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The Effects of Nutrition Education on Perceived Nutritional Food Intake in Food Bank Participants in Delaware County

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ABSTRACT

Objective: To evaluate the effectiveness of nutritional interventions in a food bank setting aimed to improve the perception of the availability of nutritious food items.

Design: Quasi-experimental design study and pre/post-intervention assessments

Methods: Food Bank participant nutritional knowledge and confidence levels in their ability to produce nutritious meals with food received from the food bank was evaluated pre and post nutritional intervention.

Setting: Delaware Opportunities, Hamden NY

Participants: Ten people who were utilizing the Delaware Opportunities Food Bank

Intervention: Participants were provided a recipe based on ingredients available at the food bank, a food demonstration of said recipe and a traffic light labeling system accompanied by education and explanation of the categorization.

Results: Nutritional knowledge significantly increased post intervention, however participant confidence in their ability to produce nutritious meals based on food items received from the food bank did not significantly increase.

Conclusion and Implications: traffic light labeling, recipe development, and food demonstration provided at the Delaware Opportunities Food Bank significantly improved participant nutritional knowledge related to the food available but did not significantly increase participant confidence to create nutritious meals moving forward. The results as well as relevant literature suggest that more long-term interventions are needed to improve confidence in a meaningful way.

INTRODUCTION

Food insecurity is a known predictor of poor nutrition and chronic conditions including diabetes, hypertension, cardiovascular disease, and kidney disease.¹ In New York State alone 1 in 4 adults (24.9%) experiences food insecurity, with rates varying by county.¹ Food insecurity is more common in rural counties than non-rural counties. In the US, 9-10 counties with the highest food insecurity rates are rural.³ There are a myriad of reasons why food insecurity is more prominent in rural communities including lack of transportation, low wages and unemployment.³ In Delaware County, a rural community in upstate New York, 13.6% of the population experience food insecurity which is 24.8% of the national average.^{2,3}

Resources exist to support food insecurity in rural communities. Food Banks are a common resource used nationwide to address food insecurity. The role of a Food Bank is to distribute donated or purchased food to families facing food insecurity at no cost to them.⁴ Food Banks often tend to receive their food stock from umbrella Food Banks such as the Regional Food Bank of Northeastern New York. The Regional Food Bank receives donations from farmers, manufacturers, retailers, and wholesalers.⁵ Food products are donated to The Regional Food Bank for a variety of reasons including overproduction, production flaws, close code dates, cosmetic damages or unharvested or imperfect produce.⁵ Due to the nature of food sources for Food Banks and Food Pantries being donation based, the food stock in such operations can be limited or not of superior quality. It is not uncommon

for food at Food Banks to be off brand, limited, of lesser quality and not obviously nutritious.⁶ Food Banks may also be limited to the amount of fresh produce they're available to store for logistical reasons of the Food Bank, and thus opt for canned goods that are easier to store and have a longer shelf life.

For these reasons, it may be a challenge for Food Bank visitors to feel that they are able to create a balanced and nutritious meal with food obtained from their local Food Banks. Per the needs assessment conducted at the Delaware Opportunities Food Bank, this author was able to ascertain that participants prioritize healthy food options and feel that their diet is lacking in nutritious foods. Participants reported being comfortable preparing meals and following a recipe. Participants showed a basic level of knowledge of nutritious food items, but with gaps in their knowledge showing room for further nutrition education. Participants also reported having chronic conditions, most commonly diabetes.

Studies have been conducted to test strategies to improve the nutrition of Food Bank visitors. "Nudge tactics" or tactics that give direction to healthier food options are one such strategy. An example of a nudge tactic is "traffic light" categorization which labels foods one should choose often green, foods one should choose sometimes yellow, and foods one should choose rarely red. Other nudge tactics studied included placing a target product (nutritiously desirable product) first in a presentation of goods or presenting a product in its original packaging.⁸ These studies show varying degrees of success in overall improvement of nutrition, suggesting just one method is not enough. However, research is

clear that in general Food Bank clients care about nutrition and in general are open to nutritional interventions to improve their experience.⁹

To address the issue of the often-limited quality of food offered at Food Banks, as well as the inconsistent success of strategies developed up to this point to encourage healthier food choices and a more positive experience at the Food Bank, the “*Effects of Nutrition Education on Perceived Nutritional Food Intake in Food Bank Participants in Delaware County*” study was developed. This study was conducted at the Delaware Opportunities Food Bank in Delaware County, a food bank generally supplied by the Regional Food Bank of Northeastern New York. To address the identified needs in the Food Bank Community interventions were created based on prior research. Interventions included recipe development based on food items in the food bank, a food demonstration and nudge tactics like a traffic light labeling system of food stock at the food bank. All interventions are centered around providing nutrition education to provide participants with nutritional knowledge and confidence in their ability to produce nutritious meals with foods acquired from the Food Bank, thus improving participant experience.

