

Program Proposal: Health Youth Across America

Background

Healthy Youth Across America is a community-based health promotion program aimed at reducing obesity rates in low-income neighborhoods across America. Financial instability is closely correlated to increased sedentary lifestyle rates and decreased access to fresh foods, causing food insecurity and rates of obesity 145% greater than in communities with less than 30% of the population living at or below the poverty level.¹ Systemic reviews by England's Health Department Agency concluded interventions aimed at increasing physical activity and reducing total caloric intake and dietary fats are key to aiding in weight loss.² By implementing a health promotion program that promotes an active lifestyle and healthy food choices, program participants will have the opportunity to increase their activity level while fostering community integration, and increasing their knowledge on healthy food choices with opportunities for hands-on cooking experiences and community involvement.

The Social Ecological Model (SEM) will be the framework for this program with an emphasis on personal accountability and interpersonal relationships to foster community integration and peer motivation. A study published in the American Academy of Pediatric journal evaluated the effects of pairing younger children with an older peer as part of an educational and physical activity program to prevent obesity.³ This health promotion program incorporated healthy eating education, physical activity, and physical fitness tests, then studied the group with buddies compared to the control

group, determining participants with a buddy throughout the program demonstrated increased knowledge on healthy behaviors, improved fitness testing, and decreased body mass index (BMI) and blood pressure (BP).³ Pairing up two children in the community to encourage and motivate each other will be key throughout this program. Additionally, the interpersonal domain can be emphasized by involving parents in the program to motivate their children, through providing additional information on ways to provide support and empowerment. When parents and caregivers are more actively involved in shaping their child's behaviors and encouraging healthy choices, typically BMI decreases, diet improves, self-efficacy increases, and amount of physical activity increases.⁴ Based on these findings, the program will involve educational programs and interactive sessions for parents of the participants to promote parent-child empowerment with a goal of further reducing BMI.

The personal domain of the SEM will be combined with the Health Belief Model (HBM) to foster self-efficacy and address individual attitudes and health beliefs that are contributing to their poor lifestyle behaviors. Innately individuals will take action to prevent illness, but these actions are widely based on attitudes and beliefs about severity, susceptibility, and benefits of partaking in or refraining from behaviors.⁵ The HBM and SEM will be addressed as a way for each participant to identify individual factors contributing to their behaviors- such as belief that obesity is not that serious, exercise isn't worth the health benefits, or misconceptions about healthy foods. Using peers as a buddy system will provide competition to hold each individual accountable for their own goals, while allowing positive discussion and providing social support to

stay dedicated to the program and opting for healthy lifestyle choices in the face of adversity. The HBM can be referenced throughout the program when participants progress stalls or they lose motivation to continue, as continuing to modify health beliefs and behaviors will help lead to their desired fitness or health goals and improve obesity-related behaviors.⁶

The first intervention will involve increasing physical activity through a variety of bi-weekly games, sports, and competitions. By increasing physical activity by two hours each day, the risk of obesity, chronic metabolic disease, and cardiovascular disease declines drastically.¹ The Center for Disease Control (CDC) recommends sedentary time spent watching television, playing video games, or playing on the computer is limited to no more than two hours per day in children ages 6-17, and recommends including at least sixty minutes of physical activity in their daily routine.⁷ The benefits of increasing physical activity include increased bone density, decreased blood pressure, reduced stress and anxiety, increased self-esteem, and improved weight management.⁷ Many of these benefits can be linked back to the HBM, as health beliefs and attitudes related to physical activity will improve as the participants identify their progress and improve their physical function. Each program session will be 90-120 minutes with an emphasis on healthy behaviors and participation in physical activity. The goal of each session will be for participants to engage in at least 60 minutes of physical activity with a target heart rate of 64-76% of their maximum heart rate to achieve moderate-intensity exercise.⁸

In addition to focusing on increasing physical activity, emphasis will be placed on increasing knowledge related to healthy dietary choices. This intervention will include

nutrition education, field trips to grocery stores or the local farmers market to taste fresh fruits and vegetables, and interactive cooking sessions with parents to become more comfortable cooking with fresh ingredients on a low budget. It has been shown that, when compared to exercise interventions alone, diet and exercise interventions lead to greater improvements in cholesterol, fasting glucose and insulin, and triglycerides, all of which are linked to improved health outcomes and decreased obesity.⁹ For example, this can be implemented by playing a game of soccer and having the participants call out a healthy food choice each time they touch the ball. Additionally, if space permits, planting a community garden will help educate participants on where their food comes from and increase accessibility to healthy food choices. A study conducted in a low-income area discovered children consumed on average 30% more fruits and vegetables when a community garden was available.¹⁰ Discussing healthy food choices throughout each session, with dedicated cooking sessions and field trips throughout the program, will allow participants to develop a strong knowledge base on how to eat and cook healthy meals.

