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## **A Systems Perspective for Integrating a Community-Based, Family-Centered Nutrition and Exercise Program into a Preexisting Physical Extracurricular Activity**

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Nursing

**DOCTOR OF NURSING PRACTICE (DNP) PROGRAM**

**A DNP PROJECT**

**A SYSTEMS PERSPECTIVE FOR INTEGRATING A COMMUNITY-  
BASED, FAMILY-CENTERED NUTRITION AND EXERCISE  
PROGRAM INTO A PREEXISTING PHYSICAL  
EXTRACURRICULAR ACTIVITY**

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**The George Washington University**

A Systems Perspective for Integrating a Community-Based, Family-Centered  
Nutrition and Exercise Program into a Preexisting Physical Extracurricular  
Activity

A Project Presented to the Faculty of the School of Nursing

The George Washington University

In partial fulfillment of the requirements

For the Degree of Doctor of Nursing Practice

By

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**Table of Contents**

Abstract.....	5
Introduction.....	6
Background and Significance.....	6
Needs Assessment.....	12
Problem Statement.....	15
Aims and Objectives.....	17
Review of Literature.....	18
Evidence-based Practice Translation Model.....	27
Methodology.....	29
Evaluation Plan.....	42
Data Analysis, Maintenance, and Security.....	42
Statistical Analysis.....	43
Measures.....	44
Results.....	46
Discussion.....	51
Conclusion.....	54
References.....	56
Appendix A.....	61
Appendix B.....	64
Appendix C.....	76
Appendix D.....	77
Appendix E.....	79
Appendix F.....	81

Appendix G.....87

Appendix H.....88

Appendix I.....89

Appendix J.....91

### **Abstract**

**Background:** Childhood obesity continues to be a problem in urban areas despite an understanding of the causes and consequences. It is essential to develop ways to reduce childhood obesity from a systems perspective, addressing the multifaceted elements that contribute to it.

**Objectives:** This project aimed to implement and evaluate a community-based, family-centered nutrition and exercise program to improve health outcomes and long-term complications related to childhood obesity in a New Jersey city.

**Methods:** A 12-week nutrition and exercise program based on materials from Let's Go 5210 was provided for children age 8-13 enrolled in a community organization dance class. Participants completed a 10-item open-ended survey to measure knowledge of healthy food behaviors and attitudes towards a healthy lifestyle pre and post intervention. Anthropometric measurements were obtained at 0, 6, and 12 weeks to determine changes from baseline.

**Results:** Participants' (N=42) pre and post intervention survey responses were evaluated using a paired t-test and indicated a significant increase in servings of fruits and vegetables (95.2%,  $p < 0.001$ ), decrease in servings of fast food per week (71.4%,  $p = 0.021$ ) and sugary drinks per day, (71.4%,  $p < 0.001$ ). Post-intervention responses indicated a significant decrease in hours of screen time per day (78.5%,  $p < 0.001$ ) and an increase in hours of active play (80.9%,  $p < 0.001$ ). A repeated measures ANOVA demonstrated significant differences for BMI but not for weight;  $p$ -value 0.005 and 0.891, with a reduction in weight and BMI, 42.8% and 23.8%, respectively.

**Conclusion:** Incorporating a nutrition and exercise program into preexisting extracurricular activities was effective in improving healthy lifestyle behaviors which can lead to decreased childhood obesity.

## **Introduction**

Prevention of obesity in children is a health priority, not only because of the increasing incidence of the problem but also because of the evidence of its impact physically and emotionally on the child into adulthood (Waters et al., 2011, Sahoo et al, 2015; Gentile et al, 2018, McCormick et al, 2008). Partnering with community organizations, such as the Young Men's Christian Association (YMCA), which provide resources to the community can be instrumental in reducing the incidence of obesity (Gentile et al., 2018, Schwartz et al., 2012; Siegel et al., 2014). Augmenting extracurricular activities with an obesity prevention program addressing healthy lifestyle, physical activity, and nutrition has the potential to result in a systems level change of improved health outcomes for the children of this urban area community of a metropolitan area. Literature has shown that a combination of physical activity and nutrition education can help prevent and reduce the incidence of childhood obesity (Sahoo et al., 2015, Duggins et al., 2010, Siegel et al, 2013, Gentile et al., 2018). The YMCA has several extracurricular activities that are available to the community, including basketball, karate, golf, and dance. The activities offer the physical component of reducing obesity. Additional support is required to help address the childhood obesity issue. Support in the form of nutrition and healthy lifestyle education is needed to combat pediatric obesity.

## **Background and Significance**

The incidence of overweight and obesity in children has been increasing for the last thirty to forty years despite more awareness and campaigns about the impact of overweight youth. Although the number of childhood obesity cases in the United States has slowed since a sharp increase in the 1970s and 1980s the incidence and prevalence remain a concern.

(stateofchildhoodobesity.org, 2019). The percentage of obesity is 18.5 for children ages two to nineteen in the state of New Jersey as of 2017 (stateofchildhoodobesity.org, 2019). The prevalence of overweight children is higher in African American and Latino children than Caucasian or Asian children the state of New Jersey (stateofchildhoodobesity.org, 2019). This is significant because the population of African American and Hispanic individuals living in Trenton, NJ, where this initiative was implemented, is fifty percent and thirty-six percent, respectively (census.gov, 2018).

The incidence of childhood obesity has been pronounced as one of the primary health problems for children in developed countries. Obesity continues to be a problem in the United States for both adults and children; however, increased focus on children is a higher priority because habits and learned behavior are easier to change in childhood rather than adulthood (stateofchildhoodobesity.org, 2019). The impact of childhood obesity is extensive; therefore, it is necessary to establish interventions to combat the issue. Children who are overweight or obese are more likely to stay obese into adulthood and develop diseases such as diabetes and cardiovascular disease (Sahoo et al., 2015, Waters et al., 2011, Butte et al, 2017, Grow et al., 2014, Trenton Health Team, 2013).

Obesity is a complicated issue to address, due in part to the link of obesity with environmental, social, and psychological outcomes (Waters et al., 2011, Butte et al, 2017, Grow et al., 2014) and the fact that both behavioral and genetic factors contribute to the health impact (CDC, 2020). The health implications of obesity for adults are numerous including hypertension, elevated cholesterol, diabetes mellitus, stroke, coronary heart disease, sleep apnea, and mental illness and even some cancers (CDC, 2020). Finding ways to address overweight and obesity in childhood is essential to reducing the likelihood of developing a chronic disease in adulthood



(Sahoo et al., 2015, Gentile et al., 2018, Grow et al., 2014, Duggins et al., 2010, Butte et al., 2017, Schwartz et al., 2012). Initiatives that address the common causes of obesity such as improving nutrition and increasing physical activity combat the issue of pediatric obesity (Sahoo et al., 2015, Gentile et al., 2018, Duggins et al., 2010, Siegel et al., 2014). Initiatives are best conducted in areas where children spend a significant amount of time such as a school or an afterschool program (Waters et al., 2011, Butte et al., 2017, Duggins et al., 2010). This is due in part to the link of obesity to environmental, social, and psychological outcomes (Waters et al., 2011).

High incidence of obesity has been attributed mostly to a lack of physical activity and healthy eating (CDC, 2020; Gentile et al., 2018, Schwartz et al., 2012, Siegel et al., 2014, Grow et al., 2014; Duggins et al., 2010). Several causative factors contribute to why some individuals are less physically active than others including the lack of safe walking areas, sedentary lifestyles, and lack of motivation or desire to get fit (Sahoo et al., 2015, American Nutrition Association, 2011, Gentile et al., 2018). Many urban areas have higher incidences of obesity within the population. Urban areas are also more prone to violence, which contributes to the resident's inability to be physically active (CDC, 2018). According to the CDC, children are not as active as they once were and have adopted a sedentary lifestyle where they spend a great deal of time watching television, on cellular phones or tablets and other technology sources. Part of maintaining a healthy lifestyle is being active, and in the current culture, this is not as prevalent (CDC, 2019; Let's Move, n.d.).

In addition to the lack of physical activity, poor nutrition choices are also a significant contributor to overweight and obesity. This could be due in part to a lack of understanding of what constitutes healthy diet (Gentile et al., 2018; Schwartz et al., 2012, American Nutrition

Association, 2011). Lack of healthy eating is also attributed to the unavailability of grocery stores in the area with the presence of convenience stores as the main food source (American Nutrition Association, 2011).

Overweight and obesity contribute to unfavorable health outcomes for both children and adults. There are several financial implications associated with obesity health outcomes. Directly, the cost of childhood obesity, including prescription drugs, emergency room, and outpatient visits totals approximately fourteen billion dollars (stateofchildhoodobesity.org, 2019). This cost grows larger as many obese children become obese adults incurring more expenses related to poor health outcomes as a consequence of obesity. Annually, about 147 billion dollars are spent on treating illness related to obesity in adulthood, as of 2010 (Cawley, 2010). One of the economic impacts of obesity is the direct medical costs associated with health conditions attributed to being overweight or obese including hypertension, diabetes, high cholesterol, heart disease and asthma (Hammond and Levine, 2010).

In addition to direct medical costs, there are also indirect medical costs associated with overweight and obesity. Some of the indirect medical expenses related to obesity include absenteeism from missing work due to obesity-related health conditions (Hammond and Levine, 2010). One study showed that workers identified as obese were about 194% more likely to use paid time off than other employees (Durden et al., 2008). Additional indirect medical costs include loss of productivity at work and disability with an increase in disability-related premiums and payments due to being overweight, both of which cost the company the individual works for additional time, money, and resources (Hammond and Levine, 2010). Addressing obesity in childhood could limit the economic impact of obesity in adulthood, creating more favorable health outcomes and less health expenditure (Hammond and Levine, 2010, Sahoo et al., 2015).

The community organization where this project was conducted is a staple in the city of Trenton, NJ. The organization offers many services to the community, including fitness classes, access to a gym, basketball, lacrosse, golf, pre-school, after school, activities, and dance classes. In order to participate in the activities and use the facilities of the community organization, one must be enrolled as a member, which was at a reduced cost of thirty dollars a month for single parent families (YMCA, n.d.). The community organization focuses on "being a valuable asset in the community, our children, promoting healthy living and fostering a strong sense of social responsibility" (YMCA, n.d.). The DNP Project aligned with the community organization's focus of promoting healthy living by ensuring that healthy eating was incorporated into the physical activities that the organization already offered. It was anticipated that combining physical activity with healthy eating would contribute to a healthier lifestyle that would prevent and reduce the amount of childhood obesity in the area.

As of 2017, the percentage of overweight and obese children aged two to four years in the state of New Jersey was 15%. As of 2016 to 2017, the rate of overweight and obese youth ages ten to seventeen was 15%. The state of New Jersey is currently ranked 22 of 51 states in the United States for levels of childhood obesity ([stateofchildhoodobesity.org](http://stateofchildhoodobesity.org), 2019). Health outcomes relate to how healthy people are in an area and how long individuals live. Mercer County, New Jersey, the county where the community organization is located, ranks tenth in health outcomes out of the 21 counties in New Jersey. Within the health outcome data, African American and Hispanic populations in Mercer County have the most significant percentage of poor or fair health, 20% and 32%, respectively. In addition, for the overall population the number of poor physical health days average 4.3 days per month, which is greater than the 3.5 days per month for the state of New Jersey ([countyhealthranking.org](http://countyhealthranking.org), 2018). According to the

State of Childhood Obesity (2019), there are programs run by non-profit groups such as churches, community centers, and schools in New Jersey that target healthy eating, physical activity, and nutrition standards. Despite these efforts, the rate of obesity continues to increase.

Based on the data for Mercer County and New Jersey State, it was evident that this area would benefit from an obesity prevention and healthy living program in the community. The organization was a staple in the community that could house the obesity prevention program. The organization addressed a need in the city, which was to increase healthy living and healthy lifestyles and to reduce the incidence of chronic diseases and conditions. An obesity prevention program targeting mostly children but also their families would help to combat the issue of childhood obesity and encourage better lifestyles that will last into adulthood. The prevention program helped to address this need and better the community.

Nutrition and exercise are components of addressing the issue of obesity and childhood obesity; however, addressing these alone will not solve the problem. In order to truly create sustainable change in the realm of childhood obesity, it was important to focus on changes that would address systems level obstacles with evidence-based interventions based on the identified needs of the community (Kumanyika, Parker, and Sim, 2010). While the obvious interventions such as exercise and nutrition are necessary, it was essential to look beyond the obvious interventions and to delve deeper to address and understand the relationship between childhood obesity and causative factors (Kumanyika, Parker, and Sim, 2010). There are obstacles and barriers within communities that contribute to the rates of obesity. A community needs assessment of the proposed project site documented limited access to food stores that sell healthy food options and the lack of space for safe, physical activity (Trenton Health Team, 2013). The city of Trenton is a food desert, lacking access to retail outlets such as supermarkets and grocery

stores that sell healthy and affordable foods, according to the United States Department of Agriculture (2010). There are many convenience stores and bodegas in the city that are conveniently located on the corners of the neighborhoods where many residents live. The convenience and affordability of these type of stores that lack healthy foods and provide fast meals for families have contributed to the rates of obesity. For the purpose of the intervention, it was necessary to identify ways to address the lack of nutritionally sound food in the community to begin changing the culture of the community. Ultimately, improving the overall health outcomes of the children in the community.

### **Needs Assessment**

The community organization in Trenton, NJ, was the location where the community-based, family-centered nutrition, and exercise program was conducted. The focus of the organization was a “commitment to nurturing the potential of our most valuable asset as a community, our children, promoting healthy living and fostering a sense of social responsibility” (YMCA, n.d., para 2). Currently, the facility service offerings include dance, basketball, lacrosse, and martial arts. These programs were geared towards the youth and available to anyone who holds a membership, which is at reduced cost for low income families. In order to ensure the organization’s health and success, the facility has continued to offer services to the community that foster healthy living, engage in social responsibility, and uplift the children (YMCA, n.d.). However, despite its greatest efforts to promote a healthy lifestyle through the activities offered in the facility, there continued to be a significant number of children and their families engaging in unhealthy behaviors including unhealthy eating habits as observed by the staff.

A needs assessment was conducted to determine if there was a need to develop a community-based, family-centered nutrition, and exercise program. Based on a review of the demographic information available in the membership system, approximately 70% of the members were African American, 27% Hispanic, and 3% Caucasian (YMCA, 2019). Majority of the members fall into an income class around 45,000 dollars (YMCA, 2019). While this YMCA does not obtain anthropometric measurements on the members, staff identified about half of the children as overweight.

