Effectiveness of a Nutrition Intervention in Older Adults Aged 55+

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ABSTRACT:
Objective: To evaluate the effectiveness of an intervention designed to improve behaviors, knowledge, and self-efficacy around chronic disease management in older adults.
Design: Quasi-experimental design with one intervention group of older adults
Methods: Participants were recruited for this study via an email from facility director, Joan Scotti and other marketing tactics. Effectiveness of the study was evaluated based on changes in pre and post survey questionnaires
Setting: Slingerlands, NY
Participants: 18 participants completed the study
Intervention: The intervention included two days of instruction. Topics discussed included adequate intake to combat malnutrition and easy ways to prepare nutritious foods. The second day included a cooking demonstration. The intervention was conducted over two days one week apart. Participants completed pre and post survey questionnaires which included questions related to general nutrition knowledge, confidence reading nutrition fact labels, and preparing fruits and vegetables to assess the effectiveness of the intervention
Results: Quantitative data was analyzed using Mann-Whitney U tests in SPSS. Participant confidence in using and interpreting food labels, confidence including fruits and vegetables in meals and snacks, and familiarity with different methods of cooking fruits and vegetables significantly increased ($p<0.05$).
Conclusions and Implications: A hands-on nutrition intervention and cooking demonstration can be effective at increasing nutrition-related knowledge and self-efficacy in older adults living at an independent senior living center.

INTRODUCTION

Defined by the World Health Organization, the elderly are people aged $\geq$ 60 years old. [1] Due to advances in healthcare and technology, people are living longer; into their sixties and beyond.[1] Between 2015 and 2020, the percentage of people over 60 nearly doubled from 12% to 22%. [1] Although the nutritional status of the elderly population has become an important issue, it often gets neglected by public health professionals. Malnutrition and chronic disease management are important health priorities amongst this vulnerable population as older adults are not free from morbidity. [1]

Older adults are susceptible to malnutrition as there are many barriers that can arise when trying to provide adequate nutrition for this population. Although both lean body mass and basal metabolic rate declines with age as well as a reduction in energy requirements, the necessity for other nutrients increases including vitamins B12, C, and D and folate due to changes in body composition and the gastrointestinal tract, alterations in fluid and electrolyte regulation, and medication use.[2] The nutrition of older adults affects their

immunity and functional ability, so it is important for public health professionals to pay attention to this. Additional factors that make the elderly more susceptible to malnutrition are feeding difficulties, reduced mobility, psychological distress, being widowed, illiteracy, caring for children, poverty, and poor access to health and social services.[2] Malnutrition increases the risk for morbidity and mortality. [2] Malnutrition costs the healthcare system $157 billion each year from costs including hospital stays, readmissions, and loss of productivity due to decreased quality of life or death. [3]

Results from the needs assessment of this study indicate that nutritional problems or themes that stood out amongst this elderly population include an increased risk for malnutrition, an elevated prevalence of chronic diseases such as type 2 diabetes, heart disease, IBS, hypertension, and osteoporosis, limited nutrition-related knowledge, unfamiliarity with nutrition label reading, and lack of fruit and vegetable consumption. Results indicated that approximately 85% of older adults have at least one chronic health condition, and 60% have at least two chronic conditions.

Various nutritional interventions can be done to address these problems amongst the elderly population. These include individual or group nutrition education sessions, nutrition counseling, collaborating with nutrition services in the community such as the Elderly Nutrition Program[4] or Meals on Wheels, cooking demonstrations, home-based exercises, etc. The purpose of this study was to assess the impact of a nutrition-related program on the changes in the nutrition-related knowledge and dietary habits amongst the elderly population.

