

Evaluating a Nutrition Education Intervention to Promote A Healthy Lifestyle Among Older Adults

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ABSTRACT

Objectives: Evaluate the effectiveness of a new nutrition program developed to address the nutrition education needs of this community.

Design: Quasi-experimental Design

Methods: The intervention included a new nutrition education program at Carmine Carro Community Center over a period of 5 weeks. Multiple nutrition education classes (5 classes) for older adults in this community were provided to increase their knowledge and promote a healthy lifestyle. Participants were asked to attend each class session. Participants were recruited from the community senior center, located in Brooklyn, NY. Convenience sampling was used to recruit participants. Participants attended these classes as they liked, but they needed to be a member in order to be able to participate. Multiple tools were used to collect data to quantify the effectiveness of the intervention, which included pre-tests and post-tests surveys/questionnaires, nutrition exit slip, activities and games. Quantitative Data (participants surveys/questionnaire scores) were analyzed and compared using paired t-tests created using SPSS software.

Qualitative Data were thematically examined to identify facilitators for this intervention, which included observations made during each class session.

Results: The nutrition education intervention program increased participants' knowledge about cholesterol ($p < 0.05$). However, it demonstrated that there was no change following the diabetes lesson. Participants reported a positive experience with the nutrition intervention program that was implemented. Many were very involved during the class sessions. p-values were used to show the significance difference between the pre-tests and post-tests.

Discussion: This nutrition education intervention was effective in increasing the community's knowledge, and skills. Even Though participation varied during each class session, positive feedback was received from participants. Previous studies have demonstrated that nutrition education works in teaching participants to recognize a healthy diet and promote a healthy lifestyle. A bigger sample size was included in these studies. However, similar results were obtained as it gave participants the opportunity to participate in increasing their knowledge. Strengths of this study is that it provided researchers with complete control over all aspects of the independent variable, more generalizable, and have better external validity. Limitations of this study is that randomization is not used, participation was very low for some of the class sessions, time conflict with the class, bias (insufficient sample size and limited access to data), and classes are only offered in English.

Keywords: *diabetes, cholesterol, knowledge, nutrition education*

INTRODUCTION

The prevalence of multiple chronic conditions disease is higher among older adults compared to the rest of the population in the United States.¹ The elderly tends to be affected by chronic conditions such as diabetes and heart disease. The quality of diet for older adults in the United States has declined over time. As people get older, they eat less and make different food choices.^{2,3} Older adults have a general understanding of nutrition and healthy eating. However, nutrition knowledge is still limited among them.^{2,3} Older adults frequently consider food and eating to be a matter of common sense and reveal a lack of interest in expanding their knowledge concerning nutrition. For this population, eating is influenced by daily habits which may have been established very early in life and remained unchanged.⁴ Even though there is access to healthcare and resources and advances in public health, older adults are experiencing this. As people get older, they eat less and make different food choices. Moreover, maintaining a healthy diet can become more difficult as we grow older.^{5,6}

The risk of chronic disease linked to food may be related to low energy or nutrient density intakes in the diet, which affects their health. Many factors may influence this decline, including lifestyle behaviors, and social and environmental conditions. Nearly two-thirds of adults aged 65 years and older eat an unhealthy diet. The portion of older adults with poor diet quality increased from 51% to 61%.^{2,3} Factors such as diet-related attitudes and beliefs, income, education, socioeconomic status, marital status, and convenience are likely to influence the quality of their diet and eating habits. In addition, physiological changes such as mobility issues, and dental problems may affect their health.^{2,3}

Furthermore, older adults with ideal diet quality remained consistently low, under 1%.⁵ People experience physiological and social changes as they age, which have an impact on important aspects of their lives, including nutrition. They also face growing health issues and increase the risk of onset disability.⁷ Also, different nutritional requirements exist for them compared to those in the general population.⁸ It is recommended that older adults eat a sufficient

amount of fruits, vegetables, low-fat dairy products, and lean meats. Healthy eating can lower the risk of chronic disease, improve quality of life, and extend life. However, maintaining a healthy diet can become more difficult as one ages. Nutrition education should be offered to seniors to better prepare them for the aging process. The lack of nutrition knowledge affects eating habits and attention paid to nutrition information.^{2,3}