The outcome measures implemented in this community-based program will be used to evaluate and track cardiorespiratory fitness, BMI and BP, and healthy lifestyle choices, with a goal of motivating participants to adhere to the program to reduce obesity and associated comorbidities. The 6-minute walk test will be administered as part of the program activities to set a cardiorespiratory baseline for each participant. Results of the 6MWT can help predict maximal oxygen uptake (VO₂max), predict walking distance, and determine walk speed.^{11,12} This is an easy, and feasible outcome

measure to administer, as it does not require any additional equipment, can be performed in a multitude of settings, and shows a high degree of reproducibility.¹² A study conducted by Ekman et al evaluated the exercise capacity of individuals with obesity using the 6MWT before and after a weight reduction program, and concluded BMI, BP, and waist circumference play a major role in the distance walked during the 6MWT, with participants increasing distance walked by an average of 64 meters (range of 46-168 meters) after the 6 month weight reduction program.¹² Psychometric measures of measurement error, validity, interpretability, and reproducibility show the 6MWT is a suitable measure to evaluate physical function in children with obesity, but should not be used to evaluate anaerobic performance, muscle strength, coordination, or balance.¹³ Additional decreases in 6MWT distances compared to healthy weight individuals are likely linked to motivation, attitude towards physical activity, and musculoskeletal pain, which can be targeted with education on the HBM.¹⁴

The second evaluation tool implemented will be a log used to record blood pressure and weight on a weekly basis and meals and exercise on a daily basis. The purpose of this tool is to hold participants accountable for making healthy food choices and provide positive reinforcement with the blood pressure and BMI log. A study conducted by Burke et al evaluated the use of self-monitoring on behavioral weight loss to determine if self-monitoring increased a person's awareness of their lifestyle behaviors to reduce weight, and discovered those who demonstrated increased adherence to self-monitoring- including diet, physical activity, and self-weighing- lost a more significant amount of weight compared to those who logged their behaviors less

often.² This study did not differentiate between the type of self-monitoring, such as on paper, using a phone application, or other forms of technology. Based on the target population of Healthy Youth Across America, a simple log, such as a notebook, will be utilized to achieve this goal. Advocating for participants to regularly log their exercise, nutrition, and body weight will allow for reflection on these lifestyle habits and form a foundation for change.

The third outcome measure that will be administered on a monthly basis throughout the duration of the program is the Youth Risk Behavior Surveillance System. This program is used to assess health risk based on common lifestyle behaviors in children and adults, including unintentional and intentional injury behaviors, tobacco use, alcohol and other drug use, sexual behaviors, dietary behaviors, and physical activity.¹⁵ This measure demonstrates good test-retest reliability and 71.7% of the items are rated as having substantial reliability.¹⁵ The results of this test can be used to determine the most detrimental health behaviors in each community and used to implement health education to prevent associated disease or injury. Based on the findings that adolescents tend to report more risky behaviors in lower income communities, education on the risks of these behaviors and alternative healthy lifestyle choices would be indicated.¹⁶ For example, if youth report participating in drug use or alcohol, substance abuse education can be implemented into the program as a fun and interactive exercise. This questionnaire can be re-administered on a monthly or bi-monthly basis to assess behavior change and the need for continued education on particular topics.

Program Goals

The ultimate purpose of this program is to educate children in low income communities on the importance of healthy lifestyle behaviors, with the goal of improving nutrition and encouraging physical activity to reduce obesity rates and associated comorbidities. The follow are specific goals for participants to achieve by the end of the 8-week program:

1. Participants will improve their 6MWT distance by 100 meters by the end of the 8-week program to demonstrate increased cardiovascular endurance. A systematic review was conducted to determine the efficacy of the 6MWT in pediatric patients with obesity and concluded the minimal detectable change (MDC) for this population is 68 meters.¹⁷ A goal of 100 meters was set, because it is greater than the MDC and will indicate a true change in performance that is outside of the standard error of measure (SEM).
2. Participants will log a minimum of 60 hours of moderate to vigorous physical activity each day during the 8-week program in adherence to the CDC's physical activity guidelines for children and adolescents ages 6-17.¹⁸
3. Participants will log a minimum of 5 servings of vegetables per day and 4 servings of fruit per day in accordance to the American Heart Association, by the end of the 8-week program.¹⁹ This will improve healthy food behaviors and promote slow, sustained weight loss.
4. Participants who are classified as overweight or obese (BMI ≥ 25), will demonstrate a weight loss of 10% in 8-weeks to yield health benefits including reduced blood

pressure, cholesterol, and blood sugar.²⁰ The CDC recommended slow, modest weight loss at 4-8 pounds a month, or 5-10% of your total body weight.²⁰ Based on these recommendations, this goal is modest with participants aiming for 5% weight loss per month.