METHODS

Study Design

A quasi-experimental design with one intervention group of older adults aged 55+ was used. Participants were residents of an independent senior living center called the Summit at Mill Hill in Slingerlands, NY. The mission of this independent senior living center is to make it easy to live a fulfilled, enriched life by connecting residents to the activities, services, and conveniences they care about once it is time for them to move out of their homes. These members were assessed because this facility does not currently have any nutrition-related programs or services in place to promote a healthy lifestyle in older adults. In February of 2022, a two-part nutrition intervention program was conducted. The first part included a nutrition education session on reading nutrition fact labels and the importance of calorie and nutrient adequacy. The second part included a cooking demonstration and a discussion on ways to increase fruit and vegetable consumption with minimal preparation. Participants were asked to complete pre and post survey questionnaires at baseline and post-intervention to determine the effectiveness of the nutrition-related programs. This study was approved by the SUNY Oneonta Institutional Review Board.

Participant Recruitment

Residents were recruited for this study via an email from the facility director, Joan Scotti, using listservs. This email included a brief introduction to the purpose of the study and the future nutrition education program, benefits for the participants, and what could be expected from participating. Other participants were recruited using marketing tactics such as flyers and including the programs in the facilities monthly event calendars. Residents who were interested reached out to Emily Williams, a graduate intern, via email or

phone. All questions the older adults had about participating in the study were answered in as much detail as possible to ensure no confusion or hesitancy. All residents were required to complete consent forms to be eligible to participate in the study. A subset of 18 out of 86 residents completed this study (n = 18). This was a convenience sample.

Intervention

The intervention was created around the results obtained from the needs assessment. Results from the needs assessment indicated that 53% of participants were found to be at risk for malnutrition. There was also a food and nutrition related knowledge deficit as 67% of participants stated they did not feel confident in reading a nutrition facts label and several requested nutrition-related programs and services. There was also a high consumption rate of soda and sweets/desserts amongst this population, with limited consumption of fruits and vegetables. Popular barriers participants listed to eating a healthy diet included cravings of sugary and salty foods, poor appetite, inexperience with cooking healthy, simple meals, and laziness.

The intervention tools were distributed for data collection of the sample group. This intervention was conducted over two days one week apart and took place at the Summit at Mill Hill facility in their activity room. Each day included a different lesson. On day 1, after completed consent forms were collected, participants were asked to complete a survey questionnaire (pre-test) on their confidence and experience with reading nutrition fact labels and other food and nutrition related knowledge questions. Then a lesson was taught to the group on reading nutrition fact labels, the importance of nutrient adequacy, and what

nutrients older adults are most at risk of being deficient in. There was also a post lesson nutrition activity which included handing out processed and packaged food items and asking participants knowledge questions about what they could read from the nutrition label. Day 2 of the intervention included a cooking demonstration on a simple healthy winter salad recipe and its health benefits, as well as ways the recipe could be modified for more variety. Participants were provided with the recipe so they could make it on their own. Participants were also given a hand out on 20 ways to enjoy fruits and vegetables from the Eat Right website to encourage consuming fruits and vegetables in different ways. We also discussed various cooking methods participants could use to easily prepare fruits and vegetables such as crock pots, instant pots, and using frozen and pre-chopped produce. Throughout this intervention, it was emphasized to participants the importance of consuming adequate calories and nutrients rather than focusing on restrictions as older adults. The same questionnaire that was given to participants before the lesson on day 1 was also given at the end of day 2 to assess the effectiveness of these nutrition-related programs. This intervention was based on the adult learning theory which assumes that the adult learner moves from dependency to increasing self-directedness and can direct their own learning.[1]

Tools

The survey tool was created by the researchers which consisted of 10 multiple choice, short response, and likert scaled questions related to general nutrition knowledge, confidence in using and interpreting food labels, and confidence with preparing fruits and vegetables

Data Analysis

The focus of the data analysis was to determine if there was a significant change in nutrition-related knowledge and cooking confidence/skills among participants. Paired t tests were first used to compare differences in pre and post-test survey scores. The researchers compared differences of all survey questions among participants. The researchers then used an independent sample t test to compare differences in pre to post survey change scores. Survey data was determined to not be normally distributed, likely due to the small sample size. Therefore, the authors conducted nonparametric versions of independent t-tests and analyzed them using Mann-Whitney U tests in SPSS to determine significance of changes from baseline to post-intervention survey scores indicated by numerical p-values. The level for statistical significance was $P < 0.05$ for all comparisons. Content analysis was used to analyze qualitative data. The dependent variables for this study were the differences in the change from pre to post-test scores, while the independent variable was subject participation in the intervention program. There was a lack of evidence to suggest that there were any significant demographic differences among participants.