The organization offered extracurricular activities including lacrosse, basketball, martial arts, and dance. However, the facility, while it promoted a healthy lifestyle, did not entirely adhere to it. For example, the vending machines had many unhealthy food and drink options in them, which many of the children and their families utilized for a quick snack. During the dance academy classes and basketball games, concessions were often available including chips, cookies, candy, popcorn, hotdogs, and fruit drinks.

The presence of unhealthy and processed foods within the vending machines and concessions contributed to the issue of overweight and obesity within the community. The community organization provided exercise and the opportunity to be physically active, which is one of the components that reduces the incidence of overweight and obesity; however, serving unhealthy food contrasts the organization's efforts to promote a healthy lifestyle. Addressing the system level issue of unhealthy foods being served through the vending machines and concessions helps to ensure the efforts to promote healthy living and reduce the incidence of obesity. Additionally, through the needs assessment it was identified that many of the children frequent the convenience stores and bodegas in the community, based on the meals and food brought into the facility for lunch and snack. The organization did serve a healthy lunch for the

pre-school aged children who attend the preschool program. However, children attending the afterschool program, often bring their own snacks and meals from home. The staff have reported that some of the snacks that the children are eating are unhealthy and include processed foods. Based on the needs assessment of the community, this was believed to be due in part to presence of a food desert in Trenton, NJ and the lack of available, accessible, and affordable healthy food choices in the convenience stores and bodegas within this community. To address this issue, a systems level change needed to occur within the community in the form of a farmer's market or something similar where the residents of the community could have access to affordable healthy food options such as fruits and vegetables.

A strengths, weakness, opportunities, and threats analysis were conducted to determine the feasibility of implementing a program within the organization (Appendix A). The greatest identified strength for this organization was the ability to provide a much-needed service to the people in the community that included a safe place for children to engage in learning and activities, a place of worship, and a place for healthy activities for the whole family. Many people utilize the services of the organization because of the safe and fun atmosphere it provides. The greatest identified weakness for the organization was the lack of space available for participants. The organization offered many services including fitness, dance, basketball, and martial arts, in addition to pre-school and afterschool programs. Finding a quiet area or a designated area to conduct classes or host a program while other activities are in session appeared to be challenging for staff. However, despite the lack of space, the organization had adequate resources for the project. The classes were held in the building where the dance classes occur, in a room that was cleared for use for this project.

An identified facility issue that was resolved is the lack of parental involvement. Past practice involved parents dropping their children off for activities and returning to pick them up when the event was over, making it challenging to develop family-centered programs. In discussing this issue with the leadership of the dance academy, the team decided to make it mandatory that every child, up to age fourteen, be signed in and out of classes. This requirement increased parental involvement, and parents were able to gather pertinent information pertaining to the child's participation in the dance program as well as participate in the nutrition program.

The needs assessment documented the value of adding a community-based, family-centered nutrition and exercise program to this organization. The contribution that this program would bring to this agency in helping them achieve their mission of fostering a healthy lifestyle for its members was seen as impactful.

### **Problem Statement**

Many studies have documented the value of implementing community-based, family-centered nutrition and exercise programs to address the pediatric obesity epidemic (Siegel et al., 2014; Duggins et al., 2010; Gentile et al, 2018; McCormick et al, 2008; Schwartz et al, 2012, Butte et al, 2017). These studies have documented success in implementing a community-based obesity prevention program on weight loss, weight maintenance of body mass index, and improvement in nutritionally sound eating behavior. A needs assessment conducted of the facility and the community that this agency serves showed an identified need for an obesity prevention program. Within the dance school, one of the programs at the organization, there were a total of 96 students aged eight to thirteen years. Of that total, approximately 25% of the youth were overweight or obese.



A Community Health Needs Assessment conducted by the Trenton Health Team revealed that as of 2010, approximately one in two children living in Trenton were overweight or obese (Trenton Health Team, 2013). Forty-eight percent of children ages six to eleven were considered overweight or obese, and forty-six percent of children ages twelve to nineteen were deemed to be overweight or obese (Trenton Health Team, 2013). The rates of childhood obesity for children ages three to five in Trenton was about 49% of the national average in the United States, which was 21% in 2010 (Trenton Health Team, 2013). Participation in the community-based, family-centered nutrition and exercise program increased both understanding and implementation of healthy eating habits for the youth and their families with decreased weight or body mass index in some of the participants. The project utilized a systems perspective for implementing and evaluating a community-based, family-centered nutrition and exercise program.

### **Practice Question**

Will a systems perspective for the implementation of a community-based, family-centered nutrition, and exercise program within the dance academy at the organization improve the healthy lifestyle habits of the participants?

### **Purpose Statement**

The purpose of this study was to utilize a systems perspective in the implementation and evaluation of a community-based, family-centered nutrition and exercise program at the organization to increase knowledge of healthy food behaviors and improve youth participant's attitude and mindset towards a healthy lifestyle over twelve weeks.

### **Aims and Objectives**

The DNP project aimed to improve health outcomes and decrease long term complications related to childhood obesity within this community located in a large, urban city in New Jersey by integrating a community-based, family-centered nutrition and exercise program at the community facility. Through the incorporation of obesity prevention programs into extracurricular activities, children were taught the importance of adopting and maintaining a healthy lifestyle to improve their health outcomes. Physical activity was one of the methods to achieve a healthy lifestyle to reduce and prevent the incidence of obesity.

The organization located in Trenton, New Jersey, includes part of the population of overweight and obese children in New Jersey. Trenton is one of the more impoverished areas in the state, and access to healthy foods is limited and incidence of unhealthy behaviors is more prevalent in Trenton (CDC, 2018). Therefore, the goal was to establish a community-based, family-centered nutrition and exercise program that focused on both the nutritional aspect of a healthy lifestyle, as well as, the physical to decrease the incidence of childhood obesity in the youth attendees of the organization by December 2019. The children were already engaged in the physical activity component by participating in extracurricular activities. The program added one of the other elements of obesity prevention, the nutritional aspect. The dietary portion included family-based educational lessons, recipe demonstration, and delivery of fruits and vegetables to the participants; these additional lessons took place before the physical activity as an added instructional piece of the class.

However, to adequately address the issue of childhood obesity in the community, it was not enough to simply advocate for nutrition and exercise. Even though, nutrition and exercise have been identified through evidence-based research as the best methods to combat the issue of

childhood obesity, it was important to address the barriers that make eating healthy and being active hard to attain. To this end, the institution of a nutrition and exercise program was one component in a systems level intervention to create sustainable change to address childhood obesity in the organization and community.

The objectives for this project were:

1. Analyze diet and physical activity patterns based on age-appropriate national guidelines.
2. Increase knowledge of healthy food behaviors by April 2020 for members of the community organization dance school through the implementation of a 12-week community-based, family-centered nutrition and exercise program.
3. Improve participant's attitude and mindset towards a healthy lifestyle by April 2020 for members of the community organization dance school through the implementation of a 12-week community-based, family-centered nutrition and exercise program.
4. Improve access to healthy food choices for members of the community organization by creating more sustainable healthy food options such as a farmer's market and increasing healthy food availability in vending machines within the facility.

### **Review of Literature**

For the purpose of answering the practice question regarding integrating a nutrition and exercise program into a community organization for children ages eight to thirteen, a search was conducted over several weeks between January and April 2019 (Appendix B). Several strategies were used to identify viable resources and studies for childhood obesity interventions, primarily in YMCAs across the country. Searches were conducted using PubMed, Medline, Cumulative

Index to Nursing and Allied Health (CINAHL), and Scopus databases. The search strategy used terms including childhood obesity, pediatric obesity, YMCA, community organizations, urban, prevention program, treatment, and intervention. In addition to searching through the four databases, hand search of the reference section of the articles was also conducted. Some of these articles examined from the hand search were able to be accessed but not as many as hoped for.

A MeSH search was also completed to identify articles usable for a literature review of the benefit of nutrition and exercise interventions and programs in the YMCA to address the issue of childhood obesity. MeSH searches are completed in the MEDLINE Database. The MeSH search terms and subheadings used to complete this search were Pediatric or Childhood Obesity AND Health Promotion AND Health Education. A skilled librarian was consulted on the proper technique to search for valuable articles for the study.

For this literature review, obesity prevention programs that were established within community organizations, specifically the YMCA, were examined. A total of ten articles were appraised with eight of them being experimental based research, and the other two sources described two programs that provide resources for community-based obesity prevention programs. A method of appraising evidence is completed by assigning a level of evidence, which assigns a grade based on design, methodology, and validity. Evidence levels of 1 represent the strongest evidence. Most of the research articles had an evidence level of four because they were quasi-experimental research articles. Additionally, two of the sources were level 1, the strongest evidence level, a randomized controlled trial experiment. Two reports were level III because they were qualitative studies.

Obesity is a significant concern in the United States for both adults and children. Being overweight and obese has several health implications, including but not limited to diabetes and

heart disease. The incidence of childhood obesity has continued to increase over the last several years despite the amount of research that has been conducted on the causes and consequences of childhood obesity and ways to address the problem to reduce the occurrence (Gentile et al., 2018; Butte et al., 2017).

Most successful and essential programs aimed at reducing the incidence of childhood obesity include components that increase physical activity, improve nutrition and healthy eating habits, and improve the attitude and mindset of the child towards adopting a healthier lifestyle (Gentile et al., 2018; Schwartz et al., 2012). The appraised literature sources have discussed the importance of including these components in an obesity prevention program because studies have shown that having a healthy diet and healthy lifestyle contributes to maintaining a healthy weight for children (CDC, 2019). The CDC (2019) recommends encouraging healthy eating habits in children at an early age and finding ways to make their favorite dishes healthier. It is also important that children stay active and avoid a sedentary lifestyle whenever possible (CDC, 2019). The combination of better nutrition and more activity leads to adjusting the mindset of the child so that being healthy becomes the new normal.

The Let's Go Campaign helps community organizations address the incidence of obesity within their settings (Let's Go, n.d.). Some of the implemented programs were found to be successful in reducing BMI and weight including a study which incorporated nutrition sessions and physical activity in a 'Fun 2B Fit' program, for children ages 9 to 13 (Siegel, 2014). The study successfully identified a weight reduction in 62% of the 21 participants in the study over the course of twelve months (Siegel, 2014). However, some intervention programs do not always yield significant results such as a study which implemented the Let's Go Campaign as a pilot study into their organization. The study successfully improved the understanding of healthy

habits and lifestyle choices but had no impact on the enhancement of lifestyle changes, healthy habits, or BMI, which can be due in part to a small sample size (Gentile et al., 2018).

This dichotomy of success seen with one study and not seen with another helps researchers and principal investigators better develop their implementation programs based on what methods worked better for the study. For example, if one researcher found that providing incentives to the participants helped increase and improve participation, the researcher may also opt to provide the participants with incentives for their continued involvement. A case series study conducted by McCormick et al. (2008) utilized incentives to encourage participation in the program. These incentives included free fruits and vegetables distributed to families regularly throughout the program as well as gift card incentives that were rewards for the children and families who regularly attended classes and showed improvement in weight (McCormick et al., 2008). The researchers found success in providing rewards for participation, as it encouraged continuity (McCormick et al., 2008).

A review of the literature revealed that many of the programs implemented within a YMCA setting, used an obesity prevention program that measured changes in weight or reduction of body mass index (BMI) (Duggins et al. 2010; McCormick et al., 2008; Gentile et al., 2018; Butte et al., 2017). The studies were conducted using a variety of obesity prevention programs either developed by the leaders of the organization or based on an already established nationwide obesity program. A study with a total of 42 children and parents at the YMCA in Minnesota implemented the Let's Go 5-2-1-0 program which focused on improving diet and activity and reducing screen time. Almost half (42.9%) of children in the intervention group showed an improvement in the servings of fruits and vegetables consumed daily versus only 19% of the control group. Additionally, 21% of participants in the intervention group reduced their

drinking of sugar-laced beverages (Gentile et al., 2018). Another study with a total of 549 Hispanic and African American children aged two through twelve utilized the MEND program which focuses on Mind, Exercise, and Nutrition (Butte et al., 2017). The plan was a 12-month program that focused on monthly nutritional education sessions and physical activity, conducted at YMCAs in Texas. The primary outcome was change in the percentage of body mass index (BMI). The results identified no statistical difference between the intervention and comparison group for ages two to five years. However, for ages six to eight years and nine to twelve years, a significant change in percentage BMI was noted with -2.32 and -2.59 from baseline, respectively.

Other sources appraised for this literature review also developed obesity prevention programs to reduce the incidence of overweight and obesity in children and their families at community organizations such as the YMCA. Many of the programs included nutrition education, demonstration, and increased physical activity (Siegel et al., 2014; Duggins et al., 2010; McCormick et al., 2008). A study of 21 children ages nine to thirteen who participated in an obesity prevention program, "Fun 2B Fit," was conducted at the greater Cincinnati YMCA (Siegel et al., 2014). The program consisted of two, one-hour group exercise sessions and a monthly nutritional education workshop with a dietician. 62% of consented participants showed a clinically significant difference in BMI; however, no statistical significance was identified most likely related to the small sample size (Siegel et al., 2014). A similar community-based obesity program with a total of 70 youth participants, ages eight to thirteen was conducted at the YMCA in Galveston, Texas (McCormick et al., 2008). The main components of the study included nutrition and behavioral counseling and physical activities entitled Fit N Fun. Thirty-five children received the intervention of being enrolled in the Fit N Fun program and thirty-five

children were in the control group and only received educational materials. After six months, 43% of the intervention group participants demonstrated clinically significant weight changes with a change of  $0.28 \pm 0.75$  kilograms per month which is less than the weight changes experienced by the control group  $0.69 \pm 0.32$  (McCormick et al., 2008).

In addition to increasing physical activity and offering nutritional seminars, some of the studies also included reducing screen time, cooking classes, improvement in healthy eating habits, and behavioral changes (Schwartz et al., 2012; Gentile et al., 2018). A study of a total of 59 children ages six to eleven was conducted at four North Carolina YMCAs. The study consisted of weekly physical activity, weekly nutrition education workshops for parents and children, and nutrition and activity questionnaires (Schwartz et al., 2012). The results of the study found significant changes in BMI from at three and six but not at twelve months

Additionally, the consumption of sugary beverages significantly decreased from baseline at three and twelve months. Two of the other measures for the study focused on increasing the number of servings of fruit per day and time engaged in physical activity, both of which showed significant differences at three and twelve months (p-value 0.01). Lastly, a decrease in screen time was significantly seen at three months but not at 12 months (p-value of 0.01 and 0.11) respectively (Schwartz et al., 2012). Overall, the study showed positive results for the reduction of weight and improved healthy habits.

