States has been reaching epidemic levels due to the steady increase in obesity in children and adolescents. This continuous increase contributes to a higher risk of adult obesity and accelerates some obesity-related disorders [11].

The obesity problem can lead to co-morbidities that can significantly affect healthy living and increase mortality rates. Co-morbid conditions that are associated with obesity include cardiovascular, pulmonary, metabolic, neurological, renal, hepatic, and orthopedic disorders [1]. The 2009 – 2010 National Health and Nutrition Examination Survey (NHANES) estimated that approximately 32% of children and adolescents are overweight, and 17% are obese [11]. Childhood obesity can significantly affect the physical health and psychological factors such as the emotional and social well-being of these children. Children who are obese often experience a decreased quality of life and poor academic accomplishments [11]. Controlling the childhood epidemic requires the unified efforts of health care providers, children, family members, schools, public policymakers, and community organizations [8]. According to Sisnowski, Handsley, and Street [12], there is a limitation to the current regulatory approaches to factors related to obesity prevention across all jurisdictions. Childhood obesity is not being diagnosed consistently by primary care providers which accounts for the need to

implement measures to prevent the problem or debilitating complications [8].

1.2. Benefit to Nursing Practice

The importance of childhood obesity prevention for the benefit of nursing practice is the overall improvement of health that can be accomplished from obesity management interventions that will promote weight loss and prevent excess weight gain [13]. According to Bonde, Bentsen, and Hindhede [14], childhood obesity is a severe health problem that is widespread and needs to be addressed in the school environment and all areas that are involved with childhood interactions. It is essential that the critical characteristics of childhood obesity are identified to provide the appropriate interventions for the best outcomes and to direct policy changes [14].

Providing education and achieving behavioral changes in diet and activity modifications will result in obesity prevention in adolescents. According to CDC [2], the body receives instructions from genes to respond to environmental changes and indirect scientific evidence of differences and resemblances among family members. These changes can result in variations in weight which can be due to genetic factors that may contribute to increased hunger and food consumption and may influence behaviors such as sedentary lifestyle or decreased metabolism [2]. This project may influence populations or settings by promoting obesity prevention through health education to individuals, families, and communities as a necessary intervention that is provided by health care professionals.

1.3. PICOT Question

In adolescents who are obese, what barriers impact adherence to a healthy lifestyle for promoting weight loss and physical activity over four weeks?

1.4. Scope of the Project

The scope of this project is to examine childhood obesity in adolescents and discuss prevention strategies that can be implemented to promote healthy eating and lifestyle among teens. The principal aim of the project is to engage primary stakeholders in the establishment and implementation of a robust plan for feasible action that prevents the incidence of childhood obesity among adolescents. The health promotion model (HPM) is the theoretical framework of the study and it provides the basis to understand the risk factors associated with childhood obesity in adolescents and possible interventions that may be adopted to reduce obesity prevalence in the selected population. The purpose of the project will be achieved by engaging the key stakeholders like parents, teachers, healthcare professionals, and adolescents to participate in the project. The stakeholders participated in developing an action plan to promote strategies for achieving healthy weight and wellbeing of adolescents.

The project was conducted in a specific community in the United States and involved parents, healthcare providers, and adolescents. A mixed methodology design

was employed, and interviews were used to collect data. Interviews were conducted among the select stakeholders, and the results obtained were used to address the prevalence of childhood obesity and suitable nursing interventions that can be used to mitigate or prevent obesity among adolescents. Weekly meetings were conducted to monitor results and provide motivation to adolescents for continued compliance with the obesity prevention guidelines. The incorporation of individual and community-based effort was factored in the efforts of accomplishing the salient efforts for the goal-accomplishment of obesity prevention in adolescents.

1.5. Problem Statement

The clinical problem is that lack of identifying the barriers that impact adherence to a healthy lifestyle for promoting weight loss and physical activity, can result in childhood obesity in adolescents and obesity-related complications.

1.6. Theoretical Framework

The theoretical framework chosen for the study is the Health Promotion Model (HPM). The HPM was developed by Pender in 1982 as a theoretical model to investigate the factors associated with health-promoting behaviors. The theory emphasizes exploring healthy lifestyle behaviors, personal behaviors, and behavior-specific influences that impact health status [15]. There are five concepts of the theory, which are the person, environment, nursing, health, and illness. The concept indicates that each person has a connection to the environment and the participants of this project have a reciprocal relationship with the environment.

The construct of perceived benefits of action involves positive views or perceived impacts of undertaking a healthy behavior. The principle of perceived barriers to action affects perceptions of factors like personal influences that hinder the implementation or ability of a person to conduct healthy behaviors [16]. The concept of perceived self-efficacy refers to personal judgment on the ability to plan and implement a specific health behavior. The principle of activity-related effect involves developing a feeling of sense or emotions during and after executing a health behavior intervention [16]. Using the model will assist in implementing suitable interventions that enhance the promoting of healthy behaviors.

2. Literature Review

The relevant literature for review used the terms obesity, overweight, childhood obesity, obesity prevention, obesity in adolescents, overweight and obesity management, and terms such as how to manage obesity in children and adolescents and ways to reduce the risk of obesity. The South University library and other electronic databases that include CINHALL, PubMed, Cochrane, EBSCO, and Medline were used in the literature search.