RESULTS

The demographic profile of this population included 100% of participants being Caucasian and > 60 years old. Sixteen out of 18 participants were female (88%). Likert scaled questions were used to assess participant confidence in accurately reading food labels and frequency of reading food labels. After the program, participant confidence in using and interpreting food labels significantly increased as evidenced by a p-value of <.001 (**Figure 1**). However, there was not a significant difference in the frequency participants read food labels as evidenced by a p-value of .230 (**Figure 2**). At baseline, participants admitted to frequently read food labels when buying food and beverage items.
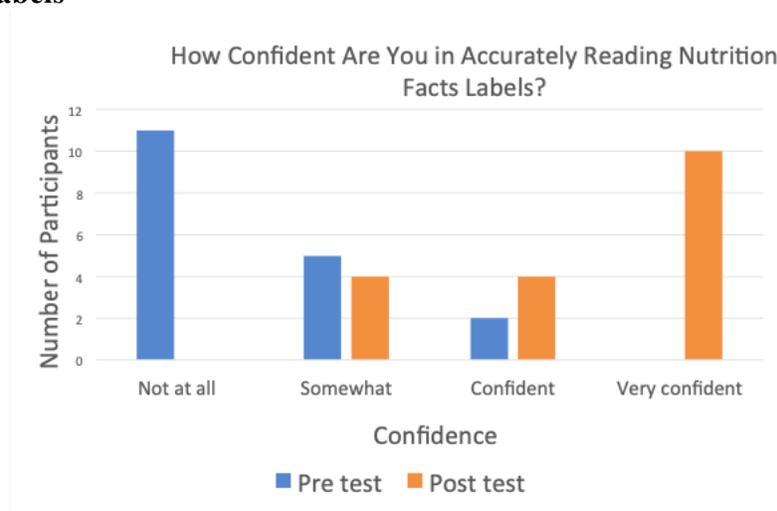
Reading Food Labels

Figure 1. Confidence in reading nutrition fact labels (n = 18). Participant confidence in accurately reading food labels increased significantly from baseline to post-intervention (p

4

< .001). *A score of 1 = not at all confident, 2 = somewhat confident, 3 = confident, 4 = very confident.* Mann-Whitney U tests were conducted via SPSS.
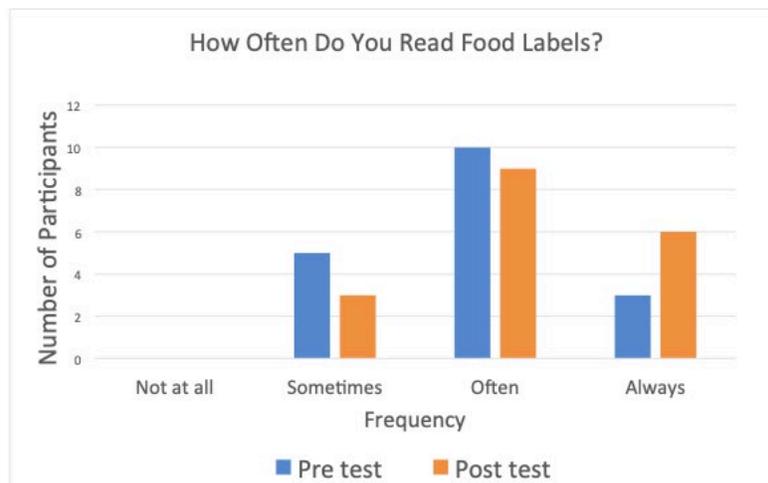