However, not all sources appraised identified significant results after the program. One study which provided a free one-year membership to participants in the treatment group and not to the control group, examined if the membership would improve health behaviors (Duggins et al., 2010). The study found no statistical significance in any of the outcome measures, including weight loss, reduction in BMI, improved diet, and improved physical activity. Eighty-three



children and their families were recruited for the study, but after withdrawals and unmet criteria; thirty were randomly assigned to the control group and thirty-six to the intervention group. The control group only received nutrition workshops and materials, while the intervention group received the nutrition element in addition to a free YMCA membership. The results of the study did not identify increased attendance to the YMCA, with an average of five sessions over twelve months for the treatment group.

Additionally, minimal changes in self-reported eating habits were noted with a reduction in unhealthy beverages and from 2.3 to 1.5 per day (Duggins et al., 2010). Though there were no significant changes in weight loss or BMI ( $p=.29$ ), a positive correlation with weight loss was identified for children who attended the YMCA and engaged in physical activity, though not enough to be statistically significant (Duggins et al., 2010). The lack of clinical importance identified in this study was due in part to the limitations of the research, including an insufficient sample size to draw valid conclusions due to low recruitment or high dropout rate.

Furthermore, a qualitative approach has also been appraised to determine its usefulness for an obesity prevention program. Telephone interviews were conducted with a total of 34 participants, 19 adults and 15 children to ascertain perceptions regarding participation in an obesity prevention program, MPOWER held at the YMCA in Ann Arbor, Michigan (Sallinen et al., 2013). The children ranged in age from seven to eleven, and the majority (74%) were female. The parents who responded to the telephone survey were mostly mothers (95%). The population was racially diverse with 63% African American, 26% Caucasian, and 11% identified as other. Through these interviews, it was determined that there was a favorable perception of the components of the program the respondents participated in, including exercise, nutrition, behavioral modifications, individual sessions, self-monitoring daily logs, and weekly weight

checks. Overall, the respondents who participated in the research study viewed these components favorably, specifically, the physical activity, nutrition, and behavioral modification components. The daily logs were seen as helpful but time-consuming and challenging to maintain. Additionally, the weekly weigh-ins were viewed as appropriate for the study but sometimes embarrassing or nerve-wracking (Sallinen et al., 2013). This qualitative study identified which elements the participants in the program found useful and enjoyable and could be adopted into an obesity prevention program at the YMCA.

Non-research evidence can be just as useful as research-based evidence because these types of sources can provide a foundation for the intervention. The sources reviewed and appraised for this literature review based their programs either directly off a toolkit that was developed or modified the toolkit to best serve the needs of the facility in order to combat the issue of childhood obesity. One of the toolkits that was described in research articles was MEND, which stands for Mind, Exercise, Nutrition, Do it (MEND, n.d., Butte et al., 2017). It is a comprehensive intervention program dedicated to addressing three major components behavioral changes (mind), physical activity (exercise), and healthy eating habits (nutrition) (MEND, n.d.). The second toolkit that was appraised was We Can, which stands for Ways to Enhance Children's Activity and Nutrition. The purpose of this toolkit is to provide resources for organizations in developing and implementing an obesity prevention program, such as was done in the research conducted by Duggins et al. (2010). The materials and resources from We Can were provided in the form of a handbook to participants of the study with information that highlights the importance of healthy food choices, being physically active and fit, and reducing the amount of time spent in front of a screen (We Can, 2014; Duggins et al., 2010).

After reviewing the evidence, most of it was determined to be of good quality or higher. The quality level determination is based on transparency, diligence, verification, self-reflection and scrutiny, participant-driven inquiry, and insightful information (Dearholt and Dang, 2018). The quality of evidence benefits the strength of the evidence pooled for the synthesis of literature and helps determine its usefulness and effectiveness with the project. The recommendations based on the research are compatible and consistent with the values and practices at the community organization, as one of the primary goals is “creating healthy communities and fostering social responsibility” (YMCA, n.d.). Therefore, based on the synthesis of the evidence, the plan is not only feasible to be conducted at the facility, but it is also likely to be successful by using the components of previous implementation projects that proved to be valuable and adjusting or amending aspects of the project that were not demonstrated as useful in the project. Support is available to complete the demands of the project because there is stakeholder support from the staff and leadership of the organization, who have bought into the plan. The facility also has the resources and funding needed to conduct a project, though not much funding is required for this project. The project fits within the priorities of the organization, and with the stakeholder buy-in, administrative support, and resources. The project may be not only successful but also sustainable.

Many of the articles appraised for the literature review discussed the need to address changes on a larger scale to make the interventions more sustainable to combat the issue of childhood obesity (Gentile et al., 2018, Siegel et al., 2014; Butte, et al., 2017). However, the articles did little to address how to create more sustainable change on a systems level. One resource *Bridging the Evidence Gap in Obesity Prevention (2010)* discusses the fact that obesity is an issue with many levels and requires a systems perspective to understand the problem and

take effective interventions to combat the problem. Examining childhood obesity from the systems perspective allows the researcher to explore the causative agents of obesity and work to remedy the overall causes in order for changes to have a sustainable impact (Kumanyika, Parker, and Sim, 2010). The systems level approach requires the individual to examine the problem of obesity from different facets including, economics, environment, education, and resources, while employing evidence-based research to develop appropriate interventions across all elements of the problem (Kumanyika, Parker, and Sim, 2010).

### **Evidence-Based Practice Translation Model**

The Rosswurm and Larrabee model is a six-step approach to evidence-based practice change and is designed to aid in shifting from traditional practice to evidence-based practice (Appendix C). The six steps of the model are: assess, link, synthesize, design, implement and evaluate, and integrate and maintain (Duffy, 2004). The model is designed to guide practitioners through the process of evidence-based practice systematically, starting with a needs assessment and ending with integrating evidence into practice (Rosswurm and Larrabee, 1999).

Assessing for and documenting the need for a practice change occurred within step one of this model (Rosswurm and Larrabee, 1999). External data related to the prevalence of childhood obesity and community-based interventions targeting this issue was identified through a systematic review of the literature. Internal data was collected through interviews with staff and leadership of this organization. A needs assessment was conducted of the organization. Stakeholders were identified and included in decision making meetings.

Linking the problem interventions and outcomes came in the second step of the Rosswurm and Larrabee model (Rosswurm and Larrabee, 1999). Having conducted a systematic review of the literature and a needs assessment in the previous step, potential interventions and activities

were identified including the establishment of a community-based, family-centered nutrition and exercise program. Interventions were geared towards addressing the outcomes of the project.

The third step of the Rosswurm and Larrabee model was to synthesize the best evidence available to address an identified gap in practice (Rosswurm and Larrabee, 1999). For the purpose of answering the practice question regarding integrating a nutrition and exercise program into a community organization, a systematic review of the literature was conducted. The resulting evidence from the review was appraised and critiqued for its validity and applicability to the potential project. Based on the synthesis of best evidence, the feasibility of the study was determined to be achievable and attainable.

Designing the practice change was the fourth step of the model (Rosswurm and Larrabee, 1999). The proposed change was to initiate a community-based, family-centered nutrition and exercise program at the community organization in the dance program. The resources needed from the facility included space, access to the parents and students, and leadership support. The primary outcome for the designed practice change was for the participants to adopt healthy habits based on the knowledge and experience gained through the program.

After the practice change was designed the fifth step was to implement and evaluate the change in practice (Rosswurm and Larrabee, 1999) by conducting the pilot program at the community organization. The process was evaluated throughout the program to determine if any elements needed to be amended. Evaluation again occurred to determine if outcomes have been met by the completion of the project. Based on the evaluation, it was decided whether to adopt or reject the practice change.

The final step of the Rosswurm and Larrabee model was to integrate and maintain the change in practice. Based on the evaluation of the program, the findings were communicated to the

stakeholders through a staff meeting. The results of the study were incorporated into the community organization with necessary changes based on the evaluation. The program was evaluated and monitored to determine the effectiveness of the program and ensure outcomes were being met.

## **Methodology**

### **Study Design**

This quality improvement study involved interventions to address the systems level changes needed to grapple with the issue of childhood obesity within this community, as well as the implementation of a community-based, family-centered nutrition, and exercise program using a convenience sample of children ages eight to thirteen who are members of the community organization dance school. A descriptive survey design was used to measure knowledge of healthy food behaviors before and after the intervention. A descriptive survey was used to measure the attitude and mindset towards a healthy lifestyle before and after the intervention.

Anthropometric measurements of height, weight, and BMI were obtained before the start of the program, during the sixth week of the program, and at program completion. Meetings were scheduled with stakeholders inclusive of the chief executive officer of the organization, local New Jersey Farm representatives, and local non-profit organizations for the purpose of introducing policy that addressed the system level changes that contribute to the childhood obesity problem in this community. Anticipated proposed policy changes included provision of healthy and nutritious food and beverage options in vending machines within the organization, partnering with a farmer's market, selecting a safe place for the location of the farmers market and providing vouchers for the purchase of fruits and vegetables.

**Setting**

The DNP Project was conducted at a staple community organization in Trenton, New Jersey. The community organization serves cities in Mercer County including Trenton, Ewing, and Lawrenceville. However, due to the location of the community organization in Trenton, NJ, 90% of the members reside in Trenton, NJ. The facility provides a multitude of services to the community, including pre-school education for children age's three to four, Monday through Friday and after school services for ages three through thirteen, Monday through Friday.

Additionally, fitness classes and access to a gym are included in the membership of the organization. The ability to participate in sports is offered at the organization for the youth members. These activities include basketball, karate/martial arts, golf, and dance. The community organization dance school was directly across the street from the main building. Since the dance school had its separate facility with space available to isolate the children and parents and conduct the workshops in a controlled environment with minimal outside distractions and stimulation, this location was chosen as the venue to conduct this DNP Project. The dance school had two large studios where the physical activity exercise took place. There was a total of four offices, one of which belonged to the director of the dance school and one which housed some of the fitness and dance equipment. The other two offices are vacant, and one was allotted to the principal investigator for this DNP Project to conduct workshops and keep the resources required to complete this project.

**Study Population**

The nutrition and exercise program component of the intervention included a convenience sample of individuals enrolled in the community organization dance school for the

2019-2020 season. The dance school had 141 students enrolled for the 2019-2020 academic year. 96 students were between the ages of eight and thirteen. Since the DNP Project targeted children between the ages of eight and thirteen, the remaining 45 students were excluded. Inclusion criteria for this intervention included the pre-identified age criteria, enrollment in at least one class at the dance school and parental consent. Exclusion criteria included lack of parental consent, and not enrolled in at least one class of the dance school.

### **Subject Recruitment**

Study participants were recruited during the registration period for the dance school. All students ages eight through thirteen enrolled in the dance school received a recruitment flyer in the mail before the annual registration day. The registration was held on September 7, 2019, at the community organization. At that time, the principal investigator met with the parents of students ages eight through thirteen as they enrolled their children in their respective classes. The details of the program were explained, and parental consent was obtained at that time. Parents were involved in the program as well and the criteria for being included in the study included having a child enrolled in the dance school and participating in the nutrition and exercise program. Parents also needed to commit to attending the parent nutrition sessions as well. The program started on the first day of dance classes the week after the registration day.

### **Consent Procedure**

At the community organization's dance school registration day, parents of children ages eight to thirteen were approached, and the principal investigator discussed the details of the program. If interested in participating in this intervention, parents/caregivers were required to sign an informed consent allowing their child (ren) and themselves to participate. Parents of the



children provided written, informed consent prior to involvement in the project (Appendix D). Additionally, child assent was obtained if the child demonstrated a clear understanding of the project and their involvement (Appendix D). The child was provided a description of the project in terms that they could understand and given the opportunity to ask questions. The consent outlined the project's purpose, procedures, potential risks, confidentiality, benefits of participation, voluntary participation, and contact information, should the participants have questions about the project. By consenting to participate in the project, parents agreed to complete a total of two questionnaires, one at the start and one at the end of the program as well as attend three parent sessions. Additionally, parents consented to allowing their children to complete nutritional lessons and demonstrations, anthropometric measurements of weight, height, and waist circumference, as well as complete two questionnaires (Appendix D and E). If parents did not provide consent, their child (ren) were not be able to participate in the proposed community-based, family-centered nutrition and exercise program.

### **Risks/Harms**

The DNP Project offered minimal risk to the participants because there is no manipulation of human subjects. The drafting of policy changes to address the unhealthy stock of the vending machines only required discussion among the principal investigator and the staff at the community organization including the chief executive officer; therefore, there was no risk or harm associated with this aspect of the DNP project. With the nutrition and exercise program, there was the possibility of physical harm occurring during the physical dance activities; however, the likelihood of that happening was minimal. When individuals enrolled in a membership with the community organization, they also sign consent forms releasing the community organization from any liability should an injury occur while on the premises of the

facility. Additionally, there was the chance of one of the participants having an emotional reaction to their involvement in the project related to the weight measurement component. The participant may have felt embarrassed about their weight at the start and end of the community-based, family-centered nutrition and exercise program. To minimize the risk of this occurring, participants were weighed in a private setting away from other participants and individuals who may be on the facility's campus. It is important to note that participation in the exercise and nutrition program was voluntary, and children and their parents who chose not to participate in the program were still able to join in the dance academy. There was also the risk of breach of confidentiality of data; however, this was managed by keeping the confidential data secure in an excel spreadsheet, which was on the personal, password protected computer that was accessed by the principal investigator, with no identifying information. The only person who had access to the data collected in the study was the principal investigator, as this individual maintained the records of anthropometric measurements, survey responses, and attendance.

### **Subject Costs and Compensation**

The costs of the program were minimal. One scale was purchased to be used for all weight measurements for all the youth participants, which helped to maintain the reliability and validity of the data obtained. In addition to the scale that was used to measure weight, a standardized measuring tape was purchased to accurately measure the height of each of the participants. Additionally, a healthy habits questionnaire was used in the study. There is no cost to download these surveys. The other costs that were incurred by the principal investigator were the cost of incentives and rewards to the students. Participants who completed the entire program were rewarded after the program with a ten dollar gift card voucher to purchase fruits and

vegetables at a farmer's market, totaling \$420.00; however, half of the vouchers were given to the principal investigator by the chief operating officer of the community organization.

### **Study Interventions**

In order to address systems level practice changes, the community-based, family-centered nutrition and exercise program was established into the community organization to address obesity prevention practices. Through this program, the facility increased healthy food options by removing unhealthy food options from the vending machines. Additionally, it was important that the organization also partner with the local schools to improve the lunch served to be more health conscious and increased the healthy lifestyle program offerings within the school system. The organization has not fully established this partnership with the school but is something that is looking to be established in the future. The healthy lifestyle program offerings included introducing nutritional elements into extracurricular activities including increasing healthy food choices and education about nutrition. Both of these initiatives coincided with the community-based, family-centered nutrition and exercise program and aligned with the objectives of the project to increase healthy food behaviors and healthy lifestyle program offerings and improve healthy food choices for children attending the organization within the community.

