

The Effectiveness of Nutritional Education Among Seniors Over the Age of 65 in Leading a Heart Healthy Lifestyle

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ABSTRACT

The purpose of the study was to evaluate the effectiveness of a nutrition educational program on increasing individual knowledge in leading a heart healthy lifestyle among seniors aged 65 years and older. The design of the study was Quasi-experimental and was completed at the Amherst Senior Center, Amherst, Massachusetts. Participants were recruited through paper flyers as well as verbal recruitment during an exercise program at the senior center. Participant knowledge was assessed utilizing a pre-and post-test which included a Food Frequency Questionnaire (FFQ). Duplicate tests were given prior to an educational session and two weeks post-education. Participant performance was evaluated by comparing test grades and results from the FFQ. Five men and women over the age of 65 years were included in the study. Data analysis was completed using IBM SPSS Statistics 26. Results showed participation in the educational session increased test scores by 24.6% ($p < 0.005$) on average. There were no significant results between pre-and post-test FFQ between educational sessions. This indicated no significant difference in dietary changes. This limitation may be related to the number of education sessions that were conducted. Ideally, nutrition education sessions can be tailored to individual, or group needs, with the idea that these programs can be repeated for future use leading to positive health results.

INTRODUCTION

In the United States, heart disease remains the leading cause of death for men and women with 659,000 deaths from heart disease per year.¹ As people age, changes in the heart and blood vessels can occur and can lead to high blood pressure, blocked arteries, and atrial fibrillation.² People over the age of sixty-five are more likely to suffer from a heart attack, stroke, develop heart disease, or heart failure.³ For men and women in the age group of sixty-five to eighty-five, heart disease is the second leading cause of death as of 2017.^{2,4} At eighty-five years and older, heart disease was the leading cause of death for both men and women.^{2,4}

Changes in lifestyle can help prevent heart disease.⁵ The American Heart Association recommends seven approaches to staying heart healthy: be active, keep a healthy weight, learn about cholesterol, do not smoke, eat a heart healthy diet, keep blood pressure healthy, and learn about blood sugar and diabetes.⁵ Evidence shows that diet can impact cardiovascular disease (CVD) through changes in dietary patterns.⁶ According to Casas R, et al., dietary patterns that include excessive intake of "sodium, added sugars, fats, and low intake of fruit and vegetables, whole grains, fibers, legumes, fish and nuts", contribute to the development of cardiovascular disease.⁶ Not only does diet play a role in the prevention of CVD, but is also can impact other

risk factors of developing CVD like hypertension, diabetes, overweight or obesity, or dyslipidemia.⁶

Although cardiovascular disease has been the leading cause of death since 1991⁷, the rate of deaths has declined partially due to changes in dietary intake over the years.⁷ Evidence shows that improvement in individual nutrition may be achievable through education programs in either individual or group settings.⁸ Nutrition education programs have also been used to improve anthropometrics and inflammatory biomarker levels.⁹ Specifically, those with cardiovascular disease have shown to improve self-efficacy, dietary patterns, and cardiovascular risk factors after partaking in a nutrition education program.¹⁰

In Fall of 2021, a needs assessment was conducted at the Amherst Senior Center in Amherst, Massachusetts to determine a nutrition need and develop a correlating nutrition education program. The needs assessment gathered information on current dietary and exercise habits, food preparation experience and abilities, label reading, how one obtains meals, and current knowledge of a basic heart healthy diet. After completing the needs assessment, deficits were noted in reading nutrition labels, exercise, preparing heart healthy meals, and overall knowledge on what heart healthy meals consist of. A nutrition education program was created to address these needs. The purpose of the program was to evaluate the effectiveness of providing group nutrition education on leading a heart healthy lifestyle for the prevention of cardiovascular disease.

METHODS

Study Design

A quasi-experimental design with an education intervention was used. To determine success of the educational program, outcomes were assessed using pre- and post-education tests. Informed consent was obtained from all participants. This study was approved by the State University of New York (SUNY) Oneonta Institutional Review Board.