Senior citizens are able to understand that eating healthy, balanced foods is beneficial for their health. An adequate and good diet is a crucial element of aging well.⁷ There should be an increase of public awareness of diet quality among older adults. By teaching senior citizens healthy eating habits and modeling these behaviors, these senior citizens have better self-management of their nutritional health.⁹⁻¹³ Older individuals are able to retain nutrition information and make connections between eating and feeling healthy.⁹⁻¹³ Several interventions exist that help promote healthy lifestyles among adults and have been shown to have positive results.⁹⁻¹³ Previous studies have demonstrated that nutrition education works in teaching participants to recognize a healthy diet and promote a healthy lifestyle. For example, after older adults participated in an active learning program, the intervention group demonstrated a significant improvement in communicative health literacy, step count, engagement in moderate-to-vigorous physical activity, dietary variety, life-space mobility, social network size, grip strength, gait speed, and depressive symptoms.⁷ Another example includes the community-based food education program, with the use of easy to implement strategies (short-duration lectures and dual-task problem-solving activities during exercise), had a positive and encouraging impact on nutrition-related knowledge in middle-aged and older patients with Type 2 diabetes.⁸ Furthermore, the *Take Heart* intervention, which included education about heart disease and support for a behavioral lifestyle change, using a goal-setting process based on self-regulation theory, was associated with modest improvements in sleep, fatigue, and cardiac symptoms burden.^{9, 11, 12}

Moreover, a community needs assessment identified needs and gaps among older adults at Carmine Carro Community Center. It showed that there is limited knowledge among this population of several important nutrition-related topics such as diabetes and cholesterol. Findings demonstrate that they did not have a good understanding about it. In order to address this, a nutrition education program, including multiple classes and activities, will be provided for older adults in this community to increase their knowledge and promote a healthy lifestyle. The purpose of this study is to evaluate the effectiveness of a new nutrition program developed to address the needs of limited previous nutrition education of this community.

The hypothesis is that through the intervention of nutrition education classes, this population will increase their knowledge and have positive behavioral changes. They will have a better understanding of healthy eating and how to prevent or manage diseases such as diabetes or high cholesterol.

METHODS

Study Design

A quasi-experimental design with an intervention of a nutrition education program was used. The study involved observing a group of participants in an attempt to look at outcomes. The nutrition education program included five classes over a period of 5 weeks between February and March 2023. Each class included a different group of people that were members of the community center. Pre-test and post-test surveys or questionnaires were used to assess the participants that attended each class. The responses of the participants were compared during each class. In addition, other activities included small activities that were interactive such as a create a meal plan, nutrition label quiz, and a Jeopardy game. Responses to these activities were assessed. This nutrition education intervention study was approved by the Institutional Review Board (IRB).

Intervention

The intervention included a new nutrition education program at the community location. Multiple nutrition education classes for older adults in this community were provided to increase their knowledge and promote a healthy lifestyle. Participants were asked to attend each class session and participated in it. The learning theory and behavior change that this intervention was based on were cognitive learning theory and transformative learning theory. These theories were used to help create nutrition education classes and tools use to assess the participants. For example, cognitive learning theory focuses on the internal processes surrounding information and memory. Pre-test and post-test surveys or questionnaires and different activities are used to test their memory after the class. On the other hand, transformative learning theory focuses on the idea that learners can adjust their thinking based on new information. This theory could be used to incorporate fun games for the participants. Overall, participants had the opportunity to learn, gain new knowledge, and ask questions to develop new skills and concepts. Also, participants were able to connect and build relationships with each other. Subjects assessed in this intervention are members of Carmine Carro Community Center, a senior community center located in Brooklyn, N.Y. This intervention included 5 class sessions and was given in a timeframe of five weeks. Each class was around 35 to 45 minutes.