Inclusion criteria involved articles published between 2014 and 2019, peer-reviewed articles, full-text articles,

articles written and published in English language, studies that involved ways to reduce the risk of gaining extra weight, behaviors to adopt and treat or prevent overweight or obesity among adolescents, and articles on types of foods that are healthy. Articles published before 2014, case reports, and articles published in a non-English language were excluded. A total of 47 articles were reviewed of which thirty-two articles were selected for this review.

The incidence of childhood obesity has been increasing for the past decades and is currently a primary health concern that has presented significant challenges to the public health systems, the government, and to health care facilities within the communities [17]. The prevalence of obesity among adolescents in the US is attributed to childhood obesity that started in earlier years. This is evidently supported in the prospective cohort study by Cunningham, Kramer, Narayan [18], which examined the national prevalence of childhood obesity in elementary school children. There were 21,260 participants, and the study's findings showed that the incidences of obesity among adolescents are more likely to result from childhood obesity, (95% CI). The study showed that adolescents who are overweight or obese during childhood years are more likely to become obese in later years. Statistical analysis was done by SUDAAN software. The research supported that due to pediatric obesity, adolescents are more likely to be overweight or obese, which may also progress as they transition to their adulthood [18]. This study attributes to higher incidences of obesity among adolescents.

Within the US, children, and adolescents with obesity account for a higher percentage than the general population. A descriptive study by Skinner et al., [40] showed that almost 4.5 million adolescents with the status of obesity are being characterized by a body mass index (BMI) that is within or above the 95th percentile range. The increased incidences of childhood obesity among children and adolescents is evidently supported in a cohort study by Qian et al. [17] that children aged between 6 years and 11 years are estimated to have obesity rates of between 6.5% and 19.6% while the adolescents aged between 12 years and 19 years have an obesity rate of between 5 and 18% [17]. Based on the current information, it is evident that obesity prevalence for both children and adolescents has increased and nursing interventions are required to reduce the prevalence.

The concern on childhood obesity has led to the implementation of interventions through various US hospitals to assist in reducing or preventing the incidences of obesity but the prevalence continues to rise. Brown, Halvorson, Cohen, Lazorick, and Skelton [19] conducted a qualitative descriptive study to examine opportunities to prevent childhood obesity in children and adults. The authors presented that health care agencies and other groups agencies within public health organizations have advocated for preventing obesity rates, but efforts to advance the interventions have been limited. The authors further cited that despite the efforts from healthcare agencies to reduce or prevent obesity in the US, for the past two decades, there are no interventions that have been proven to be effective in preventing obesity.

2.1. Obesity Prevention Policy

In the US, interventions have been adopted to assist in reducing and preventing the childhood obesity health problem. A qualitative study by Gollust et al. [20] explored scientific evidence of legislative policies that would assist in preventing childhood obesity in Minnesota. The study used archival documents from 13 obesity-related bills from 2007 to 2011. The study indicated that the rising cases of childhood obesity and public health concerns have led to the development of various regulatory and legislative proposals to assist in reducing and preventing the disease. The recommendations have been at local, national, and state levels. Similarly, two article review researches that were conducted in the US supported that developing obesity policy programs like banning the tax subsidy to advertise unhealthy foods for children, eliminating calories labeling in a restaurant menu, and reducing intake of sugar-sweetened beverages are the critical policy programs to reduce the incidences of childhood obesity [21,22].

Another proposed intervention that has been found to reduce obesity prevalence is the implementation of a family intervention. A qualitative descriptive study conducted by Pratt and Skelton [23] at Ohio State University indicated that a vital intervention that has been effective in reducing the prevalence of obesity is the inclusion of high parental responsibility. The study disclosed that family-based interventions where parents have a responsibility to assist their children in healthy eating behaviors are effective in preventing childhood obesity. The study indicated that the recommendations on family-based interventions have been at the local, national, and state levels for obesity prevention.

A systematic review by Davidson et al. [24] supported parental responsibility as being useful as it helps with the implementation of school policies to assist adolescents and other children in engaging in activities and lifestyle behaviors that can effectively decrease the prevalence of obesity. Additionally, a randomized controlled study by Wolfson et al. [25] supports the implementation of family intervention with parental involvement to reduce childhood obesity. Despite the focus of parental responsibility in preventing obesity among adolescents, the studies lacked detailed information on how the proposed interventions improve healthy eating and lifestyle behaviors on the selected population. Additionally, a systematic review by Boelsen-Robinson et al. [26] and a cross-sectional study by Hayman [27] revealed that community interventions with youth engagement have been identified as being potential strategies that can assist in the prevention of childhood obesity in adolescents. These two studies support that implementing community-based interventions and engaging adolescents or youths as change leaders are useful in mobilizing support that enhances the prevention of childhood obesity [26,27].