5. At the end of the 8-week program, participants will report less negative lifestyle behaviors on the Youth Risk Behavior Surveillance System survey compared to their baseline to indicate a positive change in healthy behaviors and reduced risk of death and disability.¹⁶

Methods

Personnel

One physical therapist and physical therapy student will be employed in each community to administer the 6MWT, review each participants nutrition and exercise log weekly, and administer and evaluate the Youth Risk Behavior Surveillance System survey on week one and at the conclusion of the program. They will also aid in providing nutrition and exercise recommendations, and other healthy lifestyle behaviors throughout the program sessions. Based on participant limitations and impairments, the physical therapist or physical therapy student will be able to tailor physical activity sessions towards improving these functional deficits, such as implementing more cardiovascular exercises if patients have limited endurance or adding in more strengthening exercises to improve weakness.

Six members in the community will be recruited to supervise all participants and activities throughout the 8-week program duration. Recruiting personnel from the

community will ensure program materials are culturally appropriate for participants, reduce the potential for language barriers, and identify specific, common negative health behaviors seen throughout the community.²¹ These personnel can be individuals known to the participants in the community, such as teachers, religious leaders, or well trusted adults. These community members will oversee all activities and provide support, encouragement, and education to all participants. They will also lead field trips around the community, oversee the community garden, and lead cooking sessions with the participants and their parents. A training session will be held for all personnel a week prior to each session to provide education on nutrition guidelines, exercise guidelines, abstinence from drugs and alcohol, and safe sex practices. Additionally, personnel will become familiar with the gym equipment provided and the games scheduled throughout each the program to ensure they are able to transition smoothly between activities.

Location

Health Youth Across America will initially be implemented in 3 low-income communities across North Carolina that have >70% of families living at or below the poverty line. The ultimate goal is to spread the program across America. Weekly activities will take place at parks in the community, in school gyms, or at the local community center. Program personnel will seek out facilities offering free gym or outdoor space to ensure program feasibility in the event of inclement weather.

Enrollment

Personnel recruited from the community will be in charge of marketing the program in the community and recruiting participants. Using members from the

community to recruit participants will be advantageous, as they will be familiar with social and cultural values, and common health beliefs and behaviors in the community. Brochures used to market the program will be tailored to the target participants based on age and gender, and preferred language, colors, images, and declarative titles.²² Brochures will be placed in schools, at community centers and parks, and at local medical offices to spread the word. Additionally, personnel will be responsible for meeting with educators and school administrators to recruit target students.

Program Details

The study will be limited to 42 participants during each 8-week program session to ensure adequate supervision and gym equipment, and to prevent overcrowding. This will allow for a 7:1 participant to personnel ratio²³, as well as allow for each younger participant to be paired up with an older participant. Program sessions will take place from 5:30PM-7:30PM on Monday's and 5:30PM-7:00PM on Wednesday's for 8 weeks in a variety of community locations. This timeframe was chosen to allow increased feasibility for parents who work during the day. Monday's will be dedicated to physical activity and Wednesday's will involve nutrition activities and healthy lifestyle behavior education. A schedule will be created following participant recruitment with exact dates and locations. All participants will be paired with a buddy for the duration of the program to improve compliance and provide a positive support system.³

Evaluations

Initial evaluations will occur on week 1 prior to the daily activities, including a 6MWT, BMI calculation, and Youth Risk Behavior Surveillance System survey.

Additionally, the daily nutrition and physical activity log requirements will be discussed. On Monday, participants will be broken into groups of 3 to complete the 6MWT, with the physical therapist and physical therapy student administering the test and recording the walk distance. Following the 6MWT, the physical therapist or student will record the participants height and weight to calculate BMI. During the evaluation, participants not completing the 6MWT will be engaged in an alternative activity, such as freeze tag or basketball. On Wednesday, the physical therapist and student will administer the Youth Risk Behavior Surveillance System.