Participants

Participants were recruited from the community senior center, Carmine Carro Community Center, which is located in Brooklyn, New York. Classes are offered for members in this facility. Convenience sampling was used for recruiting participants. Participants attended these classes as they liked, but they must be a member, in order to be able to participate. An announcement was posted to let senior citizens know what classes were offered each week. Each class was limited to 15 - 20 participants, in order to increase participation and communication,

however, there were 0 - 10 participants in each class. Each class included a different group of people. Participants signed up for it at the beginning of each class during that day. Members of this facility were 60 years old and over (40% White, 40% Asian, 20% Black and Hispanic). Also, most participants were women.

Tools

Multiple tools were used to collect data to quantify the effectiveness of the intervention. Post-test and pre-test surveys or questionnaires were developed by the researcher. Each survey or questionnaire had four questions. There were two pre-test and post-test surveys or questionnaires that were used for these classes. In addition, a nutrition education exit slip is provided to the participants at the end of each class. Another tool used was the “Create a Personal Meal Plan.” This tool was used for participants to create a meal based on MyPlate. A table was created that included the categories of protein, grain, fruit, vegetable, and dairy. Other tools used for this study were the Nutrition Label Quiz and Jeopardy Game. The Nutrition Label Quiz tool was adapted from healthbeet.org. Data was collected to see what participants learned about healthy eating, meal planning, and general tips. On the other hand, the “Nutrition Jeopardy Game” tool was adapted from Drexel University. This tool was used to assess the participants’ knowledge and behavior.

Data Analysis

This study was created to evaluate the effectiveness of a new nutrition program in the community facility. Data was collected and analyzed. Excel sheets, including tables and graphs, were used to organize the data. Descriptive statistics such as the mean and percentage were calculated. Furthermore, SPSS software was used to complete particular statistical tests. Paired T-tests (Wilcoxon) were used to compare the means of different sample groups. p-values ($p < 0.05$) were used to show the significance difference between the pre-tests and post-tests. Data was compared to current published standards from NHANES, CDC, or existing published studies. In addition, qualitative Data were thematically examined to identify facilitators for this intervention, which included observations made during each class session.

RESULTS

Demographic Profile

A demographic profile of the participants is summarized in **Table 1**. This intervention included 5 classes, in which each class included different activities and data was collected using different tools.

Demographics of Participants			
Age	60+ years old		
Number of Participants	Total # of Participants	Male	Female
First Class Session	3	2	1
Second Class Session	2	0	2
Third Class Session	9	2	7
Fourth Class Session	10	2	8
Fifth Class Session	0	0	0

Table 1. Demographics of Participants. Participants reported a positive experience with the nutrition intervention program that was implemented. Many were very involved during the class sessions.

Quantitative Data

A pre-test and post-test were given to the same participants during the second- and third-class session. **Figure 1** show a paired t-test for the data collected for the second-class session: *Diabetes: Carbohydrates, Fiber, and Sugar*. Results show the mean of the overall score of the participants' pretest and posttest. Results show no significant difference as p-value is higher than 0.05 as shown in **Figure 1**.