According to Hayman [27], implementing a youth development program is essential as it assists the youth advocates in enforcing policies on food pricing and food access that help adolescents to refrain from unhealthy eating behaviors. The study showed that the adoption of youth development programs could have significant

contributions in the development of synergistic solutions to social influence and individual attitudes on food choices among the youths. The study also included that youth development programs could be an essential factor for changing the perceptions, beliefs, and social influence that facilitate unhealthy eating behaviors in youths [27]. The program is found to be useful in supporting the implementation of community interventions and community mobilization in response to the challenges of childhood obesity among adolescents. Two randomized controlled studies, one of which was by Daly, Pace, Berg, Menon, and Szalacha [28] was conducted in Latino community in the Southwestern United States with Latino females GED 14-17 years of age. The second study was by Lee et al. [29], which was conducted in one of the special schools in Hong Kong among students with intellectual studies, supported school-based interventions in the prevention of childhood obesity. The studies showed that implementing a school-based program is essential because the programs provide promising results in improving healthy eating, BMI, and encouraging vigorous physical exercise for obese adolescents. Lee et al. [29] found that school-based programs are accepted as effective health programs because they positively impact the factors that are associated with health knowledge and psychological effects among adolescents. The programs also allow adolescents to gain an understanding of healthy eating habits and engage in activities that assist in achieving a normal BMI. This concept was also supported in a cross-sectional study by Larson, Davey, Caspi, Kubik, and Nanney [30] that was conducted in Minnesota School among students of grades 9 and 12. The study highlighted that school-based programs have significant impacts in reducing unhealthy eating behaviors in adolescents.

The existing empirical research by Pbert et al. [31] has provided contradictory information on the effects of school interventions on obesity prevention. The study by Pbert et al. [31] was a cluster-randomized controlled school-based trial that was conducted in public high schools within Massachusetts indicated that the implementation of school-based interventions does not have significant impacts on obesity prevention among adolescents. The study found that the program does not yield substantial results or is not effective in reducing obesogenic behaviors and BMI in children and adolescents with obesity [31]. Similarly, a systematic review and meta-analysis by Wang et al. [32] indicated that there is limited evidence to support the assertions that school-based interventions could be useful in reducing childhood obesity. The review showed that there is insufficient evidence to support that school-based intervention, either targeting diet, physical activity, or a combination of both is useful to prevent childhood obesity [32].

Physical activity is a useful intervention that assists in promoting the prevention of childhood obesity. A qualitative study by Dentre et al. [33] was conducted in the US among children and youth and a prospective study by Hatfield et al. [34] that was conducted among parents and children from the Hispanic community in Boston, Massachusetts, support school-based programs for obesity prevention. The studies supported that implementing policies such as sports programs, afterschool programs,

and physical activity counseling is effective in reducing obesogenic behaviors among children and adolescents. A prospective study by Xi et al. [35] that involved US children and adolescents of ages between 2 and 18 years showed that implementing a school-based program is essential because the programs provide promising results in improving healthy eating, BMI, and encourage vigorous physical exercise for obese adolescents. Additionally, school-based programs are accepted as effective health interventions because they have a direct effect on the health knowledge of adolescents regarding healthy food choices and lifestyle changes. Educating youths about weight management can be useful. This is supported in a randomized interventional study by Mazloomi-Mahmoodabad, Navabi, Ahmadi, and Askarishahi [36] that educating adolescents on weight loss management seems effective in promoting weight loss among adolescents who are obese and overweight. However, the studies lacked evidence on how and where the intervention could be implemented like at school, home, or in the community for effective weight management. Similarly, lifestyle-based intervention for weight loss has been proposed across studies to prevent childhood obesity. The programs allow adolescents to understand healthy eating habits and engage in activities that assist them in achieving healthy weight and BMI. A prospective cohort study by Preskitt, Menear, Goldfarb, and Menachemi [37] that involved US adolescents aged 12–17 year indicated that in the US, physical activity is encouraged to promote wellness, psychological well-being, and physical fitness in adolescents. However, two prospective studies by Berry, Burton, and Howlett [38] and Guerrero, Flores, Vangala, and Chung, [39] that was conducted among European American, Latino, and African American children in the US supported that physical activity is not effective in preventing childhood obesity. Physical activity was found to be ineffective in reducing the consumption of fast foods and use of sugar-sweetened beverages, which are the main contributors to obesity [38].

2.2. Strengths, Weaknesses, Limitations, and Gaps of the Research

The studies retrieved concerning the research problem provided significant evidence about childhood obesity. The studies offer information on the prevalence of childhood obesity and prevention strategies. However, these studies lacked detailed information on prevention interventions for childhood prevention in adolescents. Most of the studies reviewed a concern about childhood obesity in children and adolescents. There were limited studies that focus only on adolescents. The interventions for childhood obesity prevention were mainly limited to young children and few studies were found that provided interventions, that were explicitly for obesity prevention in adolescents. This limitation presents a gap that this study seeks to fill.

2.3. Synthesis of Evidence

The Evidence is defined as the accessible assortment of facts or information/data showing if a belief or proposition (suggestion/ proposal) is true and substantial or valid. The Evidence is the accessible assortment of realities or data

showing if a conviction or recommendation (proposal) is valid or substantial [40].