Figure 2. Participant frequency in reading food labels was not significantly different between baseline and post intervention results (p = .230). *A score of 1 = not at all, 2 = sometimes, 3 = often, 4 = always.*

Likert scaled questions were then used to analyze participant confidence with preparing fruits and vegetables. Participant familiarity with different methods to cook fruits and vegetables (**Figure 3**), familiarity with a variety of fruits and vegetables (**Figure 4**), and confidence in their ability to incorporate fruits and vegetables into meals/snacks (**Figure 6**) significantly increased from baseline to post-intervention (p<0.05). There was no significant difference in participant confidence in preparing fruits and vegetables in a way that makes them taste good from baseline to post-intervention (p=0.155) (**Figure 5**).

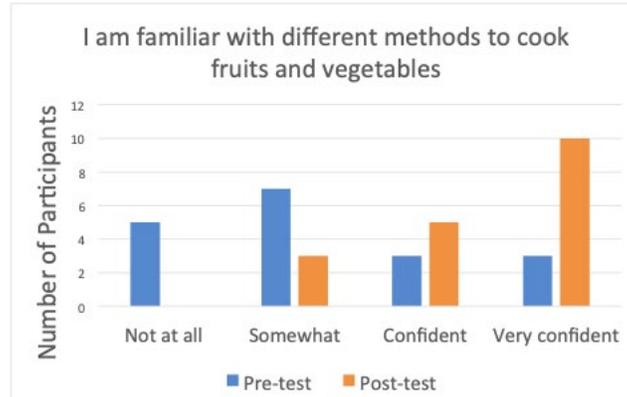**Confidence with Preparing Fruits and Vegetables**

Figure 3. Participant familiarity with different methods to cook fruits and vegetables was significantly different between baseline and post intervention results; (p = .002). Mann-Whitney U tests were conducted via SPSS.
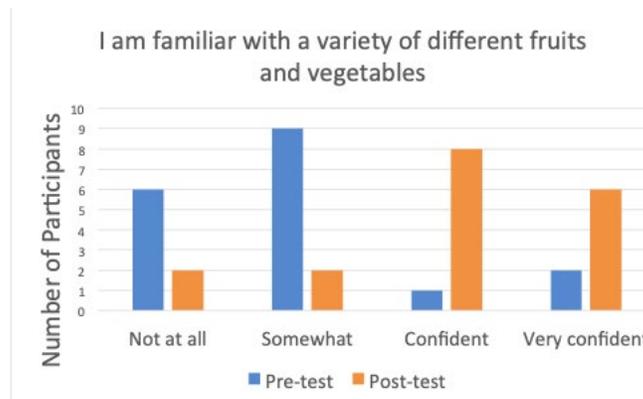

Figure 4. Participant familiarity with a variety of fruits and vegetables significantly increased from baseline to post intervention; (p = .003)
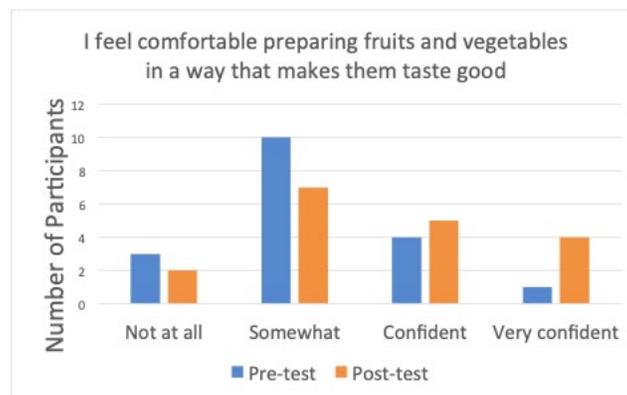
Figure 5. Participant confidence in preparing fruits and vegetables in a way that makes them taste good was not significantly different between baseline and post intervention; (p = 0.155).
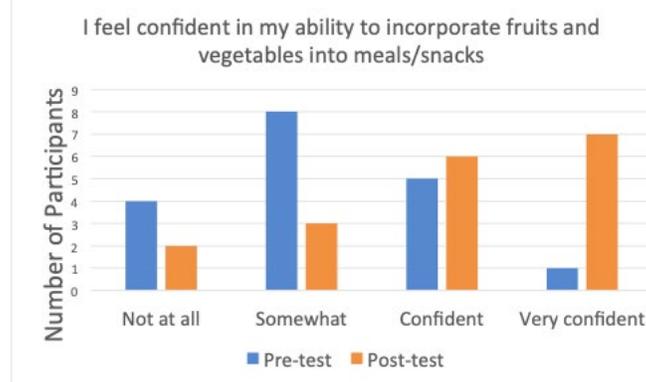