Participants

Participants were members of the Amherst Senior Center who attended other health and exercise classes held on-site. Participants were recruited using paper flyers and verbally through an exercise class held at the senior center. To be able to partake in the intervention, participants had to be sixty years of age or older and able to attend the education session and complete both pre and post-test. Eight participants were recruited with five participants meeting the criteria. There were no limitations on the number of participants allowed.

Intervention

The intervention was developed by the author and consisted of an educational program that focused on seniors leading a heart healthy lifestyle. The purpose of the intervention was to improve the knowledge and dietary habits of the participants through an education session. The program was designed to be repeated for future use at the senior center and was held in a group setting. Methods were based on the Cognitive Theory of Multimedia which states that there are two separate channels (auditory and visual) used for processing information.¹¹ Presentation of

the program was completed by the author utilizing a visual power point presentation along with auditory input.

The intervention was divided into three sessions, was held over a four-week period, and occurred at the beginning of a scheduled exercise class to capture a larger audience. The purpose of the first session was to obtain informed consent and distribute the pre-test which included a quiz and a food frequency questionnaire (FFQ). One week later, the second session occurred which included the educational program for those who gave informed consent and filled out a pre-test. The education program consisted of four topics: Reading a nutrition label, qualifications of a heart healthy diet, exercise recommendations, and meal preparation (Figure 1).

Topic	Content
Nutrition Labels	<ul style="list-style-type: none"> • Serving size • Calories • Percent Daily Value • Added Sugars
Heart Healthy Diet	<ul style="list-style-type: none"> • Lean protein and plant protein options • Different types of fat- saturated, trans fat, monounsaturated and polyunsaturated fat • Whole grain and fiber recommendations • Recommendations for salt, alcohol, and added sugar
Exercise Recommendations	<ul style="list-style-type: none"> • 150 minutes of moderate physical activity i.e., brisk walking, water aerobics, dancing, gardening, doubles tennis, slow bike ride • 75 minutes of vigorous physical activity i.e., hiking uphill, running, swimming laps, aerobic dancing, heavy yard work, singles tennis, cycling, jumping rope
Meal Preparation	<ul style="list-style-type: none"> • Tips on how to prepare meals that are a lower in calories, fat, and added sugar while increasing consumption of fruit, vegetables, and unsaturated fats.

Figure 1. Content of educational session.

Session three was held two weeks after session two with the same group. The purpose of adding the additional week between session two and session three was to evaluate changes in FFQs between pre-education and post-education. During session three the post-test was distributed to the same group who completed the intervention.

The test/questionnaire was developed by the author and consisted of seven multiple choice questions, ten "true or false" questions, and two fill in the blanks, totaling nineteen test questions. The test was divided into four sections as follows: Section 1: "Reading and Understanding Nutrition Labels", Section 2: "Leading a Heart Healthy Lifestyle", Section 3: "Meal Prepping", Section 4: FFQ. Questions from the FFQ were pulled from the (National Health and Nutrition Examination Survey (NHANES) Food Frequency Questionnaire. Each

question in the FFQ was given a score with a lower score meaning less frequent to a higher score meaning more frequent. See Appendix 1.

Data Analysis

Quantitative data was compared using Wilcoxon signed-rank tests for non-parametric data. IBM SPSS Statistics 26 was used for data analysis. The analysis determined if there was a change in quiz results for each participant between pre- and post-tests. It also determined if participants made heart healthy choices through the FFQ scores. Only participants that completed both pre and post-test were included in the analysis. The responses from the quiz section were found to be significant if $p < 0.005$. Change scores were calculated from the difference between pre and post scores for each participant. Pre and post-test quiz scores were displayed using a bar chart. The FFQ, was analyzed based on response frequency and compared between both pre and post-test for all participants. Each question in the FFQ had a correlating scale. The mean and standard deviation (SD) of each question in the survey was obtained from pre- and post-test and used for comparison.