2.4. Causes of Childhood Obesity

The primary cause of childhood obesity is associated with surplus caloric intake and consumption of foods with a high amount of sugar. Berry, Burton, and Howlett [39] conducted a prospective study in California to examine the relationship between childhood obesity, intake of fast food and sugar-sweetened beverage, and physical exercise among school-aged children. The study found that higher intake of foods with high calories and increased consumption of sugar-sweetened beverages has a positive relationship with overweight and obesity among children. The study further found that children who prefer high-calorie foods and mostly use sweetened drinks without engaging in physical activities are more likely to be obese or overweight [39].

The results were supported in a more recent descriptive study by Skinner, Ravanbakhht, Skelton, Perrin, and Armstrong [41]. The study was conducted in the US with the use of the NHANES report from 1996-2016. The participants were US children and adolescents aged between 2 years and 19 years. The participants were White and Asian American, African American, and Hispanic children. The findings of the study indicated that interaction between personal and environmental factors contributes significantly to excess weight gain among children and adolescents [41].

Parental choices and socioeconomic status are also contributing factors of childhood obesity. A randomized controlled study by Wolfson, Gollust, Niederdeppe, and Barry [25] examined parental roles in addressing childhood obesity in the US. The study used US public opinion surveys to investigate the blames and responsibility of parents in childhood obesity. The study indicated that mothers are blamed for childhood obesity. Mothers were cited as the contributing agents of obesity through poor dietary choices, especially during their breastfeeding period. The study also found that mothers and the food and beverage industry enhance childhood obesity. However, the study lacked detailed information on food choices made by mothers to facilitate childhood obesity [25]. A systematic review by Boelsen-Robinson et al. [26] supported the impacts of socioeconomic status on childhood obesity. The study indicated that in communities with low socioeconomic position, the incidences of childhood obesity are high compared to those with high socioeconomic positions. The increased incidences of childhood obesity were attributed to lack of community interventions to the low socioeconomic groups [26].

2.5. Diagnosis of Childhood Obesity

Weight assessment with a focus on weight percentile for children and BMI status among adolescents are the key diagnostic procedures for childhood obesity. The calibrated scale used for measurement of women's weight and height and Body Mass Index (BMI) was calculated. $BMI = \text{weight (kg)} \div \text{height}^2 (\text{m}^2)$; Normal weight (BMI 18.5 - 25.9 kg/m²), Overweight (BMI 25 - 29.9 kg/m²), Obese (BMI \geq 30 kg/m²) [42,43,44]. Two qualitative

descriptive studies discussed the practice approach of diagnosing and managing obesity among children [45,46]. The studies indicated that initial assessment on weight and length percentiles is essential in diagnosing childhood obesity among infants. In children between 2 years and 20 years, assessing BMI status is used to diagnose childhood obesity. The study indicated that a decrease or subsequent increase in BMI from the normal range indicates early adiposity rebound, which is the critical predictor of childhood obesity [45]. A descriptive study by Styne et al. [46] was designed to examine clinical practice guidelines for assessing, treating, and preventing pediatric obesity. The study used systematic reviews and available evidence from various published articles. From the reviews, the study indicated that assessing BMI percentiles, laboratory examinations, genetic screening, and measuring insulin concentrations are the recommended diagnostic procedures for childhood obesity [47].

3. Methods

The scholarly project used a mixed methodology approach that provided the framework for organizing and analyzing the attitudes, beliefs, and obesity prevention of adolescents. Quantitative and qualitative measurements focused on behaviors, attitudes and activity. Baseline weight and height for each participant was collected. Demographic data included age, gender, educational level, favorite activity/sport, and favorite food(s).

3.1. Tool

The quantitative survey tool is The Healthy Lifestyle and Personal Control Questionnaire (HLPCQ) [47] and administered pre and post intervention. The survey is a 26-item tool that determines the lifestyle habits using a Likert-type scale [48]. Permission was granted to use the tool.

3.2. Interventions

The intervention is a targeted education program for both the adolescent participants and their parents or guardian. The educational program addresses healthy eating, increasing activity level, effects of sedentary lifestyles, and the impact of emotions on food choices. Weekly meetings will cover the same topics for a total of 4 weeks. At the end of the 4th week, the post HLPCQ will be administered. Open-ended logs will be used to record the number of times the participants eat dinner per week, the number of times the participants eat fast food, and the number of hours the participants spend on television, play video games or engage in other computer games and associated emotions for the behaviors. Logs will be reviewed weekly and collected at the end of the 4 weeks.

3.3. Site, Agency, and Participant Information

3.3.1. Setting

The setting for the study sample is at the office of Dr. Henry Lin, a pediatric primary care office in the

southeast region of Florida, US. The clinic provides health care to pediatric patients from birth to age 19 years and from birth to 21 years for patients with special needs. Health care service is provided to the patients by either walk-in or appointment basis. The current patient population of the office is approximately 3,000. The obesity rate of the patients is approximately 60% (1,800) of which 80% (1,440) are adolescents. Most insurance plans are accepted at the office. Patients who do not have insurance coverage are placed on a payment plan. The number of patients that are seen at the office averages 12 to 15 patients daily. Most patients are seen during peak hours in the morning from 9 a.m. to 1 p.m.