To address the systems level changes that needed to be made in order to adequately address the issue of childhood obesity in the community organization and the surrounding area, the principal investigator for the program met with the key stakeholders to discuss the benefits of changing policy to deal with the products that were currently stocked in the vending machine of the facility. Between the principal investigator, the chief executive officer of the community organization, and other staff of the facility, discussions occurred to discover potential barriers to replacing and restocking the vending machines of the facility. Was it due to the vendor

contracted to stock the machines? Was it financial and not affordable? Was it due to lack of awareness? It was determined through discussion that the organization had little to do with the items that were stocked in the vending machines because the selection was left to the vendor and the staff did not pay much attention to the items that were being stocked. Additionally, discussions took place on how to rectify the situation and replace at least half of the unhealthy snacks and beverages in vending machines and concession stands with healthier food options such as granola bars, protein bars, sugar free or low sugar beverages, etc.

In addition to partnering with the local schools, the organization also partnered with the community including local farms. The partnership with the local farms allowed an agreement with a farmer's market in Trenton, NJ to be established. The placement of a farmer's market in the community provided access to affordable healthy food choices in an area where they were limited before. The partnership with the police department was beneficial because it allowed the organization in conjunction with the police to ensure the farmer's market was patrolled and covered by local police to facilitate safety. Subsequently, through the partnership with local farms, the organization also connected with local convenience stores and bodegas to include fruits and vegetables in their inventory from the local farms. By doing so, this increased the access to healthy food options and aligned with the one of the program objectives of improving healthy food choices. Through the community organization, an increase in healthy program offerings and the partnership with the community to make access to healthy food options easy and affordable, the community has begun the process of a practice change to become a healthier community, which aligned with the overall aim of the project to improve health outcomes and decrease long term complications related to childhood obesity.

Within the city of Trenton, there are only two supermarkets that sell healthier food options; though, the cost of these healthier items can be a bit pricey. However, there are a number of convenience stores and bodegas in the city that do not frequently sell fruits, vegetables, and other healthy food items. To this end, the recommendation was to work with the community organization, other non-profit community organizations, and city officials to establish a partnership with a farmer's market in the city using food sourced from local farms that was affordable to the patrons of the market. By connecting with a farmer's market in the community, it increased access to healthy food and beverage options that were also affordable. Additionally, the stakeholders that were involved in the partnership with the farmer's market also worked to ensure that members of the community organization within certain income requirements received a monthly voucher to purchase items from the farmer's market and also working to one day make Supplemental Nutrition Assistance Program (SNAP) benefits available to be used at the market.

The nutrition and exercise program (Appendix F) was integrated into an already established extracurricular program that provided the physical activity/exercise component of the obesity prevention program. The nutrition program augmented this activity and was conducted weekly for twelve weeks before the start of the activity portion of the class. The program evaluated weight and body mass index by taking height and weight measurements before the beginning of the program for baseline measurements, mid-way through the program, and at the end of the program. In addition to evaluating weight or body mass index, improvement in understanding of healthy habits was also assessed including increased daily servings of fruits and vegetables, reduction of sugary beverages, and decrease in the number of fast food outings per

week. Lastly, improvement in attitudes towards a healthy lifestyle was evaluated from before program participation and at the end of the program using a healthy habits survey.

The project was conducted over the course of twelve weeks. Phase one of the project occurred during week one of the program. During phase one, the initial surveys were completed by both the participating child and their parent. The same surveys were used for both the youth and parent participants with the only difference being the verbiage in the survey questions, with the parents' survey questions asking about the child. Both surveys have ten questions listed and were from the Let's Go campaign which encouraged healthy living in children with a goal of decreasing childhood obesity (Let's Go, n.d.). Since 2006, when the campaign was first introduced in Maine, the reach has spread across the nation and has been introduced in schools, community organizations, churches, and even in some home environments and has been successful. One of the toolkits that are used in the program is the healthy habits survey which gathers information from children about their eating habits including servings of fruits and vegetables, amount of sugary drinks consumed, and amount of time spent in front of a screen (Let's Go, n.d.). Each of the questions were open ended with the response most likely being a number. For example, one of the questions was, how many times a week do you eat breakfast? The respondent answered with a number, such as five. The programs that have used the Let's Go materials and surveys have found value in the healthy habits survey because it helps the leaders understand the current habits of the participants and know where to steer the program focus. It also allowed the program evaluators to identify if any changes in healthy habits have occurred at the conclusion of the course (Let's Go, n.d.).

Reliability refers to the consistency of the measurement. In the case of the survey, a test-retest method was utilized, and the anticipation was that each question will elicit similar

responses, with the hope that the retest showed improvements. For example, when asked how many servings of fruits and vegetables you eat per day, the retest showed a different result than the pretest. In the initial test, the answer may be two and the posttest the answer may be five. However, validity refers to the accuracy of the measurement. The accuracy lies in the ability of the children and their parents to correctly identify the answers to the survey questions. In terms of internal validity, the survey asked questions directly linked to the outcomes needing to be measured. The survey asked questions that determined the habits the participants have that hinder or help their healthy lifestyle, which indicated the internal validity of the study. The external validity correlated to the ability to generalize the survey to the general population. There was external validity present with the survey, because the questions on the survey were universal to the overall population.

The survey measured the outcome to analyze diet and physical activity patterns based on age appropriate national guidelines. The survey provided answers regarding number of times take out is consumed, the intake of sugar laced beverages, servings of fruits and vegetables, hours of screen time, and the amount of time spent in physical activity.

Phase two of the program, was the intervention itself, which took place beginning week one of the program. The specific components of the interventions of the study included nutritional education and demonstration, physical activity, and behavioral component. The nutritional element of the DNP project provided knowledge about the importance of eating nutritious foods and limiting the amount of unhealthy food consumption people indulge in. Also included was education on cost-effective ways to shop for healthier food options, food demonstrations on healthier meals and snacks to prepare and samples of fruits and vegetables to take home. The nutritional workshops were conducted by the principal investigator each week of

the study. The material for the nutrition workshops was all evidence-based research obtained from the Let's Go Campaign and from the literature review (Let's Go, n.d.). The seminars were held for fifteen minutes before the start of dance class each week. In total, there were twelve nutrition workshops that were delivered using mostly visual aids to help the children and their parents gain a better understanding of the concepts. The physical activity element of the program was the dance class that the child was enrolled in. The dance academy offered classes of ballet, tap, hip hop, and modern. All children were enrolled in at least one class while most participated in two or more classes. As a part of the requirements for the obesity prevention program, the dance classes were held for at minimum forty-five minutes each week after the instructional nutrition lesson. Both the nutritional element of the program and the activity portion helped measure several outcomes including increasing knowledge of healthy food behaviors by April 2020 and increasing healthy food behaviors by providing fruits and vegetables to the participants every two weeks.

Lastly, sessions were held at the dance school with the parents and their children, where the participants engaged in the discussion of behavioral modifications based on the results of the survey completed at the beginning of the study. The lessons were geared towards adjusting mindset and attitudes so that maintaining a healthy lifestyle becomes habitual including role modeling for the parents, decreasing the amount of screen time a child is subjected to and making being healthy and active fun rather than a burden. The material for the behavioral modification lessons was derived from the Let's go campaign (Let's Go, n.d.). This intervention helped measure the program outcome to improve participant attitude and mindset towards a healthy lifestyle.



After completion of the implementation aspect of the program, phase three occurred where the post-surveys and final anthropometric measurements were collected. For the participants who completed majority of the program, they received a ten-dollar gift certificate voucher to be used at a local grocery store. Following this, the data was analyzed to provide feedback to the community organization on the success of the program. The organization agreed to increase healthy food behaviors and healthy lifestyle program offerings by incorporating a nutrition and exercise program into the programming at the facility. In doing this, the systems-level outcome measures were addressed which were to improve healthy food choices for children attending the facility's program offerings by providing healthier lunch and snack options instead of unhealthy foods that are readily available.

### **Outcomes Measured**

The short-term outcomes of the project were to analyze the current diet and physical activity patterns of the participants and determine the barriers to adjusting the vending machines and creating a farmer's market. The medium-term outcomes were to work with stakeholders to create policy changes regarding the provision of healthy food options sold in vending machines, the partnership with a farmer's market. Additionally, medium-term outcomes included collecting participants' measurements and questionnaire answers to determine if there were changes from baseline data, as well as evaluating the effectiveness of the nutrition and exercise program in terms of weight, BMI, and improvement in healthy habits and behaviors. It was anticipated that the long-term outcome for this intervention would include improving health outcomes and decreasing long term complications related to childhood obesity within this community by increasing access to healthy foods and adopting a healthy lifestyle.

### **Project Timeline**

The community-based, family-centered nutrition, and exercise program took place over twelve weeks (Appendix G). The participants were recruited during the dance school registration day on September 7, 2019. The program started the following week on September 16, 2019 and ran until December 9, 2019. The mid-program check-in took place the week of October 21, 2019. Throughout the duration of the nutrition and exercise program, the principal investigator also worked with the community organization's staff and stakeholders to address the proposed policy change for the vending machine and concession stands, as well as, the implementation of a farmer's market in the community.

### **Resources Needed**

As discussed previously, few resources were needed to conduct this project. What was required was a scale, tape measure for waist circumference, and a tape measure for height. In addition to those resources, healthy habits surveys were also necessary for the pre and post data collection. Fruits and vegetables were dispensed to the participants bi-weekly as an incentive for continuing participation in the program. A local farmer's market agreed to supply various fruits and vegetables throughout the duration of the program; therefore, no out of pocket cost was required of the principal investigator for the purchase. After the program, gift card vouchers in the amount of ten dollars were provided to the participants that completed all facets of the program. The principal investigator purchased these vouchers.

### **Evaluation Plan**

To evaluate the effectiveness of the DNP Project, a logic model was used (Appendix H). A logic model is a successful tool used for program planning and implementation. It is a visual

description of the program identifying the project and its intended accomplishments (Hayes, Parchman, and Howard, 2011). Included in the logic model were the short, medium, and long-term outcomes regarding the system level interventions to address obstacles to achieving a healthy lifestyle within the community organization. The interventions included the community-based, family-centered nutrition and exercise program. The short-term outcome of this intervention was to analyze the current diet and physical activity patterns of the participants of the community-based, family-centered nutrition and exercise programs at the community organization. The medium-term outcomes were to gather and analyze the data necessary to effectively evaluate the system level barriers to addressing childhood obesity in the community and to evaluate the implementation of the nutrition and exercise program including weight, BMI, and improvement in healthy habits and behaviors. Lastly, the short and medium-term goals will contribute to accomplishing the long-term goal, which was to improve health outcomes and decrease long term complications related to childhood obesity within this community using a systems level approach by introducing affordable and accessible healthy food options in the community.

### **Data Analysis, Maintenance, and Security**

Data collected to evaluate the impact of this intervention was analyzed using Statistical Package for the Social Sciences (SPSS) software. The BMI and weight data were analyzed using a repeated measure Analysis of Variance (ANOVA) test. Differences in daily servings of fruits and vegetables, consumption of sugar-laced beverages, hours of active play, hours of screen time, and number of fast food outings per week, before and after the program were evaluated using the paired t-test method of analysis. The data was collected from the survey responses at the start of the program and again at the end of the program. Differences in attitudes towards a

healthy lifestyle for the youth participants were also evaluated using a paired t-test utilizing the same answers from the survey by both youth and parental participants. All collected data was maintained in a Microsoft Excel Spreadsheet on a password protected computer. There was no personally identifiable information for each of the participants. Each participant was assigned a number to link the pre and post survey information as well as the pre, mid, and post weight data. This allowed the participant's data to remain anonymous.

Achieving statistically significant data was determined using the probability level of  $p < 0.05$ , which indicates less than a 0.05% probability that the results occurred by chance and suggests with 95% certainty that the results directly occurred in response to the program interventions. The analyses were performed to measure the results of the pre-test and post-test scores to assess if changes were identified from baseline and if anthropometric changes are related to the program intervention. Comparative analyses were performed using pre- and post-intervention data.

### **Statistical Analysis**

All data collected was stored in excel in a spreadsheet on a password-protected computer. The principal investigator completed the data entry and management of all data. Data entry was examined twice on two separate occasions by the principal investigator. The community organization dance school has a strict attendance policy that parents sign when they enroll their child(ren) in the school. The attendance policy states that if a child misses three consecutive classes without notice, they are no longer able to participate in that class. As a result of this policy, the attendance of program participants was consistent, with only a few students missing a few sessions. Therefore, anthropometric data and survey answers were able to be collected from all participants. However, there was some missing data from the parent surveys. There were

three questions left blank on three different surveys that were completed by the parents. Those missing data answers were not included in the statistical analysis.

Statistical analysis was performed using SPSS data software. Data was collected using a pre-test/post-test format. The SPSS system was used to compare pre-post intervention differences, including food and physical activity behaviors. Additionally, the SPSS system was used to compare anthropometric data obtained pre, mid, and post-intervention. SPSS is an analytic data software used to run statistical analysis on collected data. The BMI and weight data were analyzed using an analysis of variance test. Additionally, the SPSS software was used to run a paired t-test analysis on the data retrieved from the questionnaire.

## **Measures**

Surveys were used in an effort to determine the effectiveness of this curriculum on healthy lifestyle behaviors. There was one survey, 5-2-1-0 Healthy Habits Survey, used for evaluation, which was developed by Let's Go 5210, an organization that works with communities to implement evidence-based strategies that support healthy lifestyle choices to prevent obesity. The survey was used to evaluate diet and activity patterns in the participants from both their viewpoint and that of their parent or guardian. Surveys were distributed at the beginning of each dance class only to the students who assented to participate in the study. Additionally, anthropometric data were collected for each student before the intervention started, midway through the intervention, and collected upon completion of the intervention.

## ***Anthropometric Data***

Anthropometric data including weight, height, waist circumference, and body mass index (BMI) was collected from each of the forty-two participants. The principal investigator collected

all data. The data was then stored in a password-protected laptop, that only the principal investigator had access to. Weight was collected using a digital scale that measured weight in both pounds and kilograms. Height was obtained from each participant using a wall-based growth chart with measurements in inches and centimeters. Waist circumference was measured using a body tape measurer in inches. BMI was calculated using the formula  $703 \times \text{weight (lbs.)} / (\text{height (in)})^2$ . The principal investigator completed the BMI calculations. Accuracy of the calculations was conducted using a BMI calculator app that was installed onto the tablet of the principal investigator.

### ***Physical Activity and Sedentary Time***

The instrument used to evaluate physical activity behaviors was the evidence-based survey from the Let's Go 5210 program. There has been no known documentation on the reliability and validity of the instrument used in the study. However, in terms of validity, the surveys measured what is supposed to be measured, which is diet and activity patterns. Regarding reliability, the survey was consistent in its questions as they did not change throughout the study. The survey measured physical activity and sedentary time through the self-report questions including hours in active play per day and hours of screen time per day. The data was obtained before initiation and upon completion of the project.

### ***Food Behaviors***

The instrument used to evaluate food behaviors was the same survey from the Let's Go 5210 program. The survey measured food behaviors based on the questions servings of fruits and vegetables per day, the number of fast-food or take out outings per week, and the number of sugary drinks consumed in a day. The same instrumentation was used; therefore, reliability and

validity were the same as above. The data was obtained prior to initiation and upon completion of the project.

## **Results**

Children and parents who were members of the community organization dance school were enrolled in the study. Parental consent was obtained for each parent and child participant. Parents self-reported parent and child age, gender, and ethnicity (See Appendix I: Table 1). There was a total of 42 participants in the study between the ages of eight and twelve and 42 parents or guardians. There were eleven participants at the age of 8 (26.2%), nine participants at the age of 9 (21.4%), eight participants at the age of 10 (19%), nine participants at the age of 11 (21.4%), and five participants at the age of 12 (11.9%). All but one of the participants were female (97.6%). Majority of the participants identified as African American, 95.2%. The remaining two participants identified as Hispanic, 4.8%.

### **Anthropometric Data**

Baseline data was collected from all child participants in the form of anthropometric measurements including height, weight, and waist circumference. No anthropometric data was collected from the parent participants. The height and weight were used to calculate each participant's BMI (See Appendix I: Table 2). At baseline, 69% (n=29) of the participants had a normal BMI. Normal BMI is considered anything less than 25. Overweight BMI is between 25 and 29, and approximately 12% (n=5) of participants were in that category. Lastly, a BMI greater than or equal to 30 were considered obese, 19% (n=8) of participants fell into that category.

To evaluate objective 2, repeated-measures ANOVA analysis was performed on pre-intervention, mid-intervention, and post-intervention data to determine if the implementation of

the intervention improved the participant's anthropometric measurements. While none of the participants moved from overweight or obesity BMI to a normal BMI, several participants did experience a change in their weight. The percentage of participants that experienced a weight decrease was 42.8% (N=18). The percentage of participants who exhibited a decrease in BMI was 23.8% (N=10).

The ANOVA analysis was conducted to evaluate changes in weight and BMI over the twelve-week program. The test was run to compare each participant's weight at three different time intervals; 0-week, 6-week, and 12-week and revealed a p-value of 0.891. The analysis of weight data did not show statistical significance based on the implementation of the intervention. The analysis of the participant's BMI at three different time intervals revealed a p-value of 0.005 which did identify statistical significance based on the intervention (See Appendix I: Table 3).

### **Physical Activity and Sedentary Time**

For objective 1, paired t-test analysis was performed on pre-intervention and post-intervention data to determine if the implementation of the intervention improved the physical activity patterns of the participants (See Appendix I: Table 4). One of the items examined was the number of hours involved in active play each day. The percentage of participants that reported an increase in the hours in physical activity was 80.9% (N=34). The number of parents of participants that reported an increase in the hours of physical activity was 25 (59.5%) (See Appendix I: Table 5). Both items revealed statistical significance, p-value less than 0.001, for both participants and parents (See Appendix O).

Another item that was examined was the hours of screen time per day. The percentage of participants that reported a decrease in the hours of screen time each day was 78.5% (N=33). The



number of parents of participants that reported a decrease in the hours of screen time was 25 (59.5%) (See Appendix O). Both items revealed statistical significance, p-value 0.001 and 0.006, respectively.

For objectives 2 and 3, the implementation of the intervention will improve the participant's attitude and mindset towards a healthy lifestyle, a paired t-test analysis was performed on pre-intervention and post-intervention questionnaire answers (See Appendix I: Table 4). Based on the analysis, the number of participants that reported a change in their attitude and mindset towards a healthy lifestyle was as reported above 80.9% and 78.5%, respectively.

### **Food behaviors**

For objective 1, the implementation of the intervention will analyze the diet patterns of the participants, a paired t-test analysis was performed on pre-intervention and post-intervention data (See Appendix I: Table 4). One item examined was the servings of fruits and vegetables consumed each day. The percentage of participants that increased the servings of fruits and vegetables per day was 95.2% (N=40). The number of parents of participants that reported an increase in the servings of fruits and vegetables per day was 34 (80.9%) (See Appendix I: Table 4). Both items revealed statistical significance, p-value less than 0.001 for both participants and parents.

Another item examined was the number of fast food or take out outings per week. The number of participants that reported a decrease in the number of outings per week was 30 (71.4%). The percentage of parents of participants that reported a decrease in fast food outings per week was 66.6% (N=28) (See Appendix J). Both items revealed statistical significance, p-value 0.021 and 0.007, respectively.

A final item examined was the number of sugary beverages per day. The number of participants that reported a decrease in sugary drinks was 30 (71.4%). The percentage of parents of participants that reported a decrease in sugary beverages was 73.8% (N=31) (See Appendix J). Figures 1-5 in Appendix J represent a breakdown of the pre and post-intervention participant responses for each questionnaire question. Both items revealed statistical significance, p-value less than 0.001 for both participants and parents.

### **System-Level Changes**

To evaluate objectives four and five, the intervention worked to increase healthy food behaviors and lifestyle program offerings, as well as, increasing healthy food choices options. This was by the biweekly distribution of fruits and vegetables to participants of the nutrition and exercise program, the restocked vending machines with healthier food items, and the new partnership with a newly established Farmer's Market, located in the community of Trenton, NJ. The market located on Greenwood Avenue in Trenton, NJ, was the brainchild of the New Jersey Partnership for Healthy Kids. The market opens every Monday from June to October. Now with the partnership with the community organization, members can receive vouchers to the market. Historically, every year in April community organizations across the country host Healthy Kids Day. It is a program that has local vendors, demonstrations, games, and activities for children. Through discussion with the stakeholders at the facility, it was recommended that some of the vendors from the Farmer's Market participate in Healthy Kids Day to provide more healthy food offerings at the event and advertise what is available at the farmer's market. Therefore, the community organization's Healthy Kids Day will have farmer's market vendors.

Additionally, the restocking of the vending machines improved healthy food choices and lifestyle offerings for members of the community organization, by providing them with the opportunity to make healthier snack choices when visiting the facility. Previously, the vending machine were stocked with chips, crackers, candy, sugary drinks. The vending machine still has chips and candy, but now contains items such as granola bars, nuts, pretzels, and popcorn.

### **Study Aims Alignment**

There was a great deal of alignment between the study aims and the outcomes that were measured. One of the outcomes was to analyze the current diet and physical activity patterns of participants to determine barriers that may hinder the restocking of the vending machines and partnering with a farmer's markets in the city. The outcome aligned with the study objective to increase healthy food behaviors and increase healthy food options for members of the community organization. The second outcome was to work with stakeholders to create policy change regarding the provision of healthy food options sold in the vending machines and farmer's markets as well as collecting measurements and survey answers of participants. This outcome aligned with the study's aims of analyzing diet and physical activity patterns based on age-appropriate guidelines, increasing knowledge of healthy food behaviors, and increasing healthy lifestyle program offerings. Another outcome was to improve health outcomes and decrease long term complications. This was accomplished through the study aim of increasing healthy food behaviors, improving participant's knowledge of healthy food, and creating more sustainable healthy food options.

### **Discussion**

The implementation of this community-based, family-centered nutrition and exercise program increased knowledge of healthy food behaviors and improved participant's attitude and mindset towards a healthy lifestyle. Overall, implementation of the nutrition and exercise program resulted in statistically significant improvements in the BMI of the participants. The implementation of the program also resulted in significant changes in healthy food and lifestyle choices including increase in fruits and vegetables and a decrease in sugary drinks. At the systems level, there was an increase in healthy food choices for the children attending the facility's program offerings through the adjustment of the products in the vending machines. Availability of the fruits and vegetables were also increased to the members of the community organization through the provision of vouchers to a new farmer's market within the community.

### **Study Limitations**

One limitation of the study was the use of self-reported surveys for data collection. The respondents were estimating their response to the survey questions at baseline and then again after the education to compare the survey answers. Self-reported answers from the participants could possibly be over or underestimated. Participants may also be embarrassed to report the true answers to the survey questions. The study was completed over the course of twelve weeks. It may have been beneficial to implement the intervention over a longer period of time to determine if there were more changes noted in the healthy habits survey or more changes noted in the anthropometric data over a longer study duration. Additionally, the sample size of forty-two participants was sufficient to collect data and conduct statistical analysis for the study. However, additional research on a larger sample size may be warranted to determine if statistically significant results are found with a larger participant population.

### **Implications for Practice**

The concluding result of this project was to provide a way to fight pediatric obesity through the implementation of a nutrition and exercise program within a community organization. The information and findings obtained from the study offered the importance of education to providers and community organizations to help alleviate the prevalence of childhood obesity. It was also of vital importance to include the parents in the nutrition and exercise program because parental involvement helped reinforce the lessons that were a part of the curriculum. The information has the potential to change current practices within primary care provider offices, schools, and community organizations. Results of the study provide valuable resources for providers to link their youth patients at risk for or found to be overweight or obese with community organizations offering nutrition and exercise programs. Additionally, schools and provider offices can work to develop their own nutrition and exercise programs to help combat the incidence of childhood obesity in communities.

### **Implications for Healthcare Policy**

The study can be used as a tool to amend healthcare policy and address gaps in practice. A policy brief based on the study can be useful to reach influential legislators, increasing the opportunities to receive funding for programs targeting childhood obesity and reducing the incidence. Previous studies have shown and demonstrated that knowledge of managing pediatric obesity is essential to ultimately decreasing the burden of childhood obesity on the children, their families, and the economy. Policies can be initiated that provide resources to providers on evidenced-based guidelines in the care of obese and overweight children including involvement in a nutrition and exercise program. In addition to policies geared towards providers, policies can

also target the school system, employing educators to establish nutrition and exercise programs to combat the incidence of childhood obesity from the perspective of the school system. Because as studies have shown, pediatric obesity is a complicated issue that requires a multi-faceted approach to handle such a vast issue.

### **Implications for Executive Leadership**

The results of the study can be used by leadership and administrators to implement similar program offerings in their community organizations. As mentioned, the community organization that hosted the nutrition and exercise program has already adopted the program as part of the curriculum in some of their extracurricular programs. Leadership within the community organization through the implementation of the nutrition and exercise program can adhere to their mission of “being a valuable asset in the community, our children, promoting healthy living and fostering a strong sense of social responsibility” (YMCA, n.d.) Other community organizations and schools can adopt the same or similar programs within their facilities to support childhood obesity prevention and foster healthier communities.

### **Plans for Sustainability and Future Scholarship**

The partnership with the farmer’s market, connections with the local bodegas and convenience stores, and the restocking of the vending machines have all contributed to the sustainable changes within the community. Having addressed some of the systems level needs within the community, the participants and members of the community now have increased access to healthy food offerings through the farmer’s market and restocked vending machines. Additionally, participants and members of the community have increased access to healthy program offerings through the organization with the implementation of the nutrition and exercise

program within the dance school. Though there are several system level issues that need to be addressed in communities including safety, education, access, and affordability. Education, access, and affordability were addressed in this study through the implementation of a nutrition and exercise program that provided education, as well as the establishment of a partnership with a farmer's market. Future research may target other systems level concerns such as safety and continuing to make obtaining a healthy lifestyle more accessible.

### **Conclusion**

As a means of addressing the obesity concerns of the pediatric population in the community organization of Trenton, NJ, a community-based, family-centered nutrition and exercise program was a needed component to the current program offerings. In addition to addressing the abundance of unhealthy food options in the community through the partnership of a farmer's market in the city and policy change to restock the vending machines and concession stands. It was essential that children understand the factors that contribute to a healthy lifestyle, including exercise and nutrition and have the resources within their community to be able to attain it. Through the integration of an obesity prevention program into the dance school of the community organization, participants were educated on nutrition and physical activity and pledged to improve their nutrition lifestyle. Upon data collection, evaluation of improvement in healthy habits, weight and BMI, and attitudes towards a healthy lifestyle were conducted, to determine if implementation of this project was effective. Throughout the program, efforts were made to create sustainable change through the facilitation of policy changes and a farmer's market in the community. After the evaluation of the project, the findings were disseminated, and plans put in place to sustain this practice change at the community organization to ultimately improve the health outcomes of the children in the community.

A combined effort of nutrition education and physical activity programs within the community has been proven as an effective way to combat the incidence of childhood obesity. Efforts to provide knowledge are beneficial to individuals and families for them to have their own awareness and understanding to make better informed decisions. What a child learns at home, school, and in the community about healthy eating, physical activity, and making appropriate healthy lifestyle choices overflow into every aspect of their life and translate into their adult life. Programs geared towards these efforts have the greatest impact on the children and their families and have the potential to produce the greatest long-term impact. Focusing on these resources may, over time, reduce pediatric obesity, leading to a healthier community overall, improving health outcomes for the children and families in the community.