RESULTS

Participant results between pre-and post-tests were divided into two sections, a quiz and an FFQ. Participant scores significantly increased following the intervention ($p < 0.005$, Figure 2). On average, participants scores increased by 24.6% (Table 1). Participants also completed the second portion of the test which consisted of the FFQ. There were no significant differences between pre-and post-test FFQ between educational sessions (Table 2).

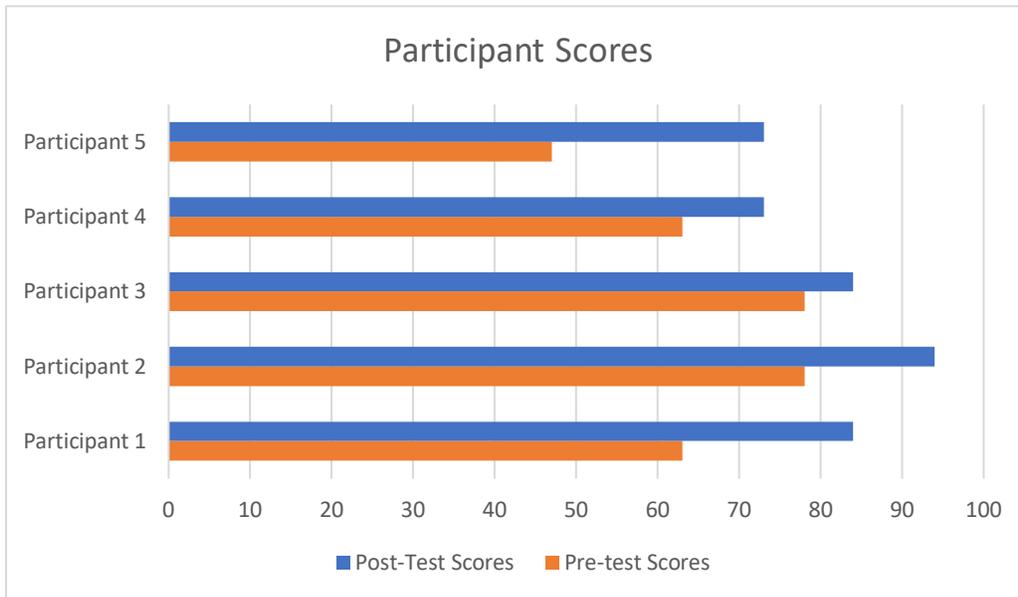


Figure 2. Pre- and post-test scores for each participant as a percentage.

Table 1

Pre- and Post-
Quiz Results
(n=5)

	Pre-Quiz (%)	Post-Quiz (%)	Change Score (pts)	Percent Change %
Participant 1	63.0	84.0	21.0	33.5
Participant 2	78.0	94.0	16.0	20.5
Participant 3	78.0	84.0	6.0	7.6
Participant 4	63.0	73.0	10.0	6.3
Participant 5	47.0	73.0	26.0	55.3
		Average Change	15.8	24.6

Table 1. Pre and post- scores for each participant including change scores (points) and percent change.

Table 2 Questionnaire Results Pre- and Post-
Test

Questionnaire (n=5) with scales (range of possible scores)	Mean (SD)	
	Before Program	After Program
Drink tomato juice or vegetable juice (1-8)	1.8 (1.6)	2.0 (1.5)
Drink 100% fruit juice (1-8)	2.2 (1.3)	2.6 (1.0)
Drink other drinks such as Kool-Aid, Lemonade, Soda, Gatorade or Powerade (1-8)	1.0 (0.0)	1.0 (0.0)
Drink milk as a beverage (1-8)	3.2 (2.6)	2.2 (1.4)
Drink alcohol (1-8)	1.0 (0.8)	1.4 (0.8)
Eat whole grains (oatmeal, whole grain bread, pastas, cereals, i.e. shredded wheat, raisin bran) (1-8)	4.8 (1.2)	5.0 (1.9)
Eat fruit (1-8)	3.8 (0.9)	5.2 (1.5)
Eat vegetables (1-8)	5.4 (1.0)	5.2 (0.7)