3.3.2. Recruitment

Permission was given to the principal investigator by Dr. Henry Lin to display flyers at the primary location. The patients were informed of the upcoming study by the flyers that were posted in the lobby, waiting room, bathrooms, and patient rooms. The flyers included the dates, times, researcher, purpose and objectives of the scholarly study. The instructions on the flyers were clear and concise to ensure that the information can be easily understood.

3.3.3. Subjects

The sample for the scholarly project consists of 30 adolescent participants who are between the ages of 12-19 years. The participants were recruited from the patient population at a pediatric primary care office. All participants were enrolled voluntarily. Written consent was obtained from each participant before conducting the interview. Written parental consent was required for all participants who were younger than age 18 years. Exclusion criteria that disqualified any prospective patients from inclusion in the project included patients who are younger than 12 years old, patients who are older than 19 years old, patients with special needs, patients who are non-English speaking, and patients who do not have a United States address.

3.3.4. Instrument

The quantitative survey tool is the Healthy Lifestyle and Personal Control Questionnaire (HLPCQ) [47] and was administered pre and post-intervention. The tool is a 26-item survey that determines the lifestyle habits of people based on the Likert-type scale scores [48]. Permission was granted to use the tool. The HLPCQ was used to assess and improve healthy eating and physical activity. The survey includes questions that determine eating habits, types of foods and frequencies of the participants. The practices of a sedentary lifestyle and activity such as watching television and playing video games are included in the survey tool. The existing evidence has proven that HLPCQ is more useful to assess the daily activities of an individual in terms of physical activity, dietary behaviors, and sedentary lifestyle habits. The survey tool is found to be easy to administer and can effectively address health-related activities [48]. The tool is applicable to this current study.

HLPCQ has been approved as a valid and reliable tool. Medical professionals and multiple uses have verified the

validity of the tool. A test-retest for HLPCQ has been done with a group of medical students and was found that the survey tool has internal consistency of 0.78 in Cronbach's alpha and 0.80 with class correlation coefficient [49]. Validity refers to the high quality of a test measure. There are different types of validity, which include face, construct, criterion-related, and formative validity. Face validity is essential for enlisting motivating stakeholders. Construct validity examines specific items that should be measured or requires feedback. Criterion-related validity predicts current or future performance and correlates test results [50]. Criterion validity for HLPCQ has been achieved among middle-aged adults where the tool was found to be useful in determining significant correlations between healthy diet and engagement in daily activities like physical exercises [48].