The purpose of this study is to evaluate the effectiveness of the proposed interventions on improving participant nutrition related knowledge and level of confidence in their ability to produce nutritious meals with foods received from the food bank. Interventions and assessments were conducted at the time of visit.

METHODS

SETTING

This study was developed based on the experiences of people who utilize the Delaware Opportunities Food bank in Delaware County, NY. The Delaware Opportunities Food Bank is a resource for people in Delaware County. The Food Bank provides meat, dairy, eggs, dry goods, canned goods and produce when available. The Food Bank takes donations from the community, and is also able to provide clothing, toys, house goods, diapers and toiletries to people who utilize the Food Bank at no cost to them. The Delaware Opportunities Food Bank is a grant funded operation. Food and goods provided by the Food Bank are purchased through grants or acquired from the Regional Food Bank of Northeastern New York.

STUDY DESIGN

The Effects of Nutrition Education on Perceived Nutritional Food Intake in Food Bank Participants in Delaware County study was developed to improve the experience of people who utilize the Delaware Opportunities Food Bank and encourage healthy choices.

A quasi-experimental design study and pre/post-intervention assessments were used to measure the effectiveness of nutrition education featuring nudge tactics, recipe development and food demonstrations. The described interventions aimed to improve the experience of people who utilize the Delaware Opportunities Food Bank and encourage consumption of nutritious foods/meals to sustain overall health with limited resources. The

study received approval from the SUNY Oneonta IRB and from the Director and Food Bank Director of Delaware Opportunities. All study participants provided written consent.

INTERVENTIONS

The interventions for this study were based on the social learning theory approach, which essentially suggests that learning is achieved by observing behavior that is modeled. The interventions modeled desired behaviors and encouraged self-efficacy to enable clients to make the best nutritious use of food obtained from the food bank. The interventions focused on educating on preferable food choices on the general food available at the food bank.

Prior to the actual interventions, participants are given an initial assessment (see appendix A). The initial assessment is based on questionnaire created for the purposes of this study by the primary investigator and approved by SUNY Oneonta's IRB. The questionnaire assesses participant's knowledge on protein, fiber, carbohydrates, and blood sugar response. The questionnaire also serves to assess participant's food preparation knowledge, confidence in their ability to create nutritious meals with the food available to them, and feelings on the efficacy of food categorization systems, and food demonstrations.

After the initial assessment participants are introduced to the traffic light categorization system which had been previously implemented at the food bank. The traffic light categorization assigns food available at the food bank with a green, yellow or red label.

Foods categorized as green foods are ones to eat often, yellow foods are ones to eat sometimes, and red foods are ones to eat rarely. The goal of this intervention is to empower participants to make nutritious food choices, and to prioritize certain food items to be most impactful to their diet.

Once participants were introduced the traffic light categorization, the next step in developing their nutritional knowledge was to introduce them to a recipe based on ingredients available to them at the food bank. The goal of this intervention was to educate on how to best utilize ingredients identified through the traffic light categorization. The recipe provided a calorie and macronutrient break down. The macronutrient break down served to provide further education for participants to understand why their food has been categorized the way it is, and to understand how the food will serve them.

Lastly, participants watched a food demonstration of the recipe they were given. The goal of this intervention was to give participants the ability to produce the recipe given. The food demonstration consisted of the measured ingredients, combination of ingredients in the proper order, proper cooking methods and the end result. The food demonstration was shown at the time of the visit and provided via a URL and could be referenced at a later date for support.

Post being exposed to the food categorization system participants take the assessment for a second time. The purpose retaking the assessment served to evaluate the effectiveness

of the interventions as well as the participants confidence in their ability to produce nutritious meals with the food they received at the time of their visit.

PARTICIPANTS

Participants for this study were recruited at the time of their visit to the Delaware Opportunities Food Bank and volunteered to participate in the nutrition education. There were ten participants in total. Participants were residents of Delaware County. Participants in this study were men and women of various ages. Participants were of various ethnicities, but mostly white. Participants in this study represent an economically disadvantaged population. Most participants regularly visit the food bank.

DATA ANALYSIS

Data from the questionnaires were analyzed with an independent T-test, run by SPSS. Data was analyzed for statistical significance if the p-value was less than 0.05 ($p < 0.05$). The results of the pre and post assessment were categorized by questions that measure participant knowledge (questions 1-5) and those that measure participant confidence (questions 6-10). See Appendix A for reference. An independent T-test was run for both groupings and results were analyzed.

RESULTS

Nutