Implementing and Evaluating a Nutrition Education Program

with Preschool Children

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Abstract

Childhood obesity affects one in four, two to five-year old children. If a child is overweight by the time he or she enters kindergarten, the child is four times more likely to develop obesity by 8th grade (CDC, 2019). Overall, children aged two to five do not consume enough vegetables and nutrition education is not valued enough. The nutrition education program, “Veggiecation”, was implemented over six weeks. This education program presented a method to increase the nutrition knowledge and overall consumption of vegetables in preschool children. The children were introduced to a new vegetable each week with the use of an educational lesson prior to participating in making and tasting their vegetable sample. A pre-intervention survey was completed with the children and descriptive statistics evaluated the overall outcome of the program. Results included an increase in vegetable consumption, an understanding that vegetables are healthy for their body, and interest in continuing to eat vegetables in the future.

Keywords: Vegetables, preschool-aged children, nutrition education, vegetable consumption
Introduction

Childhood obesity is a major concern to the health of our nation, affecting one in four, two to five-year olds (Centers for Disease Control and Prevention, 2019). In the United States, the percentage of childhood obesity has more than tripled since 1970 (Centers for Disease Control and Prevention, 2019). Children are now developing chronic diseases that are usually seen in adults, such as type 2 diabetes, hypertension, and heart disease. If young children are overweight by the time they enter kindergarten, they are four times more likely to have obesity by 8th grade and long term these children are more likely to have obesity as an adult (CDC, 2019). Research has also shown that atherosclerosis, may begin in childhood (American Heart Association, 2020). Given this knowledge the promotion of a healthy diet should begin in the early years of life.

The national requirements for nutrition and food service for toddlers and preschoolers are to always provide a variety of fruits and vegetables during scheduled snack time (National Resource Center for Health and Safety in Child Care and Early Education, 2018). Habits are formed during the early childhood years and providing children with nutritional education at this age could provide a healthy foundation for their future (Lehmann, 2011). More than 60% of children aged three to five years old are enrolled in childcare centers, Pre-K, and early start programs (CDC, 2019). These programs can directly influence a child’s nutritional habits.

Research completed by the National Institute for Early Education has shown that introducing children aged three to five years old to heart healthy foods and promoting exercise through play can diminish the likelihood of obesity and prevent development of a metabolic disease (Barnett, 2019). Additional studies have also shown that an increase in vegetable consumption and a focused nutrition education program can improve health indicators (Pem &
Jeewon, 2015). The information suggests that implementing a nutrition education program in a preschool classroom could encourage healthy habits early in life.

**Background and Significance**

Obesity rates in the United States have tripled since 1960 and obesity is now the second leading cause of death (Johnson, 2012). The National Childhood Obesity rates for 2015-2016, showed that 18.5 percent of children aged two to nineteen were obese (Warren et al., 2018). The number of overweight infants and young children up to five years old has increased from 32 million globally in 1990 to 41 million in 2016 (World Health Organization, 2019). In 2017, 38 million children under five years old were overweight or obese (World Health Organization, 2019). If the numbers continue to increase the suspected number of obese young children up to five years old is said to be 70 million by 2025 (World Health Organization, 2019).

The American Academy of Pediatrics (2019), explains that the percentage of childhood obesity persisting into adulthood is estimated to be 20% for a four-year old. Childhood obesity is associated with childhood diabetes, asthma, cardiovascular risk factors, and mortality in adulthood (Bennett, 2012). When considering the future healthcare costs that directly connect with pediatric obesity, preventable morbidity and mortality is thought to soon exceed those associated with tobacco (Jacobson, & Krebs, 2019).

The total cost of chronic diseases due to obesity was $1.72 trillion, which is equivalent to 9.3 percent of the U.S. gross domestic product (Waters & Graf, 2018). Finkelstein, Graham, & Malhotra (2014) completed a study to determine an estimate of the lifetime medical costs for an obese child. It was found that an estimate of $19,000 was the average cost of an obese ten-year old and multiplying that by the current number of obese ten-year olds gives a rough estimate of $14 billion for this age alone (Finkelstein, Graham, & Malhotra, 2014). The earlier a child is
taught the significance of vegetables and a healthy lifestyle, the more likelihood of success in decreasing childhood obesity rates and costs overtime (Lehmann, 2011).

The current national guidelines for toddlers and preschoolers state that teachers should provide the child with a variety of fruits and vegetables during meal time and snack time, provide one serving of a dark-green, red, or orange vegetables weekly, and to supply one serving of beans or peas and starchy vegetables (National Resource Center for Health and Safety in Child Care and Early Education, 2018). Due to the selective eating habits in preschool children, non-nutritious foods should not be served because they can replace nutritious foods throughout the day (National Resource Center for Health and Safety in Child Care and Early Education, 2018). Teaching children early about nutritional education and providing fruits and vegetables at snack time is shown to directly influence a child’s daily eating habits (CDC, 2019). The World Health Organization (2019) is currently developing a global action plan that will take place in early childhood education and care settings, to reduce obesity rates in school-aged children by 2025.

Adequate fruit and vegetable intake provides essential nutrients for the body and is important for a healthy lifestyle (Lehmann, 2011). According to the 2010 Dietary Guidelines for Americans, one should fill one half of the meal plate with vegetables and fruits, which provide the body with essential amounts of dietary fiber that in return can decrease the risk of obesity and heart disease (Slavin & Lloyd 2012). The Center for Disease Control and Prevention (2019) states that most children do not meet the daily recommendations for fruits and vegetables. Introducing micronutrients and a balanced diet to young children could decrease the intake of sugar and allow these healthy habits to be carried throughout their lives (Barnett, 2019).
Needs Assessment

Over 340 million children and adolescents aged five to nineteen were overweight or obese in 2016 (World Health Organization, 2019). Globally, 41 million children under the age of five years old were obese or overweight in 2016 (World Health Organization, 2019). The World Health Organization (2019), states that there is a lack of education in schools and communities regarding healthy nutrition approaches and that this information is essential in assisting with the prevention of obesity.

The obesity epidemic threatens to shorten life expectancy in the United States and bankrupt the health care system (Ludwig, 2018). The United States childhood obesity rate in 2016 for preschool aged children was 13.9% (Robert Wood Johnson Foundation, 2018). According to the National Health and Nutrition Examination Survey, childhood obesity is greater in Latino and African American children (Robert Wood Johnson Foundation, 2018). It is estimated that by 2030 more than 45% of the population will be considered obese (Organization for Economic Cooperation and Development, 2017).

New Jersey ranks 27 in overall prevalence of childhood obesity (New Jersey Partnership for Healthy Kids, 2017). Thirty one percent of children living in New Jersey are overweight or obese (Data Resource Center, 2017). With this current knowledge, The Special Supplemental Nutritional Program for Women, Infants, and Children (WIC) provides a nutrition program for children under the age of five who qualify. WIC provides nutritional education, healthy foods, and awareness of preventing obesity in early childhood (Robert Wood Johnson Foundation, 2018). The obese children enrolled in this program from 2010-2014 had shown significant improvement; there was a decrease from 18.9% to 15.3% in obesity rates (Robert Wood Johnson Foundation, 2018).
The obesity rate for preschool children in Camden County is 9.2% (South Jersey Health Partnership, 2016). Current efforts within the county include, a new mobile unit program referred to as Camden County Health Connection, which will provide health screenings and disease risk assessments at health fairs, homeless shelters, nutrition sites, shopping centers, workplaces, public housing complexes, and senior centers (Camden County, 2019). This mobile unit will also offer health education programs and lifestyle-management programs to empower children and adults in taking better care of their health by making healthy food choices and exercising (Camden County, 2019).

**Problem Statement**

The gap between current dietary practices and recommended diets for infants, children, and adolescents is an important concept to understand (Gidding, 2020). There has been an increase in consumption of fruit juices, soft drinks, fast food options, vending machines and a decrease in physical activity over the years (Johnson, 2012). Vending machines and competing nutrient poor foods provide excess calories, but also provide revenue to support school programs (Gidding, 2020). The American Heart Association recommends a diet that focuses on fruits and vegetables, whole gains, low fat and non-dairy products, beans, fish, and lean meat for children older than 2 years old (Gidding, 2020). The New Jersey Department of Education Preschool Program Implementation Guidelines (2015) states that meals and snacks should plan to meet the nutritional requirements as recommended by the Child Care and Food Program. The Child Care and Food Program is offered through the state for eligible licensed and approved centers. The concern is that the New Jersey Department of Education Preschool Classroom Teaching Guidelines (2019) do not specify that nutritional education needs to be implemented in the classroom.
Aims & Objectives

The principle aims of this project were:

1. Increase the knowledge of vegetables in preschool children using a standardized curriculum
2. Increase consumption of vegetables in preschool children.

The objectives of this study were:

1. Preschool children will have an understanding that vegetables are important for our bodies to stay healthy.
2. Preschool children will demonstrate an increase in vegetable consumption during implementation of the six-week program.
3. Preschool children will demonstrate an interest in eating more vegetables in the future at the end of the six-week education program.

Increased knowledge and vegetable consumption will promote a healthy lifestyle that can be taken into the future. The “Veggiecation” program offers education on a variety of 34 different vegetables through educational posters specific to each vegetable, coloring pages for each vegetable, and hands on classroom appropriate cooking. A total of six different vegetables were used over the course of the six-week education program. A new vegetable was discussed at the beginning of each week using the educational vegetable poster and then a coloring page activity was completed with that same vegetable. The following vegetables were used in the education program: cauliflower, spinach, squash, kale, carrot, and broccoli. After completion of each lesson, the children worked together to prepare a snack that incorporated the vegetable of the week. Each child received an “I tried it” sticker (Appendix CC) for participating in the
lesson. The recipe in class was also sent home with the child for family use. Included in these lessons were six, three to five-year old children within the preschool classroom.

**Literature Review**

The following literature review was conducted to investigate nutrition education plans, with a focus on vegetables and their effect on the prekindergarten population. The databases used for this search included CINHAL, PubMed, Science Direct, Medline, and Google Scholar. The key terms used during this search were *preschool*, *nutrition education*, “*Veggiecation*”, *vegetable consumption*, *vegetables*, and *childhood, obesity*. When searching for results initially, over 6,000 studies were available. After putting in the inclusion criteria of full text availability, peer reviewed articles, specific to preschool age, published within the years 2010-2019, and determining the accessibility of the article, a total of ten articles were reviewed.

**Childhood BMI and Health**

It has been questioned whether the weight of a child can directly predict obesity in adulthood. De Kroon, Renders, Van Wouwe, Burren, & Hirasing (2010) evaluated the BMI of eighteen to twenty-eight-year-old adults and compared the results with their reported BMI from ages two to six. The examination also included blood pressure, waist circumference, body fat percentage, and blood samples specifically looking at glucose, high-density lipoproteins, triglycerides, and high sensitivity C-reactive protein (de Kroon et al., 2010). The study found the BMI of a two to six-year old was directly related to cardio metabolic risk into young adulthood (de Kroon et al., 2010). The BMI was strongly correlated with waist circumference, blood pressure, high sensitivity C-reactive protein, body fat percentage, and HDL cholesterol.

To detail what a typical diet looks like for children, Kim et al. (2014) analyzed a 24-hour dietary recall from a total of 14,865 children, aged two to eighteen years old. Kim et al. (2014)
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states that most young children consume 60% fewer fruits than recommended and 93% fewer vegetables than recommended. Implementing the nutritional standards that meet the federal regulations for meals and snacks in school districts and early care centers may increase fruit and vegetable consumption (Kim et al., 2014).

Obesity prevention programs and studies are not commonly completed in the preschool age group although preschool aged children diagnosed with obesity serve as a direct precursor to adulthood obesity (Lakshman, Elks, & Ong, 2013). Obesity levels have continued to increase with BMI percentiles over 98, especially in children under the age of 5 (Lakshman, Elks, & Ong, 2013). The article suggests that adult morbidity and mortality may be increased by childhood obesity. Tackling childhood obesity is not only suggested because of the poor health risk in their adult life, but because of a decreased quality of life as a child. These children suffer from metabolic disease and psychological diagnoses (Lakshman, Elks, & Ong, 2013). Presenting the opportunity to provide prevention programs early can prevent childhood obesity.

Searching for Solutions

Eating a well-balanced diet is a preventative measure that reduces the risk of obesity, type 2 diabetes, certain cancers, and cardiovascular disease (Nekitsing, Blundell-Birtill, Cockroft, & Hetherington, 2018). This article strongly suggests that preschoolers have an insufficient intake of vegetables and illustrate how this is an important time to develop healthy eating habits. Increasing vegetable intake is important; it provides a great protective health effect for their future. There are many explanations as to why children may not want to try new foods, such as the bitter taste in some vegetables. Some strategies in the attempt to overcome this may include repeated taste exposure, flavor enhancement, rewards, and social praising (Nekitsing,
Blundell-Birtill, Cockroft, & Hetherington, 2018). These strategies can be attempted in the home, school, daycares, and through nutritional education programs.

Nekitsing, Hetherington, & Blundell-Birtill (2018) emphasize that nutritional education alone is not enough in the preschool population, the programs need to be strengthened with sensory play and tastings. Preschool children learn best through their five senses, sound, sight, smell, touch, and taste. A nutrition program that involves all five senses can encourage preschoolers to become more familiar with new foods. A study found that allowing children to have a sensory play session with fruits and vegetables outside of their mealtime motivated them to try more of the new foods (Nekitsing, Hetherington, & Blundell-Birtill, 2018). Evidence has affirmed that repeated vegetable exposure is another indicator to increase consumption, possibly along with nutrition education (Nekitsing, Hetherington, & Blundell-Birtill, 2018).

“Veggiecation” has been implemented in various settings, from preschools to senior citizen centers. Bai, Suriano, & Wunderlinch (2012) analyzed the effect of the program on promoting an increase in vegetable consumption. Two elementary schools participated, one control and one intervention group. The “Veggiecation” program included, a vegetable-of-the-month education, classroom vegetable lessons with the use of posters, sampling of vegetables each week, and parental involvement (Bai et al., 2012). After completion of the program, the study revealed an overall increase in vegetable consumption during lunch time (3.75 vs. 2.36, \( p =0.006 \)) and snack time (1.54 vs. 0.97, \( p =0.11 \)). Children in the intervention group were more likely to consume vegetables voluntarily (Bai et al., 2012).

In 2014, “Veggiecation” was again used to analyze the effects in a third-grade classroom over a nine-month period. The same materials were used; a vegetable-of-the-month education, classroom vegetable lessons with the use of posters, sampling of vegetables each week, and also
an “I tried it” sticker at the end of each month. Students did not necessarily receive this sticker for trying each vegetable sample, but for participating in the lesson (Bai, Suriano, & Wunderlinch, 2014). Vegetable consumption was significantly higher in the intervention school compared to the control school while the “Veggiecation” program was in place (Bai et al., 2014).

The length of a nutrition program must also be taken into consideration. Joseph, Gorin, Mobley, & Mobley, (2015) evaluated the effect of a short-term nutrition education intervention taught over two weeks in a preschool setting. The children were given a pre- and post-assessment that allowed the choice of a healthy vs. an unhealthy snack. After completion of the study, there was an increase in knowledge of healthier snacks and the capability of distinguishing between them. There was not a significant change in choice preferences, but it appeared that children who were younger, gained more knowledge during the nutrition intervention and were more likely to choose the healthy snack option (Joseph et al., 2015). The investigators concluded that a short educational nutrition program increased the nutrition knowledge of preschool children.

**The Importance of Vegetables**

Pem and Jeewon (2015) examined the benefits of fruits and vegetables as well as nutrition education on influencing and improving intake. The article emphasizes that when fruits and vegetables are consumed as recommended, their effect is directly related to a decrease in non-communicable disease due to the variety of phytochemicals and their relationship with hindering obesity development (Pem & Jeewon, 2015). Pem and Jeewon (2015) state that with a high prevalence of nutrition-related chronic illness and the rising rates of obesity, this suggests the need for nutrition education to become a priority. Various studies reviewed implemented nutrition education, which overall was found to contribute significantly to a change in food and
nutrition related behaviors. It was concluded that the most optimal nutrition education plan will focus on “to do” behaviors instead of “not to do” behaviors (Pem & Jeewon, 2015).

Furthermore, Slavin & Lloyd (2012) explain the important health benefits of fruits and vegetables. Most countries have dietary recommendations that include the essential amounts of fruits and vegetables one should consume each day. The article states that majority of Americans in all age and sex groups consume a considerably less amount of vegetables and fruits than the recommended daily amount (Slavin & Lloyd, 2012). Fruits and vegetables provide the body with vitamins and minerals, along with phytochemicals that function as antioxidants, phytoestrogens, and anti-inflammatory agents (Slavin & Lloyd, 2012). Fiber, which is also found in fruits and vegetables, is directly linked to improving health status (Slavin & Lloyd, 2012). A variety of fruits and vegetables are important because each one has a different nutrient content related to various health outcomes.