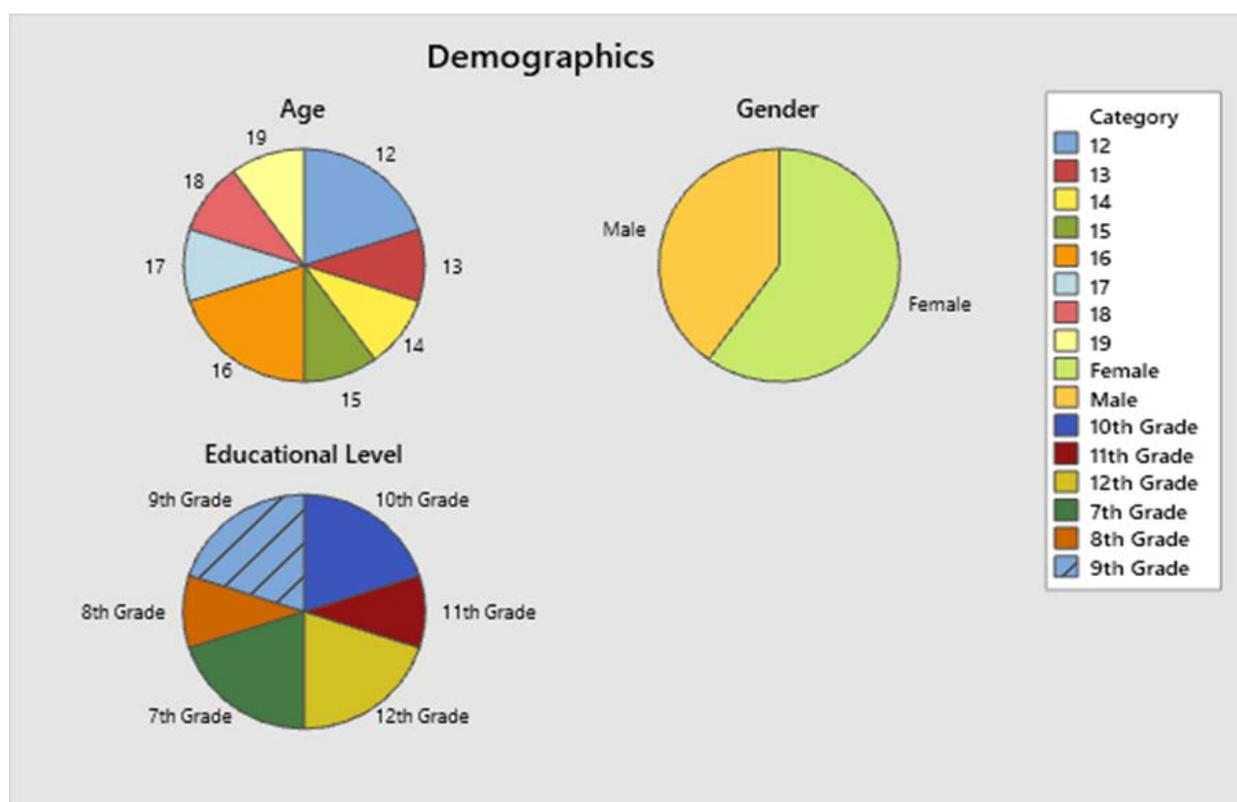
3.4. Data Collection

Before collecting data for the project, written consent was obtained from the participants and parents or guardians of participants who are younger than 18 years old. Assent was obtained from each participant who was younger than 18 years old. Instructions on the process were given to participants, parents, and guardians. The participants were reminded that participation was voluntary and that they could cancel at any time. The number of participants for the study was 10 adolescents between the ages of 12 years to 19 years. Exclusion criteria included individuals who were younger than 12 years, individuals who were older than 19 years, and individuals without a valid United States address. The principal investigator obtained weight and height for each participant at baseline and at the completion of the project. The principal investigator obtained demographic

information and administered pre-survey at the initial appointment. The Healthy Lifestyle and Personal Control Questionnaire (HLPCQ) survey tool was used for the pre- and post-survey. The HLPCQ is a 26-item survey tool which was used to determine the lifestyle habits of people and used a Likert-type scale [48]. The specific data that was collected include the number of times the participants ate dinner per week, the number of times the participants ate fast food, the number of times the participants spent watching television, played video games or engaged in other computer games. The survey was used to assess the daily activities of adolescents regarding physical activity, dietary behaviors, and sedentary lifestyle habits. The data obtained was applicable for the research to determine the key factors that contributed to obesity among adolescents.

Education was provided to the participants and parents on healthy eating, increased activity level, the effects of sedentary lifestyles, and the impact of emotions on food choices. Journals were provided to each participant. Weekly group meetings were conducted to evaluate the progress of each participant and covered the same topic for a total of 4 weeks. The post-survey (HLPCQ) was administered, and journals were collected at the final meeting. The average time for completing the survey was 25 minutes. The meetings were held at the pediatric office of Dr. Henry Lin, located at 3900 N Andrews Avenue, Oakland Park, FL 33309.

The demographics reflect information to include N = 10, ages between 12 and 19 years, both genders (male and female), and the various educational levels of the adolescents. The highest number of participants was 12 and 16 years as each group had two participants. The number of females was greater than 50% of the participants. Grades 7, 9, 10, and 12 each had two participants.

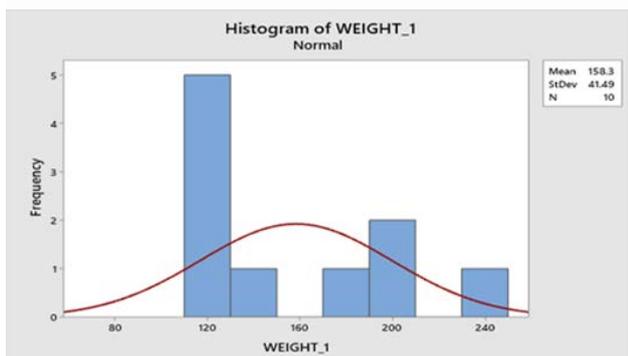
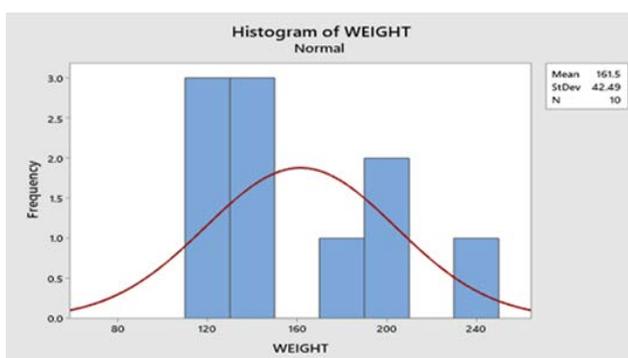


3.5. Data Analysis Plan

The data collected was entered on an Excel sheet. The Minitab software was used, and descriptive statistics was employed for data analysis. A paired t-test was performed to evaluate the relationship of obesity-related activities. This analysis showed the variance between obesity-prevention efforts and obesity prevention. The mean of the pre- and post-survey results was determined by a comparison of the initial mean and the mean at the end of the interventions. The significance level was ($p < 0.05$) based on a confidence interval of 95% [51]. The mixed methodology approach of the project provided the framework for organizing and analyzing the attitudes, beliefs, and obesity prevention of adolescents. Quantitative and qualitative measurements focused on behaviors, attitudes, and activity. Baseline weight and height for each participant was collected. Demographic data included age, gender, educational level, favorite activity/sport, and favorite food(s). HLPCQ is a quantitative tool. Qualitative data included open-ended logs to record the behaviors and emotions of adolescents. The survey measured the number of times the participants ate dinner per week, the number of times the participants ate fast food, and the number of hours the participants spent on television, played video games or engaged in other computer games and associated emotions for the behaviors.