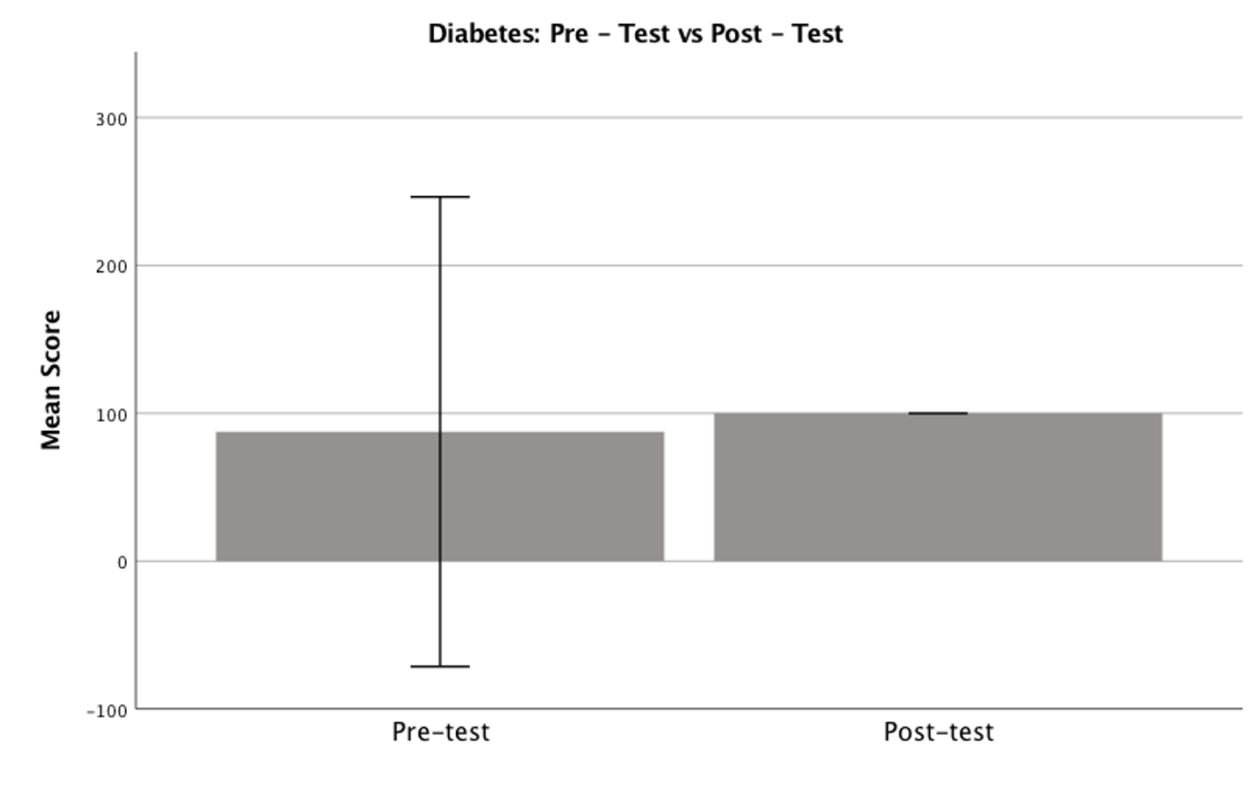


Figure 1. Paired Sample Statistics of second-class session: *Diabetes: Carbohydrates, Fiber, and Sugar*. Results show no significant difference as p-value is higher than 0.05.

Figure 2 show a paired t-test for the data collected for the third-class session: *Cholesterol, Fats, Hypertension & Heart-Healthy Diet*. Results show the mean of the overall score of the participants' pre-test and post-test. Results show significant difference as p-value is lower than 0.05 as shown in **Figure 2**. The nutrition education intervention program increased participant's knowledge about cholesterol ($p < 0.05$).



Figure 2. Paired Sample Statistics of third-class session: *Cholesterol, Fats, Hypertension & Heart-Healthy Diet*. Results show significant difference as p-value is < 0.05 . The nutrition education intervention program increased participant's knowledge about cholesterol ($p < 0.05$).

Qualitative Data

Qualitative data were thematically examined to identify facilitators for this intervention. These include observations made during each class session.

Observations

First Class Session: Balanced diet: MyPlate and Portion Size

Participants were asked to complete a handout about MyPlate after the class session. It included a protein, grain, fruit, vegetable, and dairy. All participants were able to create a breakfast meal using the knowledge that was learned during the class.