**Theoretical Framework**

The Knowledge to Action Framework (KTA) was used in this project development (Appendix A). The KTA framework is composed of both the knowledge creation and the action cycle. This framework is used to improve the healthcare system, by using current knowledge and research. In healthcare, implementation of research-based knowledge in real life is complex, therefore research data needs to be synthesized and the resulting knowledge contextualized prior to implementation (WHO, 2020). The action cycle portion of the framework, allows for determination of the knowledge tool that will be used by filtering through the research collected.

Knowledge of childhood obesity and preschool classroom nutrition requirements has been synthesized. The problem identified through clinical observation, databases, and research, is childhood obesity in children aged two to five years old. The knowledge tool used in this
project was “Veggiecation”, a nutritional education program for preschool-aged children that focuses on vegetables. The program was implemented and monitored by the study coordinator. The outcomes of the nutritional program were evaluated after the implementation of the six-week program with descriptive statistics. The program has proven to increase the nutritional knowledge of preschool children, demonstrate an increase in vegetable consumption, as well as an interest in wanting to eat more vegetables in the future. This information offers the option for sustainability within the preschool classroom and other interested preschool classrooms nearby. Dissemination of these results has included a public presentation to the DNP team members, a poster presentation on DNP poster day, sharing of information to the owner of “Veggiecation”, and the possibility of publishing in a nursing and nutrition journal.

**Methodology**

The nutrition education program was completed over six weeks. Prior to implementation of the nutrition program, the participants completed an initial pre-intervention survey (Appendix C). The survey was read to the participants given their developmental age. After completion of the program, descriptive statistics were completed to evaluate the overall outcome of the nutrition education program. Outcomes included, an increase in vegetable consumption during the education program and an increase in knowledge that vegetables are good for our bodies.

**Setting**

The program took place in a preschool located in Camden County, New Jersey. The daycare services children with chronic medical needs. The children included in this study had conditions such as asthma, stable seizure disorders, ADHD, and eczema. The site manager and preschool teacher provided the study coordinator with an official signed letter of agreement
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(Appendix G & H). The implementation of the education program took place in the preschool classroom.

Study Population

The participants were the students enrolled at the preschool in Camden County New Jersey. The preschool classroom consisted of children aged three to five. A total of nine children were in the classroom. Six of the children in the classroom participated; one child was transferred to a different school halfway through the intervention, the parents of one child did not complete the parental consent and the parents of another child declined. Inclusion criteria for the program included: between three to five years of age and possessing speech and comprehension abilities in the English language to complete the pre-program survey. All six of the children were able to participate in the pre-program survey. Exclusion criteria included: restricted by special dietary needs or oral motor deficits. Oral motor deficits could pose as a choking hazard and dietary restrictions would inhibit the child from participating in the tasting portions of the lesson. Fortunately, there were no children with these complications.

Recruitment

The method of recruitment included an informational flyer (Appendix F) that was sent home to the parents or guardians, explaining a brief overview of the project. The document also included the contact information of the study coordinator if the parents or guardians had questions or to request additional information. Parents or guardians were asked to check off the “NO” or “YES” box if willing to participate, which was listed on the bottom of the flyer. After participants were identified, parental informed consent was sent home for completion.
Consent Procedure and Risks

Parental consent (Appendix E) was completed prior to implementation of the education program. The children and their parents or guardians were informed that there weren’t any penalties for not participating and questions may be asked at any point. The participant’s names were not taken down instead gender, age, and ethnicity were reported on the pre-program survey. Confidentiality was maintained throughout the entire completion of the program. The potential benefits of participating included an increase in knowledge of vegetable benefits, a sticker after each lesson, as well as the complimentary vegetable snack after each lesson. Potential risks included expended time and unpredictable negative reactions to newly introduced food substances.

Cost and Compensation

The “Veggiecation” program is currently being used in all ages throughout New Jersey and New York. To become a “Veggiecation” educator, it is required to complete the necessary training workshop. The training consists of a two-hour video and ends with a multiple-choice exam. After completion of the exam, the educator receives a certificate of completion and the necessary equipment to begin educating. Normally, the educator charges a negotiated hourly fee to the facility where he/she is teaching. The study coordinator completed the two-hour training course and received the certificate of completion (Appendix J). The program resources were received free of charge from the CEO, Lisa Suriano and was implemented at no cost. The study coordinator assumed all costs of the vegetables that were used to prepare the classroom vegetable recipes. An additional cost of implementing this program was the time spent participating in the study. Compensation for the participants, included an opportunity to try new delicious foods and an “I tried it” “Veggiecation” sticker after each weekly lesson.
Study Interventions

The program “Veggiecation” was used to implement the nutrition education. The founder and CEO of “Veggiecation”, Lisa Suriano gave permission to use the program (Appendix I). The program offers recipes that include 34 different vegetables. In this project, a total of six vegetables were the focus. Each week offered a “vegetable of the week,” taking place over six weeks. Each class began with educating the children on why it is important to eat this vegetable with the use of a vegetable poster. The children then had the opportunity to color a picture of the vegetable and be involved in preparation of the vegetable sample. This included pouring, mixing, and shaking (specifically the cauliflower recipe). After the completion of each lesson, the children received an “I tried it” “Veggiecation” sticker regardless of trying the sample or not. They received the sticker predominately for participating in the lesson. The weekly classroom recipe was also sent home with each child for future family use. The weeks progress as listed:

1. Week 1 was the vegetable cauliflower. The poster (Appendix K) was used for education, the coloring page (Appendix L) was used as an engaging activity, and the cauliflower popcorn recipe (Appendix M) was made.

2. Week 2 was the vegetable spinach. The poster (Appendix N) was used for education, the coloring page (Appendix O) was used as an engaging activity, and the spinach smoothie recipe (Appendix P) was made.

3. Week 3 was the vegetable squash. The poster (Appendix Q) was used for education, the coloring page (Appendix R) was used as an engaging activity, and the squash coleslaw recipe (Appendix S) was made.
4. Week 4 was the vegetable kale. The poster (Appendix T) was used for education, the coloring page (Appendix U) was used as an engaging activity, and the kale chips recipe (Appendix V) were made.

5. Week 5 was the vegetable carrot. The poster (Appendix W) was used for education, the coloring page (Appendix X) was used as an engaging activity, and the carrot salad recipe (Appendix Y) was made.

6. Week 6 was the vegetable broccoli. The poster (Appendix Z) was used for education, the coloring page (Appendix AA) was used as an engaging activity, and the mini broccoli trees recipe (Appendix BB) was made.

**Outcome Measures**

The outcomes were determined by using descriptive statistics at the completion of the education program. The outcome measures included:

1. Vegetable consumption measured during the educational program.

2. The number of different vegetables tried by the preschool children throughout the program.

3. Positive feelings towards vegetables during the educational lessons and tasting portions and the reactions and responses of the preschool children.

4. The number of children that reported vegetables are healthy for the body, when asked at the end of the educational program.

5. The number of children that reported eating vegetables at home.

**Project Timeline**

The project proposal was completed in spring 2019. The proposal and supporting documentation were sent to IRB for review in Summer 2019. IRB approval was obtained prior to
implementation of the education program, which began in Fall 2019. When IRB approval was obtained, the informational flyer was sent home with each child in the preschool classroom. Once the study coordinator determined the families that were interested in having their children participate, a parental consent was sent home. Once the documentation was completed and received by the study coordinator, initiation of the project began. The project first began with the pre-intervention survey for each child. The program took place over a course of six weeks, for one day each week. The program was completed in Fall 2019. After completion of the six weeks, descriptive statistics were completed to determine the outcome. The study coordinator presented the final project in Spring 2020.

**Evaluation**

The education program began when IRB approval and consents were obtained. The method of data collection included a paper pre-intervention survey and post-intervention descriptive statistics. Considering the developmental level of a preschool child, the study coordinator read the survey questions to each child. The pre-intervention survey results remained de-identified. Each participant’s gender, ethnicity, and age were recorded on the paper survey and stored in the study coordinator’s locked desk. The pre-intervention survey determined a knowledge base prior to implementation of the nutrition program. After completion of the nutrition education program, descriptive statistics were used to determine the overall outcome of the education program. Lisa Suriano, the founder and CEO of “Veggiecation” designed the pre-intervention survey and gave permission to use this during the project. As an overview, the program survey was 26 questions. A smiley face, Likert, and dichotomous scale were used to determine the responses. Question’s one and two asked questions regarding the gender and ethnicity of the child. Part two of the survey focused on how often vegetables were eaten during
the day and if specific vegetables have been tried in the past. The vegetables mentioned in this part were shown through picture references for the children. Part three of the survey focused on the child’s feelings about eating vegetables. Part four of the survey asked questions regarding the child’s current knowledge on vegetables. Part five of the survey asked about eating habits in the home, specifically how often vegetables are consumed with dinner and availability of vegetables in the home.