Table 2 Questionnaire Results Pre- and Post-
Test

Eat luncheon or deli-meat (such as bologna, beef, turkey, chicken, ham) (1-8)	1.0 (0.0)	1.0 (0.0)
Eat lean proteins such as chicken, turkey, fish, pork (1-8)	3.8 (1.2)	3.4 (1.0)
Eat beef (1-8)	1.4 (0.4)	1.0 (0.0)
Eat lean ground beef (1-8)	1.4 (0.5)	1.0 (0.0)
Eat soup (1-8)	3.4 (0.5)	3.4 (1.7)
Eat soup made with low-sodium broth (1-8)	1.6 (0.8)	2.4 (1.3)
Eat potato chips (1-8)	1.4 (0.8)	1.4 (0.8)
Eat frozen meals (1-8)	1.0 (0.0)	1.2 (0.8)
Eat candy, desserts (donuts, cake, cookies, pop tarts, Danishes) (1-8)	3.6 (1.4)	3.6 (2.3)
Add salt to your meals or snacks (1-8)	2.4 (1.5)	2.4 (1.4)

Table 2. FFQ answers scaled to following choices: 1. 1 time per week, 2. 1-2 times per week, 3. 3-4 times per week, 4. 5-6 times per week, 5. 1 time per day, 6. 2-3 times per day, 7. 4-5 times per day, 8. 6 or more times per day.

DISCUSSION

Participation in the educational session improved individual knowledge on a heart healthy lifestyle but not show changes toward implementing a heart healthy lifestyle per FFQ. The results did not confirm the hypothesis that an educational session will increase knowledge on leading a heart healthy lifestyle and lead to changes in food intake among participants. The post-education quiz showed positive results with higher scores for all participants. Food Frequency Questionnaire results between pre- and post-tests were not statistically significant.

As discussed, nutrition education has been used to improve dietary changes and nutrition knowledge. However, the results of this study were similar to a recent study that used a 4-hour nutrition education as an intervention followed by a 9-month periodic follow up. An FFQ was used to collect data as well as subsequent questionnaires that focused on nutrition knowledge, attitudes toward nutrition, diet quality, and lifestyle.¹² Body composition was also assessed.¹² Final results showed an increase in nutrition knowledge scores and decrease in central adiposity. However, change in diet quality/FFQ was not significant.¹³ Both the study mentioned, and this study completed the nutrition education in one session rather than multiple sessions. Which may be considered for lack of dietary changes.

Limitations

The Accuracy of the FFQ was taken into consideration as the study asked for participants to remember foods typically eaten in the past two-week period which may leave room for error. Another limitation is the lack of participants in the study (n=5) and limited educational sessions which may have proven better results for dietary changes. Additional education sessions of longer timeframes may have been beneficial.

CONCLUSION

Nutrition educational sessions can improve individual knowledge on a heart healthy lifestyle but may not show changes in dietary behavior. This limitation may be related to the number of education sessions that were conducted. Dietary changes may be seen with multiple education sessions rather than a single session. Ideally, nutrition education sessions can be tailored to individual, or group needs, with the idea that these programs can be repeated for future use leading to positive health results.

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APPENDIX 1

Pre and Post Test Used for Data Collection

Pre/Post-test

Please answer to the best of your ability.

Section 1: Reading and Understanding Nutrition Labels

Nutrition Facts	
4 servings per container	
Serving size 1 1/2 cup (208g)	
Amount per serving	
Calories	240
% Daily Value*	
Total Fat 4g	5%
Saturated Fat 1.5g	8%
<i>Trans Fat</i> 0g	
Cholesterol 5mg	2%
Sodium 430mg	19%
Total Carbohydrate 46g	17%
Dietary Fiber 7g	25%
Total Sugars 4g	
Includes 2g Added Sugars	4%
Protein 11g	
Vitamin D 2mcg	10%
Calcium 260mg	20%
Iron 6mg	35%
Potassium 240mg	6%
<small>* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	

- 1) Percent daily value is a reference amount of nutrients to consume or not to exceed each day.
 - a) True
 - b) False

- 2) What is the percent daily value of saturated fat on the label?
 - a) 20%
 - b) 5%
 - c) 8%
 - d) 25%
- 3) A percent daily value of ____% is considered high.
- 4) A percent daily value of ____% is considered low.
- 5) What is the serving size of the product?
 - a) 2 cups
 - b) 4 cups
 - c) 1.5 cups
 - d) 1 cup
- 6) This product is low in sodium
 - a) True
 - b) False
- 7) This product is high in cholesterol
 - a) True
 - b) False

Section 2: Leading a Heart Healthy Lifestyle

- 1) How many minutes of physical activity should you get every week?
 - a) 90 minutes per week
 - b) 60 minutes per week
 - c) 120 minutes per week
 - d) 100 minutes per week
- 2) A low salt diet contains no more than ____ milligrams (mg) per day
 - a) 1000mg
 - b) 3000mg
 - c) 2000mg
 - d) 1200mg
- 3) You should aim to have ____ grams of fiber per day on average
 - a. 10-15 grams/day
 - b. 25-30 grams/day
 - c. 40-50 grams/day
 - d. 15-20 grams/day

- 4) Dietary fat can be part of a heart healthy diet
 - a) True
 - b) False
- 5) Limiting added sugar or high sugar food items or beverages is part of a heart healthy diet
 - a) True
 - b) False

Section 3: Meal Prepping

1. Sautéing with olive oil is a healthier alternative than sautéing with butter
 - a. True
 - b. False
2. Olive oil is considered a saturated fat
 - a. True
 - b. False
3. Rinsing canned food reduces the sodium content
 - a. True
 - b. False
4. Dark meat has less fat than white meat
 - a. True
 - b. False
5. Buying skinless or taking the skin off poultry reduces the fat content
 - a. True
 - b. False
6. A heart healthy plate should consist of:
 - a. $\frac{1}{2}$ your plate made up of fruit and vegetables
 - b. $\frac{1}{4}$ of your plate made up of fruit and vegetables
 - c. $\frac{1}{2}$ of your plate made up of fruit and no vegetables
 - d. $\frac{1}{4}$ of your plate made up of vegetables only
7. When preparing a meal, the healthy cooking option is to:
 - a. Bake, broil, grill
 - b. Poach, steam
 - c. Pan fry, sauté
 - d. A and B

Section 4: Food Frequency Questionnaire

1. In the past two weeks, how often did you drink tomato juice or vegetable juice?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

2. How often did you drink 100% fruit juice (such as apple juice, orange juice, prune juice, pineapple juice or others)?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

3. How often did you drink other drinks such as Kool-Aid, Lemonade, Soda Gatorade, Powerade?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

4. How often did you drink milk as a beverage?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day

- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

5. How often do you drink alcohol?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

6. How often do you eat whole grains (oatmeal, bread, whole grain pasta, whole grain cereals I.e., raisin bran, shredded wheats)

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

7. How often do you eat fruit?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

8. How often do you eat vegetables?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day

- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

9. How often do you eat luncheon or deli-meat (such as bologna, beef, turkey, chicken, ham)?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

10. How often do you eat lean proteins such as chicken, turkey, fish, pork?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

11. How often do you eat beef?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

12. How often do you eat lean ground beef?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day

- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

13. How often do you eat soup?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

14. How often do you eat soup made with low sodium broth?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

15. How often do you eat potato chips

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

16. How often do you eat pre-made frozen meals?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day

- 4-5 times per day
- 6 or more times per day

17. How often do you eat candy, desserts (donuts, cake, cookies, pop tarts, Danishes)?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day

18. How often do you add salt to your meals or snacks?

- 1 time per week or less
- 1-2 times per week
- 3-4 times per week
- 5-6 times per week
- 1 time per day
- 2-3 times per day
- 4-5 times per day
- 6 or more times per day