3.6. Descriptive Statistics

A paired t-test was performed to compare the weight of the adolescents before and after the activities as shown on the histograms below. The mean weight of the adolescents before the intervention was 161.5 and the mean weight after were 158.3. The results showed that there is a significant difference in weight loss from Week 1 to Week 4 because the P-value is less than 0.05 ($p=0.001$).



3.7. Strengths and Limitations of the Study

The strengths of the project were the opportunity for the participants to increase their knowledge in obesity prevention and improved self-efficacy. The participants were all excited and motivated and have promised to continue with the behavioral changes. The HLPCQ survey tool was appropriate for the study and was effective in obtaining vital information for the data collection process and obtaining a positive outcome. The HLPCQ survey tool was appropriate for the study and was effective in obtaining vital information for the data collection process and obtaining a positive outcome.

The limitations of the study are that the sample size was small. The proposed number of participants was 30 but only 10 participants responded and participated in the study. The socio-economic status of the population limited the ability of other patients to participate as the adolescents relied on their parents or guardians for transportation which was a major factor due to time restraints. The time frame was another concern as the project was conducted in four weeks. The strengths of the study are that the participants were recruited from the primary care office of my preceptor, Dr. Lin. The participants of the study were motivated and willing to participate. The project was an effective in implementing behavioral change and providing encouragement to the participants.

4. Conclusion

Childhood obesity is a pandemic and is a significant risk factor for obesity in adults. Although much effort has been placed on obesity prevention interventions, the prevalence of childhood obesity remains on an all-time high. School-based, community-based, and individualized interventions have been developed and implemented to prevent childhood obesity through lifestyle modifications, increased activity, and reduced caloric intake (Nursing Theory, 2016). Although more research is needed on the topic of childhood obesity, the study that was conducted on Childhood Obesity Prevention in Adolescents provides evidence that education, decreased food and caloric intake, increased physical activity, and decreased sedentary lifestyle contribute to weight loss. Promoting obesity prevention is a necessary intervention that should be implemented for the benefit of adolescents in maintaining a healthy lifestyle and decreasing the risk of obesity-related complications [52]. McHugh [13] indicated that obese children often have obese parents and obesity prevention interventions will be beneficial to patients with conditions such as cardiovascular problems, diabetes, and other illnesses that are affected by weight gain.

5. Inferences, Implications and Recommendations

Although the interventions have been effective in the obesity-prevention efforts, there is still a need for continuous motivation and encouragement to ensure that

adherence to the changes is maintained. Most of the participants were from low socio-economic backgrounds and providing information on the availability of resources is significant.

The problem of childhood obesity can be improved through effort and the availability of community resources. Therefore, the future implementations will include: (1) Adopting education programs for adolescents for long-term benefit and adherence to obesity prevention. (2) Implementing educational programs to increase adolescents' awareness of childhood obesity. (3) Collaborating with service providers and caregivers to promote obesity prevention and facilitate adoption of obesity-prevention strategies. Further studies will be required for improvement in the obesity-prevention measures and for adherence to behavioral change.

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Appendix A

PICOT QUESTION

In adolescents who are obese, how would implementing strategies to decrease high caloric intake and increase physical activity decrease weight gain and improve activity levels over a 10-week period?

P	Population	Adolescents who are obese
I	Intervention	What barriers impact adherence to a healthy lifestyle
C	Comparison	None
O	Outcomes	Promoting weight loss and physical activity
T	Timeframe	10 weeks

Pre- Survey

The Healthy Lifestyle and Personal Control Survey

1=Not at all 2=Some of the time 3=Half the time 4=Most of the time 5=All the time

1. Are you careful about how much food you put on your plate	1	2	3	4	5
2. Do you check the food labels before buying a product	1	2	3	4	5
3. Do you calculate the calories of your meals	1	2	3	4	5
4. Do you limit fat in your meals	1	2	3	4	5
5. Do you like cooking	1	2	3	4	5
6. Do you eat organic foods	1	2	3	4	5
7. Do you eat whole-wheat products	1	2	3	4	5
8. Do you avoid eating packaged- or fast-food	1	2	3	4	5
9. Do you avoid soft drinks	1	2	3	4	5
10. Do you avoid eating when stressed or disappointed	1	2	3	4	5
11. Do you avoid binge eating when you are out with friends	1	2	3	4	5
12. Do you eat your meals at the same time each day	1	2	3	4	5
13. Are you careful about not missing a meal each day	1	2	3	4	5
14. Do you eat a good breakfast	1	2	3	4	5
15. Do you sleep at the same time each day	1	2	3	4	5
16. Do you follow a scheduled program for your daily activities	1	2	3	4	5
17. Do you eat breakfast at the same time each day	1	2	3	4	5
18. Do you eat lunch at the same time each day	1	2	3	4	5
19. Do you eat dinner at the same time each day	1	2	3	4	5
20. Do you practice aerobic exercise for 20 or more minutes at least 3 times per week	1	2	3	4	5
21. Do you exercise in an organized manner	1	2	3	4	5
22. Do you share your personal problems or worries with others	1	2	3	4	5
23. Do you concentrate on positive thoughts during difficulties	1	2	3	4	5
23. Do you empty your brain of thoughts or the next days program during bedtime	1	2	3	4	5
24. Do you care about meeting and discussing with your family on a daily basis	1	2	3	4	5
25. Do you balance your time between work, personal life and leisure	1	2	3	4	5