Fourth Class Session: Meal Planning, Snacking, and Recipes

A cooking class demonstration was shown to the participants during the class session. Everyone was able to participate in making their chia seed pudding. A sample was given to the participants to try. This class received a lot of positive feedback. Many said that they would try the recipe at

home. Participants had hand-on experience during this class session. In addition, a mini nutrition label quiz game was given to participants. They participated in it, and were able to test their knowledge.

Fifth Class Session: Intuitive Eating & Tips on Eating Out

There were a couple of participants that signed up for this class session, however, none of the participants attended this class session. Effectiveness of this class session was not able to be assessed.

Nutrition Exit Slips

Nutrition Exit Slips were used to assess what participants learned during each class session. Participants were able to write one thing they learned during that class session. Participants were able to write one thing they want to learn more about. Also, participants were able to write one question they have during that class session. **Table 2** summarized topics that participants would like to learn more about.

Topic of Interest	
	# of Participants
Increasing muscle tone	1
Caffeine and Water Intake	1
Individual diet goals based on Male and Female	1
Sugar and Carbs	3
Staying on Diet	3

Table 2. Participants' topic of interest and the number of participants interested in that topic. Nutrition Exit Slips were used to assess what participants learned during each class session.

DISCUSSION

This study showed that this nutrition education intervention was effective in increasing the community's knowledge, and skills. Also, it influenced their behaviors and perspective through cognitive learning theory and transformative learning theory approach. This intervention included 5 class sessions and was given in a timeframe of five weeks. It gave participants the opportunity to learn, gain knowledge, and be active by participating and asking questions. Results demonstrated that these courses did have an impact on participants' knowledge and behaviors. Even Though participation varied during each class, positive feedback was received from participants. This nutrition education intervention was effective in increasing the

community's knowledge and skills. Previous studies have demonstrated that nutrition education works in teaching participants to recognize a healthy diet and promote a healthy lifestyle. A bigger sample size was included in these studies. However, similar results were obtained as it gave participants the opportunity to participate in increasing their knowledge. Intervention group demonstrated a significant improvement in communicative health literacy, step count, engagement in moderate-to-vigorous physical activity, dietary variety, life-space mobility, social network size, grip strength, gait speed, and depressive symptoms.⁹ The community-based food education program, with the use of easy to implement strategies (short-duration lectures and dual-task problem-solving activities during exercise), had a positive and encouraging impact on nutrition-related knowledge in middle-aged and older patients with DM2.¹¹ The *Take Heart* intervention, which included education about heart disease and support for a behavioral lifestyle change, using a goal-setting process based on self-regulation theory, was associated with modest improvements in sleep, fatigue, and cardiac symptoms burden.¹² However, not many nutrition education interventions are offered for older adults in the community. By implementing this nutrition program for this population in the community will influence their well-being.

There were some strengths and limitations that were noted during this study. Strengths of this study was that it provide researchers with complete control over all aspects of the independent variable. It is more generalize and have a better validity. On the other hand, participation was very low for some of the class sessions. This may be due to classes being offered only to members of the senior community center. Also, some participants mentioned that they have time conflict with the class. Another limitation is bias as there is insufficient sample size and limited access to data. Classes are only offered in English, which affect participation from other members. Further research is needed to be evaluated whether these changes are as effective.

CONCLUSION

The new nutrition education program was effective in increasing the community's knowledge at Carmine Carro Center. However, from the results, it demonstrated that there was no change following the diabetes lesson, while there was an increased participant's knowledge following the cholesterol lesson ($p < 0.05$). This may be due to the numbers of participants that attended the lesson, which may impact the results. Also, participants that attended had some prior knowledge about diabetes. Overall, these lessons influenced their behaviors and perspectives through cognitive learning theory and transformative approach. It gave participants the opportunity to learn, gain knowledge, and be active by participating and asking questions. Results demonstrated that these courses did have an impact on participants' knowledge and behaviors.