**Data Analysis, Maintenance, & Security**

All paper documents collected from the pre-intervention survey were stored in the study coordinator’s locked desk along with all hard copies of paper consents. After completion of the nutrition program, an evaluation was completed and descriptive statistics were reported. This included an overall report of how the program went over the six weeks including: if the children were receptive to the education, how many children tried the provided vegetable samples, and if there was an increase in vegetable consumption and knowledge during the education program. The results collected were compared with the pre-intervention survey report. All data collected during the implementation of the program was stored in the study coordinator’s possession. At project conclusion data was destroyed and all paper documents were shredded.

**Pretest Results**

A pretest was completed to gain a nutrition knowledge base. Initially a total of seven children participated in this program, six boys and one girl. On class five, one child was transferred to a different school therefore he was removed from the results. The following results include six children, five boys and one girl. Two of those children were Caucasian and four were African American. After reviewing the results of section one in the pretest, it was found that five of the six children admitted to never eating more than one vegetable a day (Appendix DD).
Three of the children stated they never try new vegetables, while the other three stated they sometimes try new vegetables (Appendix DD). Additional assessments were obtained to determine the children’s consumption of the following vegetables: broccoli, cauliflower, parsnip, pumpkin, kale, snap peas, zucchini, and asparagus. Results are summarized in Appendix EE. The next section was asked with the use of a Likert “smiley face” scale. The “smiley face” responses ranged from very good, to good, don’t know, and bad to very bad. This section asked the children of their feelings towards vegetables (Appendix FF). Significant responses included 3/6 of children believing eating veggies are “bad,” and 5/6 stating that trying a new food is “boring.” The pretest also asked questions related to knowledge about vegetables (Appendix GG). The responses to the questions were, yes, I don’t know, and no. The children were unaware of the importance of eating vegetables every day as 3/6 children said “no.” When asked if “Eating vegetables makes my bones stronger,” all six of the children stated they didn’t know the answer. The majority of the children (5/6) did not acknowledge “Eating colorful vegetables is important.” The final section of the pretest asked questions related to vegetables in the home (Appendix HH). The responses ranged from never, sometimes, to always. Most of the children (5/6) responded they were able to find vegetables in their home, but only 1 child responded they eat vegetables every day. There were limitations to the knowledge base of this age group to ask these specific questions about their home environment.

**Results of Vegetable Consumption**

A total of six vegetables were tried throughout the six-weeks. During week 1 of implementation, only 3/6 children tried the cauliflower recipe. As the weeks progressed, all children consumed the vegetable sample, and at times asked for additional vegetable snacks.

**Results during Education Lessons**
When evaluating the responses of the preschool children specifically during the nutritional education lesson, it was exciting to see how their interest progressed each week. Week 1 was difficult; the children were disorganized, rowdy, and not interested in talking about vegetables. Week 2, was more positive from the beginning; the children were excited to see a familiar face and curious to hear what the lesson was about. All the children also remembered the vegetable of the previous week. While teaching the nutrition lesson, the children were engaged and participatory. These behaviors continued into the subsequent weeks as the children became excited and engaged in the weekly activities, with an increase in knowledge retention from the prior weeks’ lesson.

Results during Tasting Lessons

When evaluating the responses of the preschool children during the interactive tasting portion, it was obvious that all the children loved participating starting from week one; it appeared to give them a sense of initiative. This was a great way to allow preschool children to gain confidence. The lessons during week two through week six proceeded in a similar matter. The preschool children continued to be engaged during each session, which allowed for a positive experience when tasting the vegetable sample.

Results at the Completion

At the end of the nutrition program, the children were asked two questions and to raise their hands if their answer was yes. The first question was, “Who thinks vegetables are healthy for their body?” All six of the children stated yes to the question by raising their hands. The second question was, “Who wants to eat more vegetables at home?” Four of the six children stated yes by raising their hand. It is unclear as to if the other children did not understand the question or do not want to eat vegetables at home.
Discussion

On initiation of the education program, most of the children were not interested in learning about vegetables, which could be due to unfamiliarity or other unknown factors. However, by the second class and throughout the completion of the program the children continued to progressively show excitement when the vegetable education lesson began and during preparation of their vegetable sample, which confirms preschooler’s interest in learning. It is also evident that as the weeks progressed the children were more willing to try the vegetable. Unfortunately, there is a lack of nutritional education in schools today, which may be adding to the increase of childhood obesity (World Health Organization, 2019). With structured nutrition education program, the children became more comfortable each week. The CDC (2019) explains that teaching preschool children about nutrition early and providing vegetable samples is shown to directly influence daily eating habits.

The following objectives have been met at the completion of this nutrition program. The preschool children demonstrated an increase in vegetable knowledge by understanding that vegetables are important for their bodies to stay healthy and wanting to eat more vegetables in the future, as well as an increase in vegetable consumption during implementation of the six-week program. Possible barriers to this program could have been the developmental level of the preschool child affecting the results of both the pretest questionnaire and the two post-education lesson questions.

Unintended Consequences

Some negative unintended consequence include the children and staff becoming disappointed at completion of the program, due to the lack of any additional structured nutrition education program being put in place, the pre-program survey may have been too complex for
preschool aged children, and the time preparation for the vegetable sample each week took longer than expected. Positive consequences include the staff enjoying the lessons as well and learning some new recipes for their families and the study coordinator forming a trusting relationship with the preschool children.

**Implications for Clinical Practice**

Childhood obesity has increased over the years and is something providers manage on a daily basis. If providers can encourage and promote nutrition education for young children within their clinical setting, it could further increase awareness for its importance. Clinically, nutrition can improve the overall well being of a child mentally and physically. Determining an effective way to introduce children to vegetables should be an important part in health promotion practice. As providers, it is understood that having a healthy diet can decrease the risk of childhood obesity. Encouraging hands on nutrition education can further increase the likelihood of a healthy diet, as seen with the “Veggiecation” program. Including nutrition education into each child’s visit, especially focusing on vegetables could have a positive outcome. Resources for parents related to nutrition education and programs available for families should be a standard in practice, not only given if the child is overweight or obese.

**Implications for Healthcare Policy**

Many public heath recommendations have focused on reversing obesity in school age children, which has caused less attention to obesity prevention in children ages 0-5 years of age (McGuire, 2012). Just about 20 percent of American children are already overweight before they enter school and early excessive weight gain is a direct risk for obesity (McGuire, 2011). Recognizing that childhood obesity becomes a problem in the early years of life is an important part to this battle. According to the American Academy of Pediatrics (2020) 75-90% of the
cardiovascular disease epidemic is caused by dyslipidemia, hypertension, diabetes, tobacco, physical inactivity, and obesity. The atherosclerotic process begins in youth, causing the development of vascular plaque to continue into adult years (Gidding et al., 2020). The American Academy of Pediatrics (2020) recommends limiting added sugars to less than 10 percent of calories per day and to continue consuming more vegetables, fruits, whole grains, and lean proteins. Health care community education combined with a health policy and an environmental change to support nutrition and physical activity, are essential to this health strategy (Gidding et al., 2020).

A health policy encouraging vegetable education in preschool classrooms can increase the number of children living with a healthy diet and lifestyle, which shows a direct link to a decrease in obesity. Recommendations for a vegetable education program held in a preschool classroom would be weekly hands on education, allowing the children the opportunity to assist in making the vegetable sample before trying it.

Nationally, this policy should be incorporated for all preschools and child-centers with children aged three to five years old. Incorporating this education with young children allows for them to become more aware of nutrition education and trying new vegetables. After evaluating the “Veggiecation” program thus far, it is obvious that the children have developed an increased vegetable knowledge and vegetable consumption. Observing the children become excited about preparing the sample and learning about the veggie of the day, confirms the value of this policy. A six-week program is not enough time to change daily habits, but enough time to spark curiosity and interest, therefore a nutrition program needs to be throughout the school year.

Thirty one percent of children in New Jersey are overweight (Data Resource Center, 2017). State goals for this policy include an increase in vegetable consumption and an increase in
vegetable knowledge. Encouraging a long-term healthy eating habit can decrease the childhood obesity rates for the future years. Young children spend much of their time in childcare centers and preschool classrooms and what they learn in this period is essential for future health into childhood and adolescent years. Prevention of obesity, in the early years of life, with consistent nutrition education can significantly increase the likelihood of a healthy lifestyle.

Locally, a policy incorporating nutrition education into the weekly lives of preschoolers can change the future outcomes for the community. These children may also motivate and encourage their parents to eat healthier and make lifestyle changes. The nutrition education program also offers the recipe used in the classroom to be taken home for the family to use.

**Implications for Quality and Safety**

An early child nutrition education program will promote good health and nutrition. Health, safety, and nutrition are closely related and dependent on one another; children who receive essential nutrients from a healthy diet are more likely to reach their growth potential and benefit from early learning opportunities, experience fewer illnesses, and have more energy for play time (Marotz, 2012). The “Veggiecation” program overall can improve a child’s quality of life. Nutritious foods play a demanding role in basic body functions (Marotz, 2012). These functions include supplying energy, promoting growth and development, improving resistance to illness and infection, and building and repairing body tissues. At completion of such a program, the children understand that vegetables are healthy and safe for the body.

The quality of the classroom will also improve by using this nutrition education program for the reason that vegetables improve mood and energy. Well-nourished children are alert, have high energy, and can benefit more from learning experiences (Marotz, 2012). Allowing the
children to assist in the preparation of the sample each week can also further improve patience and participation skills in the classroom.

When using the “Veggiecation” program safety is an important factor to acknowledge, safety of the children, vegetables used, and preparation of the sample. The educator must ensure that all vegetables are bought at a reputable store and are washed thoroughly prior to use. During the interactive portion of the lesson, the educator again must ensure the safety of the children and the environment while making the sample. The children should never be left alone to make the sample, the educator should be assisting the children and make certain everyone works together safely.

**Clinical Implications for Economy**

Investing in the health of our students contributes to healthy communities in the future (Munson, 2017). Programs in health and nutrition aimed at women and young children can promote better growth and development, which would improve human capital and increase economic productivity in years to come (Yin, 2008). Future economic benefits may include a decrease in healthcare costs due to illness and obesity with the knowledge that a healthy diet including vegetables can decrease the risk of such diagnoses. Investing in nutrition is a long-term human investment with positive outcomes that could further decrease this obesity risk (Yin, 2008). Funding a nutrition program for all young children should be a national standard.

**Plan for Future Scholarship**

Overall, the DNP project has reached all intended outcomes. Throughout the six-week program, there was an increase in vegetable knowledge and consumption. The program also supports that with continuous introduction and education, children will be more willing to try new vegetables/foods. The results have been publicly presented using a PowerPoint presentation.
by the study coordinator to the DNP team and other interested people in Spring 2020. A poster was also presented including background information, problem statement, the project purpose, methods, findings, and implications on DNP poster day. The findings of this intervention may also be published in a nursing or nutrition journal. Future plans include continuing to educate the community on the success of vegetable knowledge and consumption with the use of the “Veggiecation” program. Educating the community may include using the DNP poster at conferences, sharing this information with parents through practice, and speaking with nearby preschools about implementing a nutrition education program into their classrooms.

**Sustainability**

The “Veggiecation” program has educated the children on the health benefits of vegetables and how to prepare them in simple and unique ways in the future. By educating preschool children about the importance of vegetables early on, information will be carried with them into the future. The affordable recipes completed in the classroom were sent home with the children for the families to continue to use. It was hoped that the children continued to prepare these snack ideas at home with the parents, as well as share the information they learned in class that day. The preschool can also decide to continue to provide the program, as well as recommend it for other preschool classrooms in the nearby area. This would continue young children’s education about vegetables and promote a healthy lifestyle for their future.

**Conclusion**

In summary, the “Veggiecation” program was implemented over six weeks in a preschool classroom located in Camden County, New Jersey. The Knowledge to Action Framework was used during project development. Prior to implementation of the program, a pre-intervention survey was completed with the children to gain a basic level of knowledge. The program
included weekly educational information on vegetables, coloring activities, and a child-friendly interactive classroom recipe, which the children were then able to taste their vegetable sample. An “I tried it” “Veggiecation” sticker was given for participation after each weekly lesson. Descriptive statistics were used to determine the outcome of the overall program. All data was secured throughout the project and all students remained anonymous. At the end of the program the children demonstrated an increase in vegetable knowledge by understanding that vegetables are healthy for their body and an increase in overall vegetable consumption.
References


doi: 10.1080/07315724.1998.10718778


Appendix A

Knowledge to Action Framework

## Appendix B

### Table Of Evidence

<table>
<thead>
<tr>
<th>Article #</th>
<th>Author &amp; Date</th>
<th>Evidence Type</th>
<th>Sample, Sample Size, Setting</th>
<th>Study Findings that help answer the EBP Question</th>
<th>Limitations</th>
<th>Evidence Level &amp; Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peem &amp; Jeewon, 2015</td>
<td>Literature Review</td>
<td>100 scientific articles were considered from various databases, using the keywords fruit and vegetable, nutrition education, body weight, obesity, benefits and challenges</td>
<td>Data suggests that fruits and vegetable are found to be protective against adiposity and a potential treatment in obesity. Nutrition education must be more comprehensive by considering environmental factors and behaviors.</td>
<td>Challenges faced in the articles that were used in the review include, realistic educational goals, research designs, and valid and reliable measurements.</td>
<td>V/B</td>
</tr>
<tr>
<td>2</td>
<td>Nekitsing, Bundell-Birtill, Cockroft, &amp; Hetherington, 2018</td>
<td>Systematic review</td>
<td>Systematic review and a meta analysis of published studied were reviewed that specifically measured vegetable consumption in preschool children</td>
<td>It was found that repeated taste exposure and offering vegetables plain rather than cooked in oil, had better consumption rates. Additional intervention strategies included allowing a child to choose, nutrition education, modeling, rewarding, offering a variety, and visual presentation.</td>
<td>The clinical interpretation of the findings is a concern when using standardized effect sizes.</td>
<td>I/B</td>
</tr>
<tr>
<td>3</td>
<td>Kim, S. A., Moore, L. V., Galuska, D., Wright, A. P., Harris, D., Grummer-Strawn, L. M., Merlo, C. L., Nihiser, A. J., Rhodes, D. G., Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, CDC, 2019</td>
<td>Systematic Review</td>
<td>14,865 children aged 2-18 years old, United States</td>
<td>A 24 hour recall was completed with the NHANES over 7 years to estimate the trends of fruit and vegetable intake. There was an increase in whole fruit and a decrease in fruit juice. There was no change in vegetable intake. Continued efforts must be made to increase children’s fruit and vegetable intake.</td>
<td>The 24 hour recall information was reported by either parents of the children or the children themselves, which makes them subject to biases. Estimating fruit and vegetable intake relied on MyPyramid and Food Pattern databases, which hold food and beverages into cup equivalent according to standard recipes. There is a possibility this caused a measurement error. The most recent data used was from 2009-2010, because earlier data did not separate total fruit into whole fruit and fruit juice in the USDA databases before 2003. The response rates in NHANES were up to 90% across all years (1-19 years old), high response rates could include bias.</td>
<td>I/A</td>
</tr>
</tbody>
</table>
## A Nutrition Program with Preschool Children