Follow-up evaluations will occur on week 8 before the conclusion of the program to assess participant progress, efficacy of the interventions, and participants implementation of healthy lifestyle behaviors. These evaluations will be set up similar to the initial evaluation, with the physical therapist and student administering the 6MWT in groups of 3 and calculating BMI on the physical activity day and administering the Youth Risk Behavior Surveillance System survey on the nutrition/education day.

Interventions

The primary interventions in this program will involve interactive games and nutritional activities and education. On Monday's, activities will consist of two games that involve aerobic and strengthening activities, with a goal of each participant maintaining a heart rate of 64-76% of their age-predicted maximum heart rate for a minimum of 60 minutes.⁸ The participants will be divided into two groups, a group of 20 and a group of 22, to ensure buddies are kept together during each activity. Participants will participate in a 10 minute warm-up at the start of each session to increase blood flow to their

muscles and reduce the risk of injury.²⁴ These warm-up exercises could include a brisk walk, skipping, crab walks, jumping jacks, or another dynamic exercise. Each group will participate in one of the two activities for 45 minutes, then switch. Following the second activity, participants will have a 10-minute cool down session that could include any of the warm-up exercises or another low-intensity exercise for 5 minutes, followed by 5 minutes of gentle stretching. The physical therapist or physical therapy student will be in charge of modifying activities as needed throughout the program based on participant strengths and limitations. For these activities, basic gym equipment will be required, such as basketballs, footballs, jump ropes, cones, mesh pennies, dodgeballs, and flag belts. Many community centers and schools supply this basic equipment for use, and the remaining equipment can be purchased and reused throughout the year for each 8-week session.

On Wednesday's, the session will focus on nutrition education, hands-on nutritional activities, and general healthy lifestyle behaviors. These lifestyle behaviors will be based on the results generated from the Youth Risk Behavior Surveillance System. These topics could include behaviors that contribute to unintentional and intentional injury and violence, tobacco use, alcohol and other drug use, sexually transmitted diseases and teenage pregnancy, dietary behaviors, and physical activity.¹⁶ For example, if a large percentage of participants in the community report drug use, emphasis will be placed on the dangers and legal repercussions associated with drug use. The foundation of these educational interventions will be based on the Social Ecological Model and Health Belief, fostering personal accountability while modifying

attitudes and beliefs related to exercise, nutrition, and the severity and consequences of obesity. Nutrition education will be provided based on the American Heart Association Guidelines for serving sizes, caloric intake, and healthy cooking skills.²⁵ Nutrition education will also involve recording nutrition and physical activity daily, which will be checked each Wednesday by the physical therapist or physical therapy student. This will allow for frequent follow-ups to promote compliance, integrity, and self-efficacy with their new healthy lifestyle behaviors. Further education can be provided based on these nutrition logs. Individuals who self-monitor and record lifestyle behaviors regularly tend to demonstrate increased weight loss, healthier eating habits, and increased physical activity compared to their peers who do not adhere to lifestyle behavior logs.² Nutrition activities will be interactive and include field trips to the farmers market to taste fruits and vegetables, cooking sessions with and without their parents to learn how to create healthy meals, field trips to the grocery store with their parents to identify healthy food choices on a budget, and planting a community garden. Planting a community garden will increase accessibility to fresh fruits and vegetables without demanding a financial strain, as well as encourage participants to increase fruit and vegetable intake by as much as 30%.¹⁰ Parent education will be provided on community and government resources available to increase accessibility to fresh foods and reduce food insecurity. Some of these resources include the Supplemental Nutrition Assistance Program (SNAP), Women, Infants and Children (WIC), National School Lunch Program (NSLP), and Summer Food Service Program (SFSP).²⁶