I feel confident in my ability to incorporate fruits and vegetables into meals/snacks

Figure 6. Participant confidence in their ability to incorporate fruits and vegetables into meals/snacks significantly increased from baseline to post-intervention; (p = 0.013)

Nutrition-Related Knowledge Questions

The number of participants able to identify 3 of the 5 stops on a nutrition fact label increased by 77.8%, 38.8% for the three categories of carbohydrates, and 72.1% for identifying at least two nutrients older adults are at risk of being deficient in from baseline to post-intervention (**Table 1**).

Nutrition Question	Number of Correct Answers at Baseline	Number of Correct Answers on Post-Test
Name 3 of the 5 "stops" on a nutrition fact label	4 (22.2%)	18 (100%)
Total carbohydrates include which three categories?	0	7 (38.8%)
Older adults have a risk of being deficient in what nutrients? (able to identify at least two)	3 (16.7%)	16 (88.8%)

Table 1. Number of nutrition-related knowledge questions participants were able to answer correctly at baseline compared to post-intervention.

Content Analysis

Qualitative data was analyzed by content analysis and open-ended questions were analyzed for any common themes (**Table 2**). Common themes were discussed by 2 members of the research team and revised until agreement was reached. The most common themes related to nutrients participants look for on nutrition fact labels at baseline included protein and carbohydrates, while at post-intervention it included protein, added sugar, and sodium. The common theme related to the

importance of fat at baseline included brain health, while at post intervention it was insulation/lubrication then brain health. Common themes related to the importance of adequate protein in the diet were muscle building and energy/fuel at baseline and post-intervention. Energy/fuel was the common theme for the importance of carbohydrates at baseline and post-intervention.

Question/Response	Number of Participants Making Responses (n) at Baseline (n = 18)	Number of Participants Making Responses (n) at Post-Intervention (n = 18)
What do you look for when reading a nutrition fact label?	-	-
Protein	13	15
Fat	5	12
Calories	11	12
Added Sugar	2	15
Cholesterol	4	11
Carbohydrates	12	13
Sodium	6	17
What is the importance of adequate fat in your diet?	-	-
Brain health	9	12
Insulation/Lubrication	2	14
Hormones	0	8
Absorbs nutrients	0	9
What is the importance of adequate protein in your diet?	-	-
Muscle building	12	14
Energy/fuel	10	10
Healing	3	7
Cellular structures and	0	8

functions		
Good health	9	1

What is the importance of adequate carbohydrate in your diet?		
Energy/fuel	10	18
Brain health	7	3
Weight maintenance	2	0

Table 2. Common themes of answers for open-ended questions compared from baseline to post-intervention.