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APPENDIX

Appendix 1: Create A Healthy Meal with MyPlate

Create a Healthy Meal with MyPlate

Protein:

Grain:

Fruit:

Vegetable:

Dairy:

Appendix 2: Nutrition Exit Slip

Appendix 3: Pre-Test and Post-Test of Diabetes Lesson

Diabetes: Carbohydrates, Fiber, and Sugar

Activity 1: Pre-test: What do you know about Diabetes?

1. Which of these is not a type of diabetes?
 - a. Prediabetes
 - b. Gestational diabetes
 - c. Type 1
 - d. Type 3
2. Diabetes happens because of which of the following:
 - a. Your muscles use too much blood sugar
 - b. Your liver doesn't make enough blood sugar
 - c. Your body can't use blood sugar the way it should
 - d. Your body makes more insulin than it needs
3. The risk factors for type 2 diabetes mellitus include:
 - a. Family history
 - b. Being overweight
 - c. High intake of dietary fat
 - d. All of the above
4. Prediabetes can be reversed.
 - a. True
 - b. False

Activity 4: Post- test: What did you learn about Diabetes?

1. Which of these is not a type of diabetes?
 - a. Prediabetes
 - b. Gestational diabetes
 - c. Type 1
 - d. Type 3
2. Diabetes happens because of which of the following:
 - a. Your muscles use too much blood sugar
 - b. Your liver doesn't make enough blood sugar
 - c. Your body can't use blood sugar the way it should
 - d. Your body makes more insulin than it needs
3. The risk factors for type 2 diabetes mellitus include:
 - a. Family history
 - b. Being overweight
 - c. High intake of dietary fat
 - d. All of the above

4. Prediabetes can be reversed.
 - a. True
 - b. False

Appendix 5: Pre-Test and Post-Test of Cholesterol Lesson

Nutrition Education Exit Slip

Name ONE thing you learned in class today

Name ONE thing you want to learn more about

Ask ONE question you have about today's lesson

Cholesterol, Fats, Hypertension & Heart- Healthy Diet

Activity 1: Pre-test

1. A diet that helps keep blood cholesterol levels in check includes which of the following?
 - a. Limit amount of saturated fats
 - b. Limit amount of cholesterol
 - c. Limit amount of fiber
 - d. A and B
2. A high cholesterol level can increase your risk of cardiovascular disease. In general, a total cholesterol level should be:
 - a. < 200 mg/dL
 - b. 200 - 239 mg/dL
 - c. >240 mg/dL
 - d. >200 mg/dL
3. LDL cholesterol is called "bad" cholesterol.
 - a. True
 - b. False
4. How is high cholesterol treated?
 - a. With diet changes
 - b. With weight management and physical activity
 - c. With Medicine
 - d. All of the above
5. What is considered normal blood pressure?

- a. Less than 120 / 80 mmHg
 - b. More than 120 / 80 mmHg
 - c. 140 / 90 mmHg
 - d. More than 180 / 120 mmHg
6. Hypertension is commonly called “the silent killer.”
- a. True
 - b. False
7. Which of the following is NOT the nutrient that should be rich in DASH diet?
- a. Potassium
 - b. Calcium
 - c. Sodium
 - d. Magnesium
8. Lifestyle changes CAN'T prevent high blood pressure
- a. True
 - b. False

Activity 2: Post- test

1. A diet that helps keep blood cholesterol levels in check includes which of the following?
- a. Limit amount of saturated fats
 - b. Limit amount of cholesterol
 - c. Limit amount of fiber
 - d. A and B
2. A high cholesterol level can increase your risk of cardiovascular disease. In general, a total cholesterol level should be:
- a. < 200 mg/dL
 - b. 200 - 239 mg/dL
 - c. >240 mg/dL
 - d. >200 mg/dL
3. LDL cholesterol is called "bad" cholesterol.
- a. True
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4. How is high cholesterol treated?
- a. With diet changes
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- 7. Which of the following is NOT the nutrient that should be rich in DASH diet?
 - a. Potassium
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 - c. Sodium
 - d. Magnesium
- 8. Lifestyle changes CAN'T prevent high blood pressure
 - a. True
 - b. False