Sample Weekly Program Schedule		
Week	Physical Activity (Monday)	Education/ Nutrition Activity (Wednesday)
1	<ul style="list-style-type: none"> - Introduction to CDC guidelines on exercise recommendations - 6MWT - Freeze tag 	<ul style="list-style-type: none"> - Introduction to MyPlate Guidelines - Discuss nutrition/exercise log - Complete Youth Risk Behavior Surveillance System survey
2	<ul style="list-style-type: none"> - Basketball - Jump Rope Competition 	<ul style="list-style-type: none"> - Plant community garden
3	<ul style="list-style-type: none"> - Flag football - Relay Races (i.e bear walk, wheelbarrow, etc) 	<ul style="list-style-type: none"> - Discussion on healthy lifestyle behaviors (i.e drugs, smoking, etc) - Water community garden
4	<ul style="list-style-type: none"> - Crab soccer - Capture the flag 	<ul style="list-style-type: none"> - Field trip to the farmers market - Water community garden
5	<ul style="list-style-type: none"> - Scavenger Hunt - Dance party 	<ul style="list-style-type: none"> - Interactive cooking session
6	<ul style="list-style-type: none"> - Dodgeball - Musical chairs 	<ul style="list-style-type: none"> - Field trip to the grocery store with parents - Water community garden
7	<ul style="list-style-type: none"> - Obstacle Course Race - Circuit activities (i.e jumping jacks, run backwards, etc) 	<ul style="list-style-type: none"> - Cooking demonstrations with parents - Water community garden
8	<ul style="list-style-type: none"> - 6MWT - Parachute game - Balloon games 	<ul style="list-style-type: none"> - Review nutrition/exercise log - Complete Youth Risk Behavior Surveillance System survey - Water community garden

Program Evaluation

The efficacy of this community-based program will be based on the results of the outcome measures provided above: BMI, 6MWT distance, compliance with their daily nutrition and physical activity log, and reported behaviors on the Youth Risk Behavior Surveillance System survey. Each participant will complete these outcome measures on day 1 to obtain a baseline score, then again during the last week to obtain follow-up scores for comparison. Program goals will be assessed at the conclusion of the 8-week program by comparing baseline scores to scores recorded at the 8-week follow-up. This program will be deemed successful if participants are able to improve their 6MWT

distance by ≥ 100 meters, if they remain compliant with their nutrition and physical activity log and log the adequate amount of physical activity and servings of fruits and vegetables, if overweight and obese participants reduce their body weight by 10%, and if participants report fewer negative lifestyle behaviors on the Youth Risk Behavior Surveillance System survey. The goal for the 6MWT distance is an improvement of at least 100 minutes, but it can be assumed the participant made meaningful improvement if they improve by at least 68 meters based on the stated MDC above.¹⁷ While there are no psychometric measures for the nutrition and physical activity log, BMI, or Youth Risk Behavior Surveillance System survey, it can be assumed the program goals were met if participants meet the goals stated above.

To evaluate the efficiency and cost-effectiveness of the program, a simple spreadsheet will be created to document all costs related to the program, such as personnel compensation, gym equipment, cooking supplies, and healthy food. These costs will be analyzed to determine if and where costs can be cut to increase cost-effectiveness.^{27,28} This spreadsheet can be presented to policymakers to lay out funding needs that are allocated to specific aspects of the program. Additionally, a survey will be created for all stakeholders to identify the strengths and weaknesses of the program. The stakeholders are defined as anyone involved in the program, such as program personnel, funding agencies, and the program participants.²⁷ These surveys will be targeted towards participants, parents of the participants, and personnel, with questions involving program feasibility, program accessibility, accuracy of the program description, cultural and social appropriateness, favorite and least favorite program

activities, and any additional comments for program improvement.²⁷ Participants and their guardians, and personnel will complete these surveys at week 4 and week 8 to identify changes. The physical therapist and student will determine which recommendations are deemed appropriate in an effort to continually improve this community-based program. Many of these changes may be community-specific based on location accessibility, parents work schedules, cultural and social values, and baseline physical function of the participants.

Conclusion

Healthy Youth Across America is aimed at reducing obesity rates and associated comorbidities among children in low-income communities through the implementation of interactive games and fun, educational nutritional activities. Youth in low-income communities are at a 145% increased risk of obesity compared to their peers who live in more affluent communities.¹ Childhood obesity leads to an increased risk of obesity in adulthood and a multitude of preventable comorbidities, including hypertension, high LDL and low HDL cholesterol, type two diabetes, coronary heart disease, stroke, osteoarthritis, sleep apnea, and depression.^{1,29} Studies show approximately 70% of overweight or obese adolescents will remain overweight or obese throughout adulthood.³⁰ It is crucial to educate our youth³⁰ on the importance of making healthy lifestyle behaviors early on, through exercise guidelines, nutrition guidelines, and abstaining from drugs and alcohol, to promote healthy behaviors from a young age. In addition to reducing the risk of obesity and these medical conditions, implementation of this community-based health promotion program will significantly lower healthcare costs

and the associated financial burden, as obesity and related health conditions account for 70% of medical expenses in the United States.²⁹ This community-based and community-led program will foster not only healthy lifestyle choices, but community integration, self-efficacy, and healthy social interactions with their parents and peers.

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