DISCUSSION

This study showed that a nutrition intervention designed to improve behaviors, knowledge, and self-efficacy around chronic disease management in older adults was effective. The primary hypothesis was supported as evidenced by the several statistically significant improvements in survey scores from baseline to post-intervention including participant confidence in using and interpreting food labels, confidence including fruits and vegetables in meals and snacks, and familiarity with different methods of cooking fruits and vegetables (p<0.05). Additionally, 88% of participants were able to identify at least two nutrients of concern for older adults on the post-test compared to only 16.7% from the pre-test (**Table 1**). Overall, a hands-on nutrition intervention and cooking demonstration can be effective at increasing nutrition-related knowledge and self-efficacy in older adults at an independent senior living center. Confidence in this conclusion is strengthened by the finding that a similar study conducted by Jahromi et al. found that a diabetes self-

management nutrition education and behavioral intervention program was effective in improving the quality of life in older adults aged 60 - 74 with type 2 diabetes mellitus.[5] 90 participants completed the study, and were divided into experimental and control groups. Participants filled out a Quality of Life (QOL) questionnaire at baseline and 2 and 3 months after the intervention. This QOL questionnaire included questions related to physical health, psychological health, social relationships, and environmental health. Their results showed that 2 and 3 months after the intervention, QOL scores had a significant difference between the two groups. In other words, the training sessions improved the score of QOL in the intervention group (p<0.001) versus control group (p=0.5).[5]

Strengths

A major strength of this study was that participants answered pre and post-tests completely with no blank responses, as they were checked by the researchers for completeness before being handed in. The intervention promoted socialization and was

very interactive as participants were frequently asked questions by the presenter relating to their prior knowledge throughout each lesson. Participants seemed extremely engaged throughout both lessons and communicated with their peers about the various learning activities resulting in several statistically significant findings. Lastly, the same participants who participated in the needs assessment in the Fall of 2021 were not the same participants who participated in the nutrition intervention in the Spring of 2022 which likely impacted the results found.

Limitations

Major limitations of this study was the small sample size (n=18). Additionally, 100% of participants in this study were Caucasian and 88% were female, as the majority of residents living at this independent senior living center are Caucasian and female. More diversity in participants related to gender and race/ethnicity would have been beneficial to the findings in this study. Lastly, due to the time restrictions of this program, the two days of the intervention were only one week apart. Therefore, participants completed pre and post survey questionnaires just one week apart. In future programs, it would be favored to spread out the time between participants completing pre and post-tests to at least a few months apart for optimum results.

Implications for Research and Practice

The results of this study serve as a model for how nutrition education programs can be used to improve behaviors, knowledge, and self-efficacy around chronic disease management in older adults at an independent senior living center. These results have implications for how other types of nutrition interventions may be used to help manage chronic diseases amongst older adults. Further research is needed to evaluate what other types of nutrition programs may be beneficial amongst this population group at the community level.

CONCLUSION

The results of this study serve as a model for how nutrition education programs can be used to improve behaviors, knowledge, self-efficacy around chronic disease management in older adults at an independent senior living center. Further research is needed to evaluate what other types of nutrition programs may be beneficial amongst this population group at the community level.

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Appendix

Pre and Post Survey Questionnaire :

1. How confident are you in accurately reading nutrition fact labels?
    a. *Not at all confident*
    b. *Somewhat confident*
    c. *confident*
    d. *very confident*

2. How often do you read nutrition fact labels?
    a. Not at all
    b. Sometimes
    c. Often
    d. All the time

3. What do you look for when reading a nutrition fact label? _____

4. Name 3 of the 5 "stops" on a nutrition fact label.

5. Total carbohydrates include which three categories?

6. Older adults have a risk of being deficient in what nutrients?

7. What is the importance of adequate fat in your diet? What is the function of fat?

8. What is the importance of adequate protein in your diet? What is the function of protein?

9. What is the importance of adequate carbohydrate in your diet? What is the function of carbohydrate?

Question	Not at All	Somewhat	Confident	Very Confident
I am familiar with different methods to cook fruits and vegetables				
I am familiar with a variety of different fruits and vegetables				
I feel comfortable preparing fruits and vegetables in a way that makes them taste good				
I feel confident in my ability to incorporate fruits and vegetables into meals/snacks				