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**Appendix A: SWOT Analysis**

	Helpful To achieving the objective	Harmful To achieving the goal
Internal Origin	<p style="text-align: center;"><b>Strengths</b></p> <ul style="list-style-type: none"> <li>● Dedicated and passionate team members (CEO, Director, Teachers, Staff, Students)</li> <li>● Already established programs such as Dance Academy with committed students, where many of the youth are observed to be overweight</li> <li>● Commitment to healthy lifestyles exemplified by staff and program offerings</li> <li>● Strong presence in community and support from community leaders and members</li> </ul>	<p style="text-align: center;"><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>● Lack of sufficient space to host multiple programs at once</li> <li>● Lack of commitment from parents of enrolled children</li> <li>● Located in an impoverished community with a poorer population which is sometimes unable to afford certain services</li> <li>● Lack of access to healthy option grocery stores/markets</li> </ul>
External Origin	<p style="text-align: center;"><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>● Opportunity for new programs such as obesity prevention program</li> <li>● Opportunity to partner with other community organizations to increase healthy food options in the community such as establish a Farmer's Market at the facility</li> <li>● Opportunity to expand reach into the community with added services</li> </ul>	<p style="text-align: center;"><b>Threats</b></p> <ul style="list-style-type: none"> <li>● Lack of consistent involvement from the city, participate in a program for a short duration of time</li> <li>● Lack of regular involvement from parents who have children participating in programs</li> <li>● Lack of funding from the program director, who because of budget</li> </ul>

<b>(Problem)</b>	<b>(SWOT Analysis to identify a specific problem, list it here)</b>
<p><b>Strengths:</b></p> <ul style="list-style-type: none"> <li>● What is your organization’s greatest strength?</li> <li>● Do you consider your organization leadership team strong? Why?</li> <li>● What does your organization offer to its employees that make it worthwhile to belong to your organization? What’s in it for them?</li> <li>● Are your colleagues active and engaged?</li> <li>● Additional strengths</li> </ul>	<ul style="list-style-type: none"> <li>● The greatest strength is the organization’s ability to provide a much-needed service to the people in the community including a safe place for their children to engage in learning and activities, a place of worship, a place for healthy activities such as fitness for the whole family.</li> <li>● There is a strong leadership team in place. Each department has a knowledgeable leader who possesses the skills necessary to not only lead but to run that department well, such as the Dance School Director.</li> <li>● The facility offers employees the opportunity to become invested in the community. The facility offers several community programs and provides its employees with the opportunity to utilize the facilities at no cost. One of the programs that is orchestrated by the employees is Healthy Kids Day, which has become an annual event.</li> <li>● Many of the employees develop a sense of pride in their community and frequently travel in the city and schools offering the services of the organization.</li> </ul>
<p><b>Weaknesses:</b></p> <ul style="list-style-type: none"> <li>● What is your organization’s biggest weakness?</li> <li>● What can be improved?</li> <li>● What necessary expertise/manpower do you currently lack?</li> <li>● Does your organization have adequate resources for this project?</li> <li>● Additional weaknesses</li> </ul>	<ul style="list-style-type: none"> <li>● The greatest weakness for the community organization is the lack of space available for participants. The facility has two campuses, one where the dance academy and some fitness classes are located. The other campus houses the basketball court and pre-school classrooms. There is not much available space for outside play; however, expansion plans are being discussed.</li> <li>● An issue that can be improved is the lack of parental involvement. For many of the programs, the parents tend to drop their children off and then return when the activity is over, which makes it challenging to involve the parents in their child's activities.</li> <li>● The facility lacks the expertise of a registered dietician that was utilized when the New Jersey Partnership for Healthy Kids used the facilities of the Y. This organization is no longer active, but the facility still provides healthy living programs to the community.</li> <li>● Despite the lack of space, the organization does have adequate resources for the project as it will take place inside the Dance Academy building where many of the children spend time throughout the week. There is enough staff to help with the project, therefore it is not a weakness.</li> </ul>
<p><b>Opportunities:</b></p> <ul style="list-style-type: none"> <li>● What is your organization’s greatest opportunity?</li> <li>● What environmental trends might impact your organization?</li> <li>● What external changes or factors present exciting opportunities?</li> <li>● Additional opportunities</li> </ul>	<ul style="list-style-type: none"> <li>● One of the most exceptional opportunities the organization has is to increase the reach into the community is to add more family-based programs into their services such as healthy living programs and family activities, some of which already exist at the facility such as Healthy Kids Day.</li> <li>● An environmental trend that impacts the organization is achieving a healthier lifestyle. The facility has been campaigning for healthy kids and healthy communities through 5K walks, fitness classes,</li> </ul>

	<p>healthy kids’ day, and lifestyle coaches. Though these services are already in place, the organization can expand them and make them more appealing for families to attend.</p> <ul style="list-style-type: none"> <li>● External factors that present exciting opportunities are the lack of stores to purchase nutritionally sound food exist in the city. The organization has helped to introduce healthy food groups within the facility but could partner to achieve this outside of it.</li> </ul>
<p><b>Threats:</b></p> <ul style="list-style-type: none"> <li>● What is your organization’s biggest threat?</li> <li>● What obstacles do you face?</li> <li>● What are other organizations doing that yours is not?</li> <li>● What challenges can be turned into opportunities?</li> <li>● Are external economic forces affecting your organization?</li> <li>● Additional threats</li> </ul>	<ul style="list-style-type: none"> <li>● The biggest threat to the organization is lack of involvement from the community despite the numerous resources and services the organization offers.</li> <li>● Lack of commitment from parents is the biggest obstacle faced for this program because some parents agree to be involved with their children, but they fail to show up when required.</li> <li>● Other organizations like the community organization offer similar programs. Other organizations are using the more space they have to their advantage as they can provide more and larger scale programs. However, the facility makes good use of the space available but is limiting.</li> <li>● Challenges that can be turned into opportunities include the lack of parental commitment; an incentive can be offered to encourage parents to participate.</li> <li>● Currently, there no economic forces affecting the organization because it is a non-profit organization, and the resources and facilities are maintained through donors and the membership dues. Additionally, the program will be of no cost to the participants because it will be available to the students and their parents who are already enrolled in the dance school.</li> </ul>
<p><b>What needs to happen to ensure your organization’s health and success?</b></p>	<p>To ensure the organization's health and success, the facility must continue to offer services to the community that foster healthy living, engage in social responsibility, and uplift the children. This program will add to the value of the facility in allowing the organization to continue its impact in the community.</p>



**Appendix B: Literature Review Table**

<b>Article #</b>	<b>Author &amp; Date</b>	<b>Evidence Type</b>	<b>Sample, Sample Size, Setting</b>	<b>Study findings that help answer the EBP Question</b>	<b>Observable Measures</b>	<b>Limitations</b>	<b>Evidence Level &amp; Quality</b>
1	Siegel, R., Pitner, H., Kist, C., et al. (2014)	Quasi-experimenta 1	Children ages 9-13,  Twenty-eight children obtained informed consent.  21 of the 28 had two height and weight measurements obtained.  Greater Cincinnati YMCA	Participants enrolled in a comprehensive program for nutrition and exercise have more considerable clinically significant changes.  One weekly exercise session and one monthly nutrition workshop with a registered dietician	Changes in weight and BMI pre and post-program involvement  62% of participants had a clinically significant reduction in BMI, though not statistically significant  A significant change in BMI z-score overall (p=.035)	Small sample size due to lack of informed consent  No long-term results recorded.  Small sample size contributes to limits evidence of the statistical significance	Level II  Good quality

<p>2</p>	<p>Duggins, M., Cherven, P, Carrithers, J., et al. (2010).</p>	<p>RCT</p>	<p>83 families enrolled. 17 excluded 30 children in the control 36 children in treatment</p> <p>Patients and families recruited from 2 family medicine clinics and a specialty clinic in Wichita, KS.</p> <p>Children between ages 5 to 17 with BMI 85<sup>th</sup> percentile or higher</p> <p>A local YMCA in Wichita, KS.</p>	<p>Weight loss program targeting both physical activity and healthy nutrition are beneficial to weight loss.</p> <p>Nutrition education alone can also be beneficial</p> <p>Will free membership to YMCA improve participation in physical activity and nutritional classes versus receiving educational materials from We Can and nutrition</p>	<p>Changes in weight noted throughout the 12-month study for those who visited consistently</p> <p>No statistically significant difference between the control or intervention group in weight loss or BMI changes (3 participants in the control group experienced weight loss and 5 in the intervention group)</p> <p>The intervention group (free one-year YMCA membership), only 27 families visited the YMCA during the one year with an average of five visits.</p>	<p>Unexpectedly low enrollment in the program</p> <p>Lack of attendance and consistency with visits to the YMCA to engage in physical activity or participate in the nutritional education class.</p> <p>No evidence to support the benefits of receiving free year membership to YMCA on increased physical activity and improved healthy eating habits</p>	<p>Level I</p> <p>Good quality</p>
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				<p>classes to facilitate healthy eating and living habits</p>	<p>(Relationship between the # of visits and weight loss was small but positive; however, not statistically significant (p=.29).</p> <p>Only 30% of the control group attended at least one nutritional sessions (median of 2 classes), and 67% of the treatment group attended at least one class (average of 3 classes)</p>		
3	<p>Schwartz , R., Vitolins, M., Case, D., et al. (2012).</p>	<p>Quasi-experimenta l</p>	<p>59 children recruited and met criteria for eligibility</p> <p>Twenty-five children ages 6-8 and 34 ages 9-11.</p> <p>Thirty-two were African American, 22</p>	<p>Incorporating physical activity and healthy eating behavior can impact the knowledge about obesity prevention as well as show</p>	<p>Screen time, hours of weekly physical activity, and healthy eating habits</p> <p>Significant changes in BMI at 3 and six months,</p>	<p>Small sample size (29% dropout rate from baselines until 12 months)</p> <p>Another limitation is only offering nutrition education to parents; children were not</p>	<p>Level II</p> <p>Good quality</p>

			<p>Caucasian, and 5 Hispanic.</p> <p>Four YMCAs in North Carolina</p>	<p>positive changes in weight</p> <p>In addition to physical activity and healthy eating, modifying the amount of screen time is also beneficial</p>	<p>but not at 12 months (p=0.001 and p=0.0017)</p> <p>The decrease in sugary drinks at 3 and 12 months (p=0.05 and 0.02).</p> <p>Increase in physical activity at 2 and 12 months (p=0.01 for both)</p> <p>Increase in servings of daily fruit at 12 months (p=0.01).</p> <p>The decrease in screen time at three months but not 12 months (p=0.01 and p=0.11)</p>	<p>included. Some participants believed it would have been more useful to include the children as well.</p>	
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<p>4</p>	<p>McCormick, D., Ramirez, M., Caldwell, S, et al. (2008).</p>	<p>Quasi-experimental</p>	<p>70 total participants: 35 matched control group and 35 in intervention group</p> <p>Children ages 8-13 with 51% Hispanic, 20% African American, 23% Caucasian, and 6% Asian.</p> <p>YMCA in Galveston, TX</p>	<p>Involvement in physical activity and nutritional education program has positive implications for changes in weight</p> <p>Students enrolled in the Fun 2 Fit program at the YMCA, which included physical activity, nutrition, and behavioral counseling experienced less weight gain over the study period, 43%. As opposed to the control group which had a</p>	<p>Changes in weight, specifically weight gain which this study measured</p>	<p>The short duration of the study</p> <p>Does not discuss the benefit of healthy eating classes</p>	<p>Level II</p> <p>Good quality</p>
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				weight gain of 0.62±0.39 versus the intervention group 0.28±0.75			
5	Gentile, N. et al. (2018).	Quasi-experimenta 1	<p>Sample Size: 42 total: 15 children and families in the intervention group and 27 children and families in the control group.</p> <p>YMCA in Rochester, MN</p> <p>Four-month program with cooking classes, physical activity classes</p>	<p>Using insight from the Let's Go 5-2-1-0 to develop their obesity prevention program</p> <p>Use of pre and post surveys and questionnaires including Modified Healthy Habits Survey and 5-2-1-0 knowledge acquisition for study data</p>	<p>42.9% of participants showed improvement in sugary drink intake and servings of fruits and vegetables</p> <p>21.4% had an improvement in the number of sugary drinks consumed</p> <p>No significant difference in BMI or weight within and between intervention and control</p>	<p>Small sample size makes it difficult to replicate on a larger scale with more participants. Small sample size limits the ability to recognize significant changes in the results.</p>	<p>Level II</p> <p>High quality</p>

<p>6</p>	<p>Sallinen, B., Schaffer, S., &amp; Woolford, S. (2013)</p>	<p>Qualitative</p>	<p>34 interviews completed: 19 parents and 15 children</p> <p>Children ages 7-11 63% African American, 26% Caucasian, 11% other</p> <p>Ann Arbor, Michigan YMCA</p>	<p>Surveys through telephone interviews to identify the perception of children and their families to obesity program</p> <p>The interviews conducted determined the perception of the exercise, nutrition, and behavioral components of the program, which were all favorable.</p> <p>Additionally, it examined individual session, self-monitoring activities, and</p>	<p>Perception and satisfaction were rated for:</p> <p>Physical activity, nutrition, behavior, self-monitoring, and weight checks</p>	<p>Small sample size</p> <p>Based on one weight management program</p>	<p>Level III</p> <p>Good Quality</p>
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				<p>weekly weight checks. Most respondents agreed that the different sessions were helpful but wished they were longer. The daily logs (self-monitoring) was beneficial but, and the weekly weight checks were useful but could be embarrassing.</p>			
7	Butte, N., et al. (2017)	RCT	<p>Total: 549 Hispanic and African American Children ages 2-18 divided into three different age groups</p> <p>Ages 2-5:</p>	<p>Program in a community-based organization can be more effective than in primary care office</p>	<p>No statistical change in percentage of BMI change for age group 2-5.</p>	<p>Barriers to participation, such as transportation, scheduling, and costs.</p> <p>These barriers contribute to the retention of participants</p>	<p>Level I</p> <p>High Quality</p>



			<p>60 in the comparison group and 100 in the intervention group</p> <p>100 intervention</p> <p>Ages 6-8:</p> <p>68 in the comparison group and 113 in the intervention group</p> <p>Ages 9-12:</p> <p>106 in the comparison group and 102 in the intervention group</p> <p>YMCAs in Austin and Houston, Texas</p>	<p>The study utilized MEND (Mind, Exercise, Nutrition, Do It) and CATCH (Coordinated Approach to Child Health) programs.</p> <p>MEND2-5 was used for the age 2-5 group.</p> <p>MEND/CATC H6-12 was used for the age groups 6-8 and 9-12.</p> <p>MEND program is based on nutritional science and learning, exercise, and social</p>	<p>-2.32 change in percentage BMI for age 6-8</p> <p>-2.59 change in percentage BMI for age 9-12</p> <p>Completion of a survey entitled Next Steps to ascertain the nutrition and physical activity understanding of parents and children participants</p>	<p>throughout the 12-month duration and the number of participants who complete the full program</p>	
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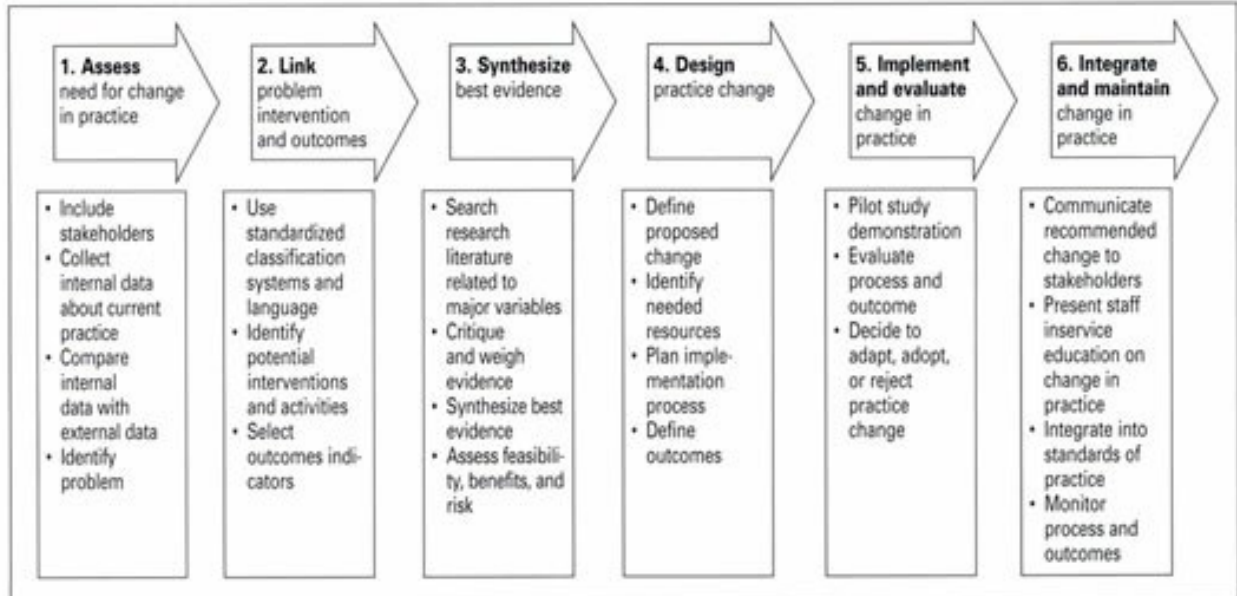
				cognitive theories.			
8	Grow, H., Hencz, P. (2014).	Mixed Methods	<p>134 families qualified and enrolled in the study with 144 children participating</p> <p>Children ages 8-14 years</p> <p>21% African American, 27% Hispanic 56% Caucasian families</p> <p>61% had a household income of less than 61%</p> <p>11 YMCA site within Greater Seattle</p>	<p>Less focus on weekly weights and more emphasis on achieving lifestyle modifications</p> <p>The program can be sustained if working with the staff at the YMCA and encouraging them to participate.</p>	<p>Knowledge attainment, lifestyle modifications via self-report</p> <p>Children's attitude about eating fruit and vegetables improved from 4.0 to 4.2 on the Likert Scale.</p> <p>Children reported more activity in sports 49.5% to 59.6%</p> <p>Children reported a decrease in screen time, 13.1% to 20.2% (p=.11,</p>	<p>Lack of comparison Group</p> <p>Reliance on self-report rather than objective data</p>	<p>Level III</p> <p>Good quality</p>

					<p>almost statistically significant.</p> <p>Statistical significance was seen for parents who reported reducing portion size (<math>p &lt; 0.001</math>), decrease in offering child their favorite food as a reward (<math>p &lt; .05</math>), and increase in family physical activity (<math>p &lt; 0.001</math>).</p> <p>BMI z-scores showed slight statistical significance, <math>p &lt; .01</math>.</p>	
9	MEND	Non-research	Program for ages 7-13, comprehensive family-based program	Combines three critical components of lifestyle changes including	<p>Mind- behavioral component</p> <p>Exercise- physical activity and sports</p>	<p>Level IV</p> <p>High Quality</p>

			A toolkit designed to be used by community organizations to facilitate programs to reduce childhood overweight and obesity	exercise, behavior change, and healthy eating	Nutrition- healthy eating behaviors		
10	We Can!	Non-research	<p>A national program designed to help parents and communities with children aged 8-13 achieve healthy weights</p> <p>A toolkit designed to be used by community organizations to facilitate programs to reduce childhood overweight and obesity</p>	Offers methods and resources to help youth achieve healthy weights including healthy eating, improved physical activity, and reducing screen time among other things	<p>Improved physical activity</p> <p>Enhanced nutrition</p>		<p>Level IV</p> <p>High Quality</p>

**Appendix C: Rosswurm and Larrabee Model**

**Figure 1.**  
**A Model for Evidence-Based Practice**



From Rosswurm & Larrabee (1999). By permission of Sigma Theta Tau International Honor Society of Nursing.

Pipe, T., Wellik, K., Buchda, V., Hansen, C. and Martyn, D. (2005). Implementing evidence-based nursing practice. *MedSurg Nursing*, 14(3): 179.

## Appendix D: Parental Consent Form

### Consent for Participation in a Research Study

Dear Parent or Guardian:

I am a Doctor of Nursing Practice student at the George Washington University School of Nursing. I am conducting a research project on pediatric obesity and the impact of a family-based program in the community on pediatric overweight and obesity prevention. I request permission for you and your child to participate.

The study consists of a community-based, family-centered nutrition and exercise program that will be conducted during the scheduled dance sessions that you have enrolled your child in. There will be nutritional education for your child during the first fifteen minutes of dance class. The remaining 45 minutes will be the physical activity of dance. As a parent, you will also be expected to attend four parent sessions. Both you and your child will be expected to complete a questionnaire at the beginning and end of the program. Additionally, biometric measurements (height, weight, and waist circumference) will be obtained from your child three times throughout the program.

The project will be explained in terms that you and your child can understand, and you and your child's participation is completely voluntary. Only I and members of the administrative team of the Community Dance Academy will have access to information from you and your child. At the conclusion of the study, you and your child's responses will be reported and only used for the purposes of this study. At the conclusion of the study a summary of group results will be made available to all interested parents through a memo that will be distributed.

Participation in this study is voluntary. Your decision whether or not to participate will not affect the services normally provided to your child by the Community Dance Academy. You and your child's participation in this study will not lead to the loss of any benefits to which he or she is otherwise entitled. Even if you give your permission for your child to participate, your child is free to refuse to participate. If your child agrees to participate, he or she is free to end participation at any time. You are also free to end participation at any time.

Any information that is obtained in connection with this study that can be identified with you will remain confidential and will be disclosed only with your permission or as required by law. Confidentiality will be maintained by means of sealed envelopes locked in a secure safe. The primary investigator, Chayna Hardy-Taylor, will only have access to information. Upon completion of the study, information will be shredded.

Should you have any questions or desire further information, please call me or email me at 609-247-7496 or [chardytaylor@gwu.edu](mailto:chardytaylor@gwu.edu).

If the primary investigator fails to answer any questions or address concerns, please contact the following project advisor, Dr. Mercedes Echevarria at [mechevarria@gwu.edu](mailto:mechevarria@gwu.edu).

If you have any questions about your rights as a research subject, you may contact the George Washington Institutional Review Board (IRB) by phone at (202) 994-2715, or by e-mail at [ohrib@gwu.edu](mailto:ohrib@gwu.edu).

Sincerely,

Chayna Hardy-Taylor

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Please indicate whether or not you wish to allow your child to participate in this project by checking one of the statements below, signing your name and return to .....

I grant permission for me and my child to participate in the study.

I do not grant permission for me or my child to participate in the study.

\_\_\_\_\_  
Signature of Parent/Guardian

\_\_\_\_\_  
Printed Parent/Guardian Name

\_\_\_\_\_  
Printed Name of Child

\_\_\_\_\_  
Date

**Appendix E Child Assent Form****ASSENT TO PARTICIPATE IN RESEARCH*****A Systems Perspective for Integrating a Community-Based, Family-Centered Nutrition and Exercise Program into a Preexisting Physical Extracurricular Activity***

1. My name is Chayna Hardy-Taylor and I am a student at George Washington University.
2. My advisor, Dr. Mercedes Echevarria, and I are asking you to take part in a research study because we are trying to learn more about how to help improve your health through nutrition and exercise to achieve a healthier lifestyle.
3. If you agree to be in this study, I will ask you to do a few things over the next few weeks.  
I will ask you questions about what you have learned here.  
I will ask you questions about what you do in the program.  
I will ask you questions about how you feel about being in the program.
4. I do not believe that you will be hurt or upset by being in this study. If you take part in the study and believe that you have been hurt or upset in any way, you may stop being in the study.
5. This study probably will help you, but if you participate in this study, it will teach me important ways to help other children like you in the future.
6. Please talk this over with your parents before you decide whether or not to participate. Your parent gave permission for you to take part in this study. Even though your parent said “yes,” you can still decide not to do this.
7. If you don’t want to be in this study, you don’t have to participate. Remember, being in this study is up to you and no one will be upset if you don’t want to participate or even if you change your mind later and want to stop.
8. You can ask any questions that you have about the study. If you have a question later that you didn’t think of now, you can call me at 609-247-7496.



- .
9. Signing your name at the bottom means that you agree to be in this study. If you are not able to sign your name, you do not have to. You will continue to attend the Community Dance Academy of the community organization if you choose not to participate.

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Signature of Subject

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Printed Name of Subject

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Date

**Appendix F : Curriculum of Program**

Dates	Event	Topic	Objective	FYI	Time
September 7, 2019	Registration Day	Enroll participants, have informed consents signed by parents	To enroll participants		
Week of September 16, 2019	CDA Classes Begin	Questionnaires completed by parents and participants  Obtain biometric measurements in private room from each individual	To obtain baseline data		30 minutes

<p>Week of September 23, 2019</p>	<p>Nutrition Lesson by Chayna Hardy-Taylor</p>	<p>How much sugar is really in those drinks we love?</p>	<p>Gain understanding of how much sugar is in drinks and what it does to your body.</p>	<p>Fruit and vegetable give- away</p>	<p>20 minutes</p>
<p>Week of September 30, 2019</p>	<p>Nutrition Lesson by Chayna Hardy-Taylor  Parent meeting</p>	<p>Eat this vs. that?  How to reduce your child's screen time?</p>	<p>Understand the benefits of eating healthy and what foods are better for your body</p>		<p>20 minutes</p>
<p>Week of October 7, 2019</p>	<p>Nutrition Demonstration by Chayna Hardy-Taylor  (Children and parents)</p>	<p>Quick, easy healthy recipes kids can make</p>	<p>Knowledge of nutritious recipe</p>	<p>Fruit and vegetable giveaway</p>	<p>20 minutes</p>

Week of October 14, 2019	Nutrition Lesson by Chayna Hardy-Taylor	What's in a meal?	Gain an understanding of food groups and how much of what food group should be on your plate.  (Based on my plate)		20 minutes
Week of October 21, 2019	Nutrition Lesson by Chayna Hardy-Taylor  Parent session	Increase your fruits and vegetables  Cost-effective shopping for healthy foods	Understanding of what fruits and vegetables are and how much should be consumed in a day.	Mid-program biometric measurements  Fruit and vegetable giveaway	20 minutes + 10 minutes for measurements
Week of October 28, 2019	Healthy Living Lesson by Chayna Hardy-Taylor	Reducing screen time and getting more activity	Knowledge of the danger of too much screen time and how to		20 minutes

			be more active while still doing the things you enjoy		
Week of November 4, 2019	<b>Nutrition Demonstration by Chayna Hardy-Taylor</b>  (Both children and parents)	<b>Quick, easy healthy recipes</b>	Knowledge of nutritious recipe	<b>Fruit and vegetable giveaway</b>	20 minutes
Week of November 11, 2019	<b>Nutrition Lesson by Chayna Hardy-Taylor</b>	<b>The benefits of water</b>	Understanding on how great water is for the body and how to drink more water in a day		20 minutes
Week of November 18, 2019	<b>Nutrition Lesson by Chayna Hardy-Taylor</b>	<b>What's really on those labels?</b>	Knowledge and understanding on how to read nutrition labels	<b>Fruit and vegetable giveaway</b>	20 minutes

	Parent session	Reading food labels	on food and drinks		
Week of November 25, 2019	No classes this week	Thanksgiving			
Week of December 2, 2019	Nutrition Lesson by Chayna Hardy-Taylor	How to pack your lunch?	Understanding of what should be in your lunchbox to keep you healthy and give you energy throughout the day		20 minutes
Week of December 9, 2019	Healthy Living Lesson by Chayna Hardy-Taylor	Exercise and Nutrition: a healthy combination	Gain an understanding an awareness of how to get healthy and stay healthy with better nutrition	Biometric Measurements and Post Survey completion	20 minutes + 10 minutes for measurements and survey

			and more exercise	Fruit and vegetable giveaway  Gift card giveaway	
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**Appendix G: Project Timeline**

Submit DNP Project Proposal	April 28, 2019
Approval of the DNP Project Proposal	May 2019
IRB Submission and Approval	May-June 2019
Recruitment- Dance School Registration Day	September 7, 2019
Program Start	September 16, 2019
Mid-program Check-in	October 21, 2019
Program Completion	December 9, 2019
Program Evaluation and Dissemination	January-May 2020

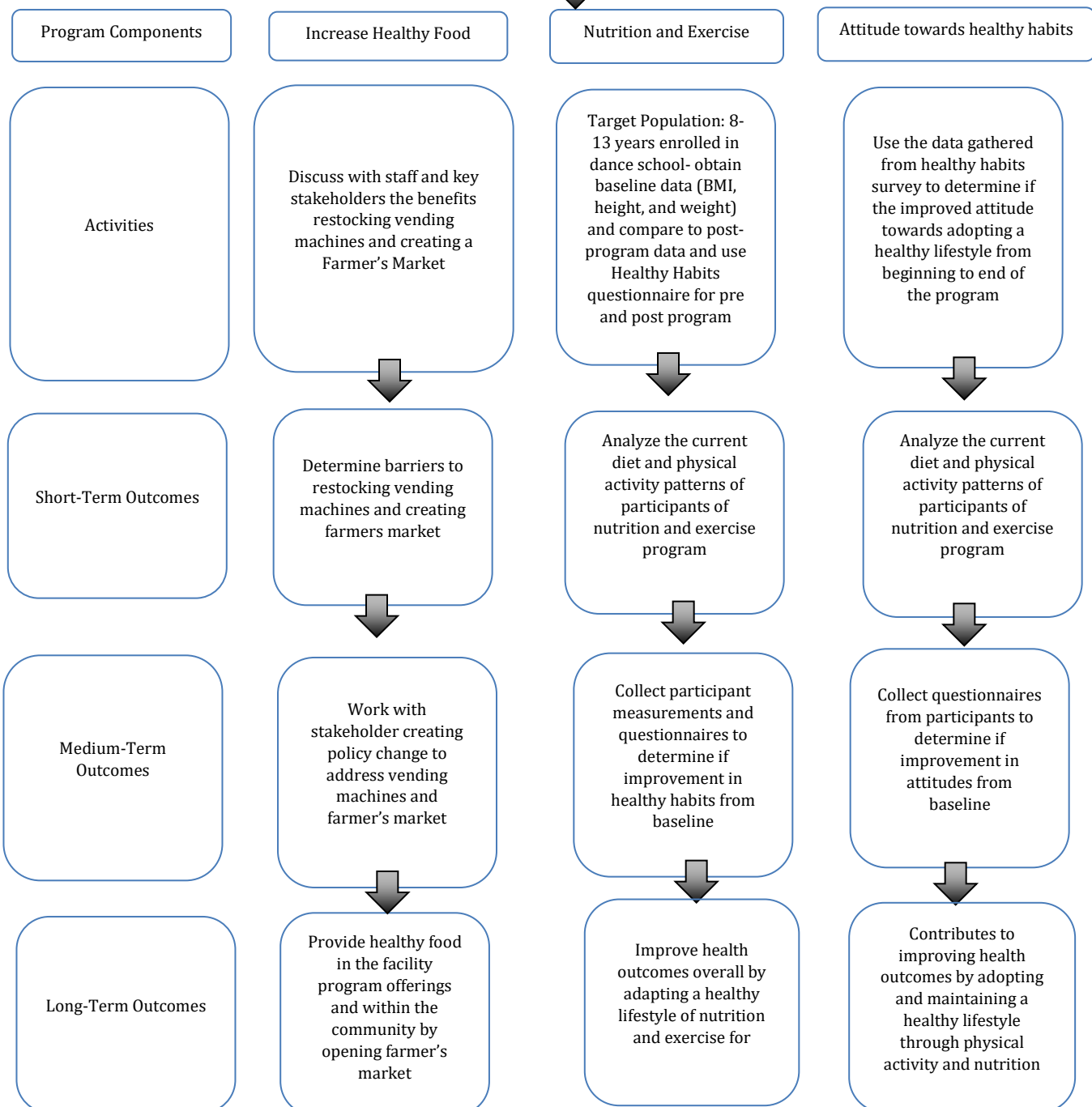


**Appendix H: Logic Model for nutrition and exercise program**

**Need in Community:** To establish a community-based, family-centered nutrition and exercise program within the community organization’s extracurricular activities

**Program Goal:** Improve health outcomes for the children in Trenton, NJ through the integration of a nutrition and exercise program in the facility

**Rationale:** Research identifies physical activity, and improved nutrition help improve childhood obesity rates, ultimately improving health outcomes



**Appendix I: Results Tables**

**Table 1: Demographic Characteristics of Sample**

	Total Sample N=42
<b>Variable</b>	
Gender	
• Male	1 (2.4%)
• Female	41 (97.6%)
Age	
• 8	11 (26.2%)
• 9	9 (21.4%)
• 10	8 (19%)
• 11	9 (21.4%)
• 12	5 (11.9%)
• 13	0 (0%)
Race/Ethnicity	
• African American	40 (95.2%)
• Hispanic	2 (4.8%)

**Table 2: Weight Categories**

Weight Categories	
• Normal (BMI<25.00)	29 (69%)
• Overweight (BMI 25.00-29.99)	5 (11.9%)
• Obese (BMI >= 30.00)	8 (19%)

**Table 3: Repeated Measures ANOVA**

	N	Df	Baseline Mean (SD)	6-week Mean (SD)	12-week Mean (SD)	Significance (p value)
Weight over 12-week program	42	2	47.26	46.97	45.72	0.891
BMI over 12-week program	42	2	7.9	7.85	7.2	0.005

**Table 4: Pre and Post Questionnaires Participant Responses Paired T-test**

	Pre -Mean (SD)	Post-Mean (SD)	N	t	Df	Significance (P value)
Servings of Fruits \and Vegetables	2.8 (0.82)	4.4 (1.1)	84	-19.7	83	0.001
Fast Food/Take Out Per Week	2.3 (0.98)	1.3 (0.56)	84	-2.3	83	0.021
Hours of Screen Time Per Day	2.9 (1.1)	1.8 (0.75)	84	-5.6	83	0.001
Number of Sugary Drinks Per Day	2.6 (1.2)	1.5 (0.7)	84	-7.3	83	0.001
Hours of Active Play Per Day	1.7 (0.86)	3.2 (1.4)	84	-7.3	83	0.001

**Table 5: Pre and Post Questionnaires Parental Responses Paired T-tes**

	Pre-Mean (SD)	Post-Mean (SD)	N	T	df	Significance (P value)
Servings of Fruits and Vegetables (Parents)	2.4 (0.95)	3.8 (0.72)	82	-17.1	81	0.001
Fast Food/Take Out Per Week (Parents)	2.2 (0.95)	1.4 (0.63)	83	-2.8	82	0.007
Hours of Screen Time Per Day (Parents)	3.1 (1.1)	2.0 (0.71)	83	-6.8	82	0.006
Number of Sugary Drinks Per Day (Parents)	2.2 (1.2)	1.4 (0.66)	82	-2.8	81	0.001
Hours of Active Play Per Day (Parents)	2.1 (1.4)	2.7 (1.1)	81	-7.1	80	0.001

**Appendix J: Pre and Post Survey Data**

Figure 1. Graphical Depiction of Servings of Fruits and Vegetables per Day Pre and Post Intervention

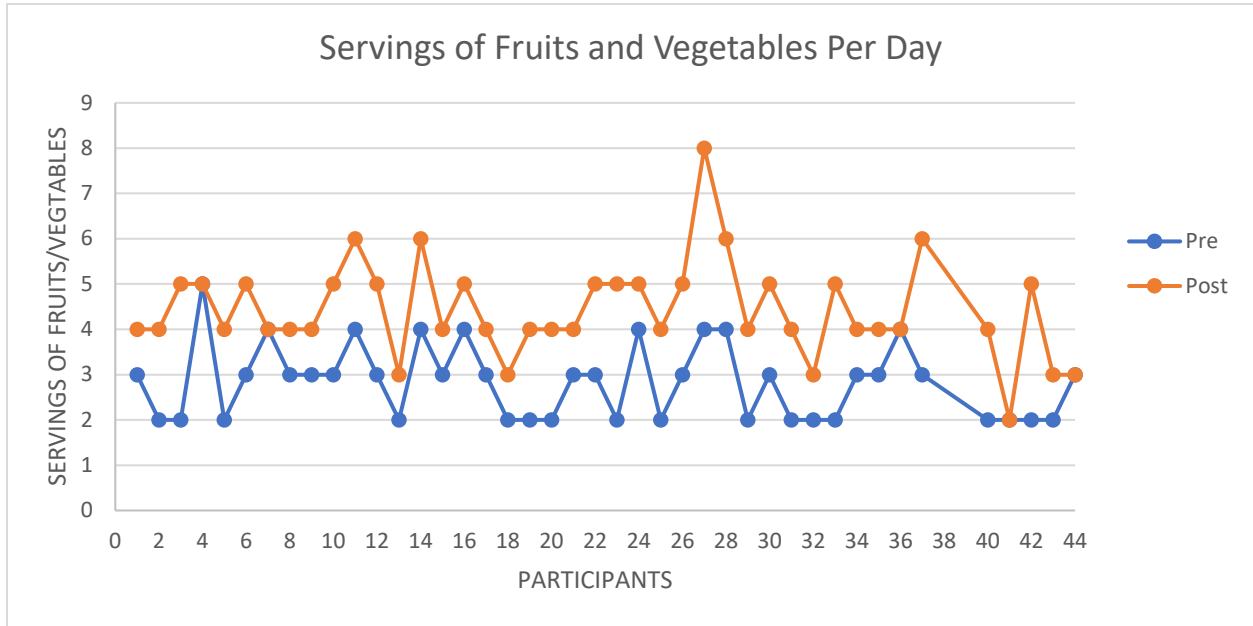


Figure 2. Graphical Depiction of Fast Food Outings per Week Pre and Post Intervention

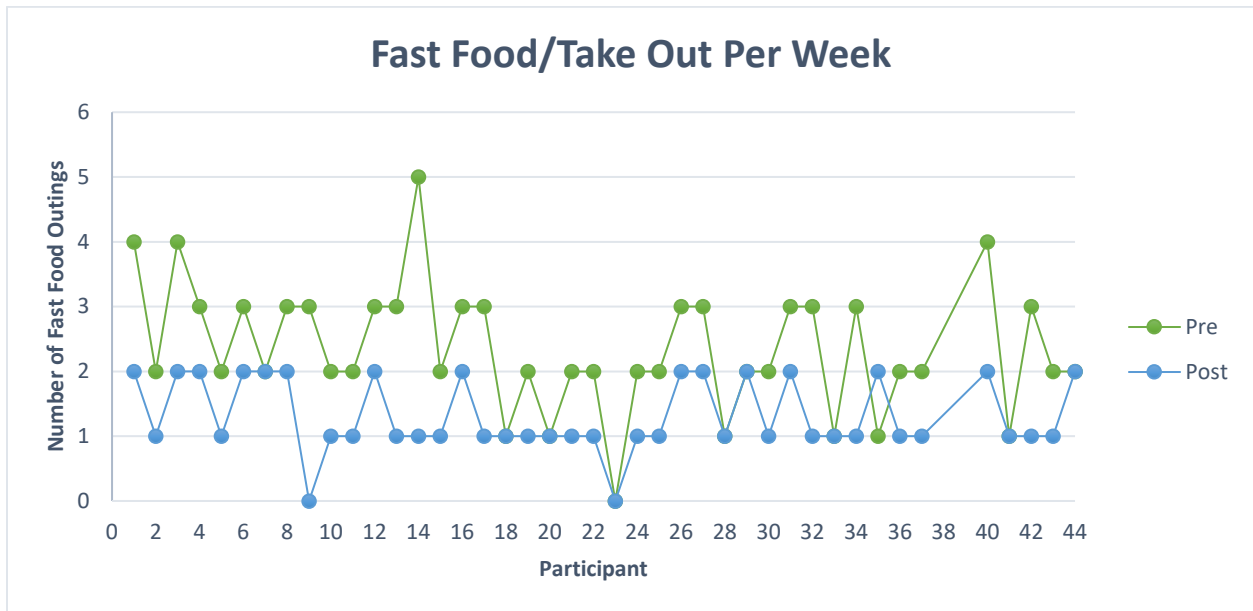


Figure 3. Graphical Depiction of Number of Sugary Drinks per Day Pre and Post Intervention

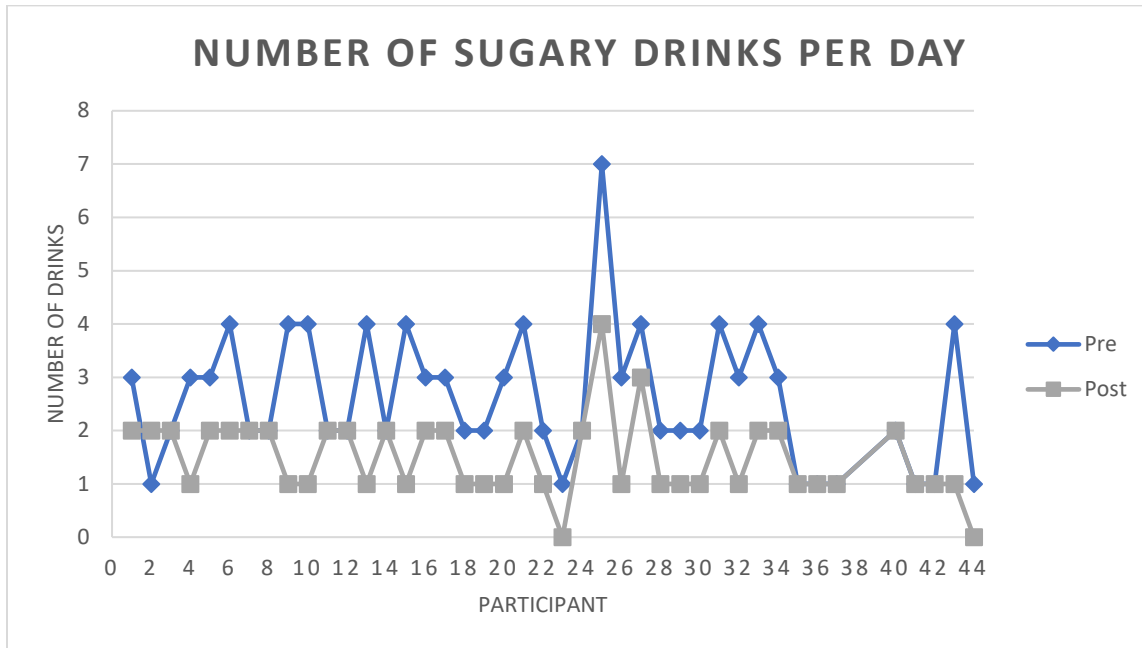


Figure 4. Graphical Depiction of Hours of Screen Time per Day Pre and Post Intervention

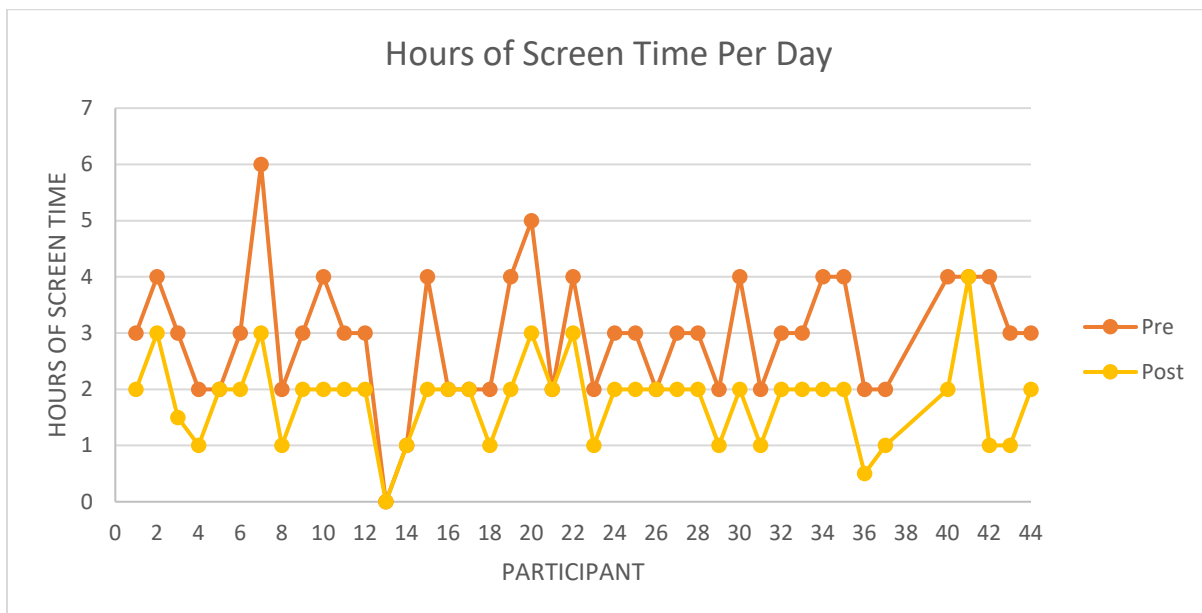


Figure 5. Graphical Depiction of Hour of Active Play per Day Pre and Post Intervention