<table>
<thead>
<tr>
<th>Study</th>
<th>Authors</th>
<th>Type</th>
<th>Participants</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Nekitsing, Hetherington, &amp; Blundell-Birtill</td>
<td>Systematic Review</td>
<td>None</td>
<td>The study explains that the intake of vegetables in children is still a huge concern for parents and members of the health care team. Findings suggest that nutrition education should be used along with sensory learning to increase the long-term consumption of vegetables in preschool children.</td>
</tr>
<tr>
<td>5</td>
<td>Slavin &amp; Lyod, 2012</td>
<td>Literature Review</td>
<td>None</td>
<td>The information explains the health benefits of fruits and vegetables and the importance of consuming them regularly. Fiber is also discussed as a role in disease prevention.</td>
</tr>
<tr>
<td>6</td>
<td>De Kroon, Renders, Van Wouwe, Burren, &amp; Hirasing, 2010</td>
<td>Cohort study</td>
<td>642 18-28 year olds were studied with their BMI from 2-6 years old; Terneuzen, Netherlands</td>
<td>The study found that BMI changes from 2 to 18 years old are directly related to cardiovascular risk factors. Preventing an increase in BMI from age 2 can decrease the risk of metabolic disease into young adulthood.</td>
</tr>
<tr>
<td>7</td>
<td>Lakshman, Elks, &amp; Ong, 2013</td>
<td>Literature Review</td>
<td>None</td>
<td>This article reviews the trends in childhood obesity, specifically infants to preschool age, by looking at genetic and nutrition risk factors and the current prevention/treatment strategies. It was found that childhood obesity prevention programs are not often completed even though this can decrease the obesity rates. Childhood obesity not only affects their future adult health but also negatively impacts the child’s quality of life.</td>
</tr>
<tr>
<td>8</td>
<td>Bai, Y., Suriano, L., &amp; Wunderlich, 2014</td>
<td>Randomized Controlled Trial</td>
<td>3rd grade students in 2 schools; Connecticut</td>
<td>The “Veggiecation” program has been implemented successfully in over 30 states. During this specific study, there was an increase in vegetable consumption after the implementation of the program when compared to the schools who didn’t use the program. The knowledge was the same in both schools.</td>
</tr>
<tr>
<td>9</td>
<td>Bai, Suriano, &amp; Wunderlich, 2012</td>
<td>Quasi-experimental design</td>
<td>73 school aged children, One intervention group &amp; one control group; Connecticut</td>
<td>Intake of vegetables were higher among the intervention children, including lunch time, snack, and dinner. Regression analyses found that attitude and subjectivity dictated how many vegetables were consumed that day in the intervention group and behavior such as attitude dictated vegetable consumption in the control group. Parent involvement is needed to support the program effect.</td>
</tr>
<tr>
<td>10</td>
<td>Joseph, Gorin, Mobley,&amp; Mobley, 2015</td>
<td>Randomized Controlled Trial</td>
<td>49 preschool children, 3-5 years old</td>
<td>The study found that in a two-week nutritional program there was an increase in knowledge of healthier snacks.</td>
</tr>
</tbody>
</table>

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**Notes:**
- None of the studies explicitly address sensory learning.
- The study by Bai, Suriano, & Wunderlich, 2012, notes a lack of baseline data and researchers were unaware of the number of survey participants in the program.
- The study by Joseph, Gorin, Mobley, & Mobley, 2015, notes the study was very short; it took place over 2 weeks.
Appendix C

Pre-intervention Survey

Part 1 Tell us about yourself. Answer the following questions by marking an “X” in the box by your choice. Mark only one box for each question.

1. Are you a boy or a girl?  Boy  Girl

2. How do you describe yourself? (Mark only one box)
   Asian or Asian American
   Black or African American
   Hispanic/Latino/Latina
   White
   Native American
   Other (write it in the box)

Part 2 The following questions/statements by circling the number that corresponds to the likelihood of you performing the task at question (“Never” = 0, “Sometimes” = 2, “Always” = 4)

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Sometime</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. I eat more than one kind of vegetable every day.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I try new vegetables.</td>
<td></td>
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</tbody>
</table>

Have you ever tried the following vegetables?

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Never</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>5. Broccoli</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>6. Cauliflower</td>
<td></td>
<td></td>
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<tr>
<td>7. Parsnip</td>
<td></td>
<td></td>
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<tr>
<td>8. Pumpkin</td>
<td></td>
<td></td>
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<tr>
<td>9. Butternut squash</td>
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<td></td>
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<tr>
<td>10. Kale</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11. Snap Peas</td>
<td></td>
<td></td>
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<tr>
<td>12. Zucchini</td>
<td></td>
<td></td>
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<td>13. Asparagus</td>
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</table>

Part 3 My feelings about Veggies

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<th></th>
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<tbody>
<tr>
<td>14. Eating veggies is...</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Eating veggie every day makes me feel...</td>
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</tbody>
</table>
Part 4 What I know about vegetables

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>?</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>18. I should eat vegetables everyday</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Eating vegetables make my bones stronger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Eating vegetables can help my heart be healthy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Eating vegetables can help my eyes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Eating colorful vegetables is important</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Part 5: In my house...

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Sometime</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. In my house, I can find vegetables any time I want.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. I eat my vegetables whenever I want.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. I eat my vegetables only when I am told to eat vegetables.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. I ask my parents (mom or dad) to buy vegetables in the grocery.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Source: (“Veggiecation”)

Appendix E

Parental Informed Consent Form

RUTGERS
School of Nursing

PARENTAL PERMISSION TO PERMIT CHILD TO TAKE PART IN RESEARCH

TITLE OF STUDY: Implementing and Evaluating a Nutritional Education Program with

Preschool Children

Study coordinator: Taylor Kemery RN, BSN

STUDY SUMMARY: This consent form is part of an informed consent process for a research study and it will provide information that will help you decide whether you want your child to take part in this study. It is your choice for him/her to take part or not. The purpose of the research is to: educate the child on nutrition, specifically focusing on vegetables. If your child takes part in the research, s/he will be asked to participate in the educational nutrition lesson by listening, they will then be asked to color a picture of the “vegetable of the week,” and lastly your child will be asked to try the vegetable sample being provided. Their time in the study will take 30 minutes once a week, for 6 weeks. Possible harms or burdens of taking part in the study may be an unfavorable reaction to a recipe sample and possible benefits of taking part may be an increase in nutrition knowledge and food recipes to bring home for family use. Your child’s alternative to taking part in the research study is not to take part in it. The information in this consent form will provide more details about the research study and what will be asked of your child if you permit him/her to take part in it. If you have any questions now or during the study, you should feel free to ask them and should expect to be given answers you completely understand. After all of your questions have been answered and you wish your child to take part in the research study, you will be asked to sign this permission form. You are not giving up any of your child's legal rights by permitting him/her to take part in this research or by signing this parental permission form.

Who is conducting this research study?
Study coordinator Taylor Kemery is the Study coordinator of this education program. However, there are often other individuals who are part of the research team.

Study coordinator Taylor Kemery may be reached at

The Study coordinator will also be asked to sign this informed consent. You will be given a copy of the signed consent form to keep.
Why is this study being done?
The education program is being done to increase the knowledge of vegetables in preschool-aged children.

Who may take part in this study and who may not?
Children of the age 3-5 years old may participate in this study. Children younger than the age of 3 and older than the age of 5 may not participate. Possessing of speech and comprehension abilities in the English language is needed to complete the pre-program survey. The child will not be excluded from participating in the education program if unable to complete the pre-program survey with the study coordinator but a determination of knowledge base prior to implementation of the education program is indicated. Oral motor deficits could pose as a choking hazard and dietary restrictions would inhibit the child from participating in the tasting portions of the lesson. These children will still be able to participate in the education and coloring portion of the lesson.

Why has my child been asked to take part in this study?
Your child has been asked to take part in this study because they are between the age 3-5 years old.

How long will the study take and how many subjects will take part?
The education program will take place for a total of 6 weeks, 1 day each week. The entire preschool classroom was asked to participate.

What will my child be asked to do if s/he takes part in this study?
The study will take place over six weeks, 1 day a week. Prior to the first class, your child will be asked to complete a pre-program nutrition knowledge survey. The study coordinator will read the pre-program survey to your child. Each day, the study coordinator will teach a new vegetable with an educational poster and then your child will color an activity page with that vegetable. As they color, the Study coordinator will prepare the vegetable sample. Your child will have the opportunity to assist in pouring, mixing, and preparing the vegetable to eat. This allows for an interactive experience. The recipe will then be sampled. Each child will receive an “I tried it” sticker and the recipe will be sent home to the family. Your child will then be asked questions regarding what they remember from the six-week educational experience. This not a test and there will be no grade given.

What are the risks and/or discomforts my child might experience by taking part in this study?
Risk- an unfavorable reaction to the vegetable sample such as an allergic reaction or a disliking of the vegetable.

Are there any benefits to my child if s/he takes part in this study?
The benefits of taking part in this study may be in increase in nutrition knowledge, directly related to vegetables. However, it is possible that s/he may not receive any direct benefit from taking part in this study.
**What are my alternatives if I do not want to take part in this study?**
If you do not want your child to participate in the study, the preschool teacher will give an alternate activity.

**How will I know if new information is learned that may affect whether I am willing to allow my child to stay in the study?**
During the course of this program you will be updated about any new information that may affect whether you are willing to allow your child to continue taking part in the study. If new information is learned that may affect your child after the program or their follow-up is completed, you will be contacted.

**Will there be any cost for my child to take part in this study?**
No, this does not cost anything for you or your child.