[48]

Post-Survey

The Healthy Lifestyle and Personal Control Survey

1= Not at all 2=Some of the time 3=Half the time 4=Most of the time 5= All the time

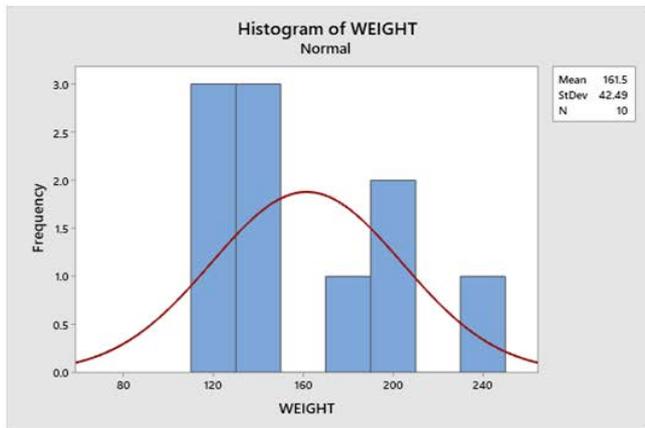
1. Are you careful about how much food you put on your plate	1	2	3	4	5
2. Do you check the food labels before buying a product	1	2	3	4	5
3. Do you calculate the calories of your meals	1	2	3	4	5
4. Do you limit fat in your meals	1	2	3	4	5
5. Do you like cooking	1	2	3	4	5
6. Do you eat organic foods	1	2	3	4	5
7. Do you eat whole-wheat products	1	2	3	4	5
8. Do you avoid eating packaged- or fast-food	1	2	3	4	5
9. Do you avoid soft drinks	1	2	3	4	5
10. Do you avoid eating when stressed or disappointed	1	2	3	4	5
11. Do you avoid binge eating when you are out with friends	1	2	3	4	5
12. Do you eat your meals at the same time each day	1	2	3	4	5
13. Are you careful about not missing a meal each day	1	2	3	4	5

14. Do you eat a good breakfast	1	2	3	4	5
15. Do you sleep at the same time each day	1	2	3	4	5
16. Do you follow a scheduled program for your daily activities	1	2	3	4	5
17. Do you eat breakfast at the same time each day	1	2	3	4	5
18. Do you eat lunch at the same time each day	1	2	3	4	5
19. Do you eat dinner at the same time each day	1	2	3	4	5
20. Do you practice aerobic exercise for 20 or more minutes at least 3 times per week	1	2	3	4	5
21. Do you exercise in an organized manner	1	2	3	4	5
22. Do you share your personal problems or worries with others	1	2	3	4	5
23. Do you concentrate on positive thoughts during difficulties	1	2	3	4	5
23. Do you empty your brain of thoughts or the next days program during bedtime	1	2	3	4	5
24. Do you care about meeting and discussing with your family on a daily basis	1	2	3	4	5
25. Do you balance your time between work, personal life and leisure	1	2	3	4	5

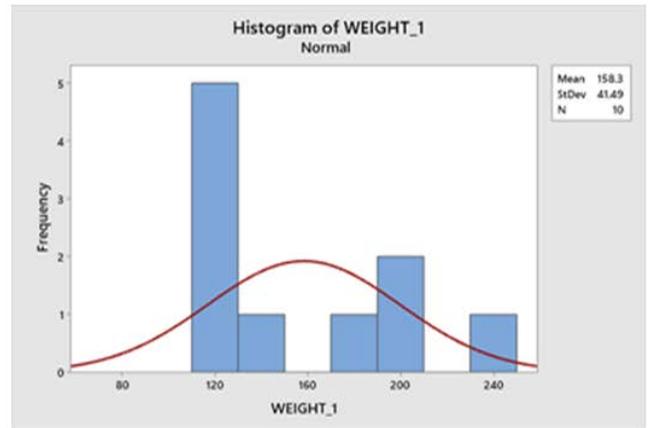
[48]

Appendix B

Pre-Test Results



Post-Test Results



Descriptive Statistics

Sample	N	Mean	StDev	SE Mean
WEIGHT	10	161.5	42.5	13.4
WEIGHT_1	10	158.3	41.5	13.1

Test

Null hypothesis $H_0: \mu_{\text{difference}} = 0$

Alternative hypothesis $H_1: \mu_{\text{difference}} \neq 0$

T-Value	P-Value
4.98	0.001

Estimation for Paired Difference

95% CI for				
Mean	StDev	SE Mean	$\mu_{\text{difference}}$	
3.188	2.026	0.641	(1.739, 4.637)	

$\mu_{\text{difference}}$: mean of (WEIGHT - WEIGHT_1)