**Will my child be paid to take part in this study?**
Your child will not be paid to take part in this study.

**How will information about my child be kept private or confidential?**
Your child’s name will not be taken down on the pre-program survey. The identifying factors will be age, gender, and ethnicity. All paper documents will be locked in a desk and all computer data will be locked on a password-protected computer.

**What will happen to my child’s information collected for this research after the study is over?**
The information collected about your child for this education program will not be used by or distributed to investigators for other research. It will be destroyed after completion of the education program.

**What will happen if I do not wish my child to take part in the study or if I later decide that I do not wish my child to stay in the study?**
It is your choice whether your child takes part in the education program. You may choose to have your child take part, not to take part or you may change your mind and withdraw your child from the education program at any time.

If you do not want your child to enter the education program or decide to stop taking part, their relationship with the study staff will not change, and s/he may do so without penalty and without loss of benefits to which your child is otherwise entitled.

You may also withdraw your permission for the use of data already collected about you child, but you must do this in writing to Study coordinator Taylor Kemery. If this is necessary, an email can be provided.

If you decide to withdraw your child from the study for any reason, your child may be asked to return for at least one additional visit for safety reasons.

**Who can I call if I have questions?**
If you have questions about your child taking part in this study or if you feel your child may have suffered a research related injury, you can call the Study coordinator: Taylor Kemery, [Contact Information]

If you have questions about your child’s rights as a research subject, you can call the IRB Director at: Newark HealthSci (973)-972-3608 or the Rutgers Human Subjects Protection Program at (973) 972-1149.

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**PARENTAL PERMISSION FOR CHILD**

I have read this entire form, or it has been read to me, and I believe that I understand what has been discussed. All of my questions about this form or this study have been answered.

I am the [ ] parent or [ ] legal guardian of ___________ (name of child) and I agree for my child to take part in this research study.

Subject/Child’s Name: __________________________________________________________

Parent’s Signature: __________________________ Date: __________

**Signature of Investigator/Individual Obtaining Consent:**

To the best of my ability, I have explained and discussed the full contents of the study including all of the information contained in this consent form. All questions of the research subject and those of his/her parent or legal guardian have been accurately answered.

Investigator/Person Obtaining Consent: ________________________________

Signature: __________________________ Date: __________
Appendix F

Recruitment Flyer

Attention Parents/Guardians

Your child is being asked to participate in a nutritional education program that will be taking place in the Preschool classroom!

Purpose? To increase the knowledge and consumption of vegetables in preschool children!

What does this consist of? A pre-program survey will be completed with your child, asking them what they know about vegetables. A 6-week education program will then take place, your children will learn from an educational vegetable poster 1 day each week (a total of 6 classes), have the opportunity to color a picture of the vegetable after the lesson, and then your child will try a sample of a unique vegetable recipe! Your child will also be allowed to assist in the preparing of the recipe sample. At the end of the program your child will be asked questions about what they have learned about vegetables. This will not be a test; your child will not receive a score or a grade.

Who can participate? All children in the class of the ages 3-5 years old. If the child has strict dietary needs, they may participate in the lesson and coloring portion. If the child does not understand the English language, they may participate in all areas except for the pre-program survey.

Benefits? This is completely FREE! Your child will receive a sticker after each weekly lesson and the vegetable sample recipe will be sent home for the family to use.

Time? The 30-minute education class will take place during school hours. Your child must attend all 6 classes to be included in the research.

YES, I want my child to participate in both the pre-program survey and the program □

NO, I do not want my child to participate □ (An alternate activity will be provided by the preschool teacher)

Questions? Contact Taylor Kemery (A Doctorate of Nursing student at Rutgers University directly- or )
Appendix G
Letter of Site Agreement from Administration

Date: 4/3/19

Re: Letter of Cooperation For [Redacted] (Preschool Class)

Dear Taylor Kemery,

This letter confirms that I, as an authorized representative of [Redacted] allow the Principal Investigator access to conduct study related activities at the listed site(s), as discussed with the Principal Investigator and briefly outlined below, and which may commence when the Principal Investigator provides evidence of IRB approval for the proposed project.

• **Study Purpose:** The purpose of this study is to provide nutritional education, focusing on vegetables, to children ages 3-5 years old.

• **Study Activities:** The program “Veggiecation”, a nutritional education program will be implemented in the preschool classroom over 6 weeks. The program includes a weekly interactive lesson on vegetables including posters along with a correlating coloring page. The lesson will end with a non-allergenic recipe for the children to try the vegetables that were mentioned in the lesson. The children may also have the opportunity to assist with the recipe. This may include mixing and pouring. A survey will also be distributed to the children before implementation of the program and then directly after. Given the developmental level of the children, the principle investigator will read the questions to the preschool children. Recipes conducted in class will also be sent home to the family.

• **Subject Enrollment:** Inclusion Criteria- age 3-5 years old, speak and understand English, and enrolled in the preschool classroom at [Redacted] Preschool classroom. Estimated sample size is 9 participants

• **Site(s) Support:** A classroom will be provided to conduct the study activities, authorization from teacher to identify children who qualify and can participate in the study, survey questionnaire to be distributed to the preschool children before and after completion of the study, recipes to be sent home to the family, and information food allergy information to be retrieved from patient data site files.
A loving, caring environment for children with special medical needs.

- **Data Management:** The data being collected will include responses from the pre survey and post survey. Collected data throughout the invention will be de-identified. Data will be analyzed using Excel Microsoft Office Home and password protected on the computer of the principle investigator at all times.
- **Anticipated End Date:** December 2019

We understand that this site’s participation will only take place during the study’s active IRB approval period. All study related activities must cease if IRB approval expires or is suspended. I understand that any activities involving Personal Private Information or Protected Health Information may require compliance with HIPAA Laws and Rutgers Policy.

Our organization agrees to the terms and conditions stated above. If we have any concerns related to this project, we will contact the Principal Investigator. For concerns regarding IRB policy or human subject welfare, we may also contact the Rutgers IRB (see orn.rutgers.edu/hspp).

Regards,
Appendix H
Letter of Site Agreement from Preschool Teacher

A loving, caring environment for children with special medical needs.

- **Data Management:** The data being collected will include responses from the pre survey and post survey. Collected data throughout the invention will be de-identified. Data will be analyzed using Excel Microsoft Office Home and password protected on the computer of the principle investigator at all times.

- **Anticipated End Date:** December 2019

We understand that this site’s participation will only take place during the study’s active IRB approval period. All study related activities must cease if IRB approval expires or is suspended. I understand that any activities involving Personal Private Information or Protected Health Information may require compliance with HIPAA Laws and Rutgers Policy.

Our organization agrees to the terms and conditions stated above. If we have any concerns related to this project, we will contact the Principal Investigator. For concerns regarding IRB policy or human subject welfare, we may also contact the Rutgers IRB (see orra.rutgers.edu/hspn).

Regards,
Appendix I
Letter of Site Approval to use “Veggiecation”

To Whom It May Concern:

I am writing to confirm that the Veggiecation program and the survey tool provided may be used in the DNP project of Taylor Kemery. The purpose will be to educate preschool children about nutrition specifically focusing on vegetables and provide them with hands-on culinary experience.

I am the founder and CEO of a children’s nutrition education program, Veggiecation. It is the mission of Veggiecation to promote and educate communities on the health benefits of vegetables and how to prepare them in simple, unique, affordable, and, most importantly, delicious ways.

Veggiecation lessons allow children and parents to develop the culinary skills that will empower them to prepare meals that are environmentally sustainable. This ability will benefit participants throughout their lives and allow them to make food choices that are socially conscious and give them the power to take responsibility of their own health and wellness in a way that is realistic and affordable.

Our materials and educational messaging focus on the seasonality of vegetables, beans and herbs as well as their common geographic region and their health benefits most relevant to young minds and bodies.

We have no concerns and fully support Ms. Kemery in this important wellness initiative and study.

Thank you,
Appendix J
Certification of Completion for “Veggication” Training

Certification of Completion

awarded to

Taylor Kemery

has successfully complete the
Veggication Educator Training Program

On the 1st Day of April
in the year of 2019

Signed by:
Lisa R. Suriano, Founder & CEO Veggication LLC
The Special Veggie Is cauliflower

who cauliflower
what flower
where USA
when fall and early spring
why folate = brain power
    vitamin C = healthy body
    fiber = happy tummy

Illustrated by Lauren Ruth
Raw Cauliflower Popcorn

**TOOLS and EQUIPMENT:**
- Knife
- Cutting Board
- Measuring Spoons
- Mixing Bowls
- Sealable Plastic Container, hard Tupperware style or a plastic bag

**YIELD:** 4 Servings

**INGREDIENTS**
- 2 cup of Cauliflower, washed
- 1 Tbsp. Olive Oil
- ¼ tsp Garlic Powder
- Salt and Pepper to taste

**DIRECTIONS**
Cut cauliflower into large pieces and then break into small “popcorn-sized” pieces with your hands.
Place cauliflower in a sealable plastic container.
Seal container and shake to coat your popcorn with oil.
Add garlic powder, salt, and pepper to your plastic container and shake again.
Repeat as needed until you get that flavor you are looking for!

**TIP:** A variety of different spices will add flavor to this crunchy popcorn: curry, turmeric, ginger, cayenne, cumin, soy sauce, and nutritional yeast.
Just a pinch between shakes until you find that flavor you enjoy!

*Enjoy as a popcorn substitute indoors or out, fun finger food for any picnic!*

For more recipes visit us at: www.veggiecation.com
Find us on Facebook www.facebook.com/veggiecation
Follow us at http://twitter.com/Veggiecation
Spinach Poster

- The Special Veggie Is Spinach
- Why: spinach
- What: seed and seed pods
- Where: Persia, China, America
- When: fall and spring
- Why: calcium = strong bones, folic acid = good mood, iron = healthy eyes

Illustrated by Lauren Roth
Spinach Coloring Page

Spinach

Good Mood

Healthy Eyes

Strong Bones
Spinach Recipe

Sweetheart Smoothie

YIELD: 2 Servings

INGREDIENTS

2 cups washed Spinach
8 oz Strawberries
2 cups plain or vanilla Yogurt
1 tbs Honey

DIRECTIONS

Place all of the ingredients in a blender and blend well.
Pour over ice.
Enjoy a very refreshing drink!

Spinach = Vitamin K = A Strong, Healthy Heart
Strawberries = Fiber = Lower Blood Pressure

For more recipes visit us at: www.veggiecation.com
Find us on Facebook www.facebook.com/veggiecation
Follow us at http://twitter.com/Veggiecation
Appendix Q

Squash Poster

The Special Veggie Is butternut squash

**Who** butternut squash

**What** fruit

**Where** USA, South America, Europe

**When** late winter

**Why**
- potassium = fast healing power
- magnesium = healthy blood
- vitamin A = fights cancer

Illustrated by Lauren Roth
Butternut Squash

Fast Healing Power

Healthy Blood

www.veggiecation.com
Butternut Slaw

TOOLS and EQUIPMENT:
Vegetable Peeler
Knife
Cutting Board
Measuring Cups and Spoons
Medium Bowl
Hand Grater
Apple Corer

YIELD: 5 Servings

INGREDIENTS

Salad Ingredients:
2 cups shredded Butternut Squash
1 large Granny Smith Apple

Dressing Ingredients:
3/4 cup Orange Juice
1/3 cup Oil
1/2 tsp. Ground Cinnamon
2 tbsp. Honey
1/2 tsp. salt
pepper to taste
1/8 tsp. prepared mustard
1/8 tsp. pumpkin pie spice

DIRECTIONS

Combine dressing in a bowl and mix well.
Add the butternut squash and apple.
Toss and chill.

For more recipes visit us at: www.veggiecation.com
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The Special Veggie Is **kale**

- kale
- what leaf
- where North America, Central America, Europe, Africa, Asia
- when winter

**why** vitamin K = healthy heart
vitamin A = strong eyes
vitamin C = fight colds

*Illustrated by Lauren Koch*
Appendix U

Kale Coloring Page

Kale

Strong Eyes

Fight Colds

Healthy Heart

Veggiecation
Appendix V

Kale Recipe

Cinnamon Baked Kale Chips

YIELD: 5 servings

INGREDIENTS

12 large kale leaves
1 tbsp olive oil
3 tbsp sugar
2 1/2 tsp of cinnamon

DIRECTIONS

Preheat oven to 250°F.

Wash the Kale leaves and dry well. Cut each leaf in half lengthwise. Remove stem and center rib.

Toss kale with oil in large bowl.

Arrange leaves in single layer on 2 large baking sheets.

Combine Cinnamon and sugar in a bowl and sprinkle over Kale leaves.

Bake until crisp, about 25 - 30 minutes. Check after 25 minutes. Smaller leaves take less time and should be removed first. The larger more wrinkled leaves usually need to bake for a few extra minutes to get crisp.

Transfer leaves to rack to cool.

For more recipes visit us at: www.veggiecation.com
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Follow us at http://twitter.com/Veggiecation
Appendix W

Carrot Poster

The Special Veggie Is carrot

who Carrot

what Foot

where USA, England, and Poland

when spring and summer

why vitamin A = prevents pimples

vitamin B6 = shiny, healthy hair

potassium = feeling calm and happy

for the love of vegetables

Illustrated by Lauren Roth
Carrot Coloring Page

Carrot

Shiny, Healthy Hair

Feel Calm & Happy
Appendix Y

Carrot Recipe

Sweet Carrot Salad

**TOOLS and EQUIPMENT:**
- Vegetable Peeler
- Cutting Board
- Box Shredder
- Bowls
- Measuring spoons
- Measuring Cup

**YIELD:** 5 Servings

**INGREDIENTS**
- 1 ½ lbs. Carrots, shredded
- 2 pieces Gala apples, peeled and shredded
- ½ cup Golden Raisins
- 1 cup Organic Yogurt
- 2Tbsp. Honey
- ¼ tsp. Cinnamon
- ¼ tsp. Vanilla Extract
- ½ Lemon, juiced
- 2 Tbsp. Parsley
- Salt and pepper to taste

**DIRECTIONS**

Peel and shred carrots in to a mixing bowl.

Combine yogurt, honey, vanilla, cinnamon, lemon juice and mix well. Pour over carrots and add peeled and shredded apples, parsley and raisins.

For more recipes visit us at: [www.veggiecation.com](http://www.veggiecation.com)

Find us on Facebook [www.facebook.com/veggiecation](http://www.facebook.com/veggiecation)

Follow us at [http://twitter.com/Veggiecation](http://twitter.com/Veggiecation)
Broccoli Coloring Page
Appendix BB

Broccoli Recipe

Mini Broccoli Trees with Asian Dressing

Yield: 5 servings

Ingredients

2 broccoli crowns cut into florets
1 clove garlic, minced
1 tsp minced fresh ginger root
4 tbsp canola oil
1 tbsp rice vinegar
2 tbsp soy sauce
2 tsp honey
1 tbsp water

Directions

Blanch the broccoli in boiling salted water and cook until fork tender.

Drain broccoli in a colander; run under cold water until the broccoli is cold.

Drain well and chill.

In a blender, combine garlic, ginger, canola oil, rice vinegar, soy sauce, honey and water.

Serve chilled broccoli with dressing and enjoy!

For more recipes visit us at: www.veggiecation.com
Find us on Facebook www.facebook.com/veggiecation
Follow us at http://twitter.com/Veggiecation
Appendix CC

“I tried it” Sticker

Source: (“Veggiecation”)
Appendix DD

Vegetable Consumption - Pretest Information

I eat more than one kind of vegetable every day

- Never
- Sometimes
- Always

I TRY new vegetables

- Never
- Sometimes
- Always
Children’s prior consumption of vegetables
Appendix FF

Feelings Towards Veggies- Pretest Information

<table>
<thead>
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<th>Feelings about vegetables</th>
<th>Very good</th>
<th>Good</th>
<th>Don’t know</th>
<th>Bad</th>
<th>Very Bad</th>
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</thead>
<tbody>
<tr>
<td>Eating vegetables is</td>
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<td>X</td>
<td>XXX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eating vegetables makes me feel</td>
<td></td>
<td></td>
<td>XXX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
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<th>Feelings about vegetables</th>
<th>Very Fun</th>
<th>Don’t know</th>
<th>Boring</th>
<th>Very Boring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trying new foods is</td>
<td>XXXXXXX</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trying a “Veggie of the week”</td>
<td>XX</td>
<td>XX</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix GG

Vegetable Knowledge - Pretest Information

- I should eat veggies everyday
- Veggies make my bones strong
- Veggies make my heart healthy
- Veggies help my eyes
- Eating colorful veggies are important

Options: Yes, I don’t know, No
Appendix HH

Vegetables in the Home- Pretest Information

I can always find veggies in my house
I eat veggies whenever I want
I eat veggies only when told to
I ask my parents to buy me veggies

- Never
- Sometimes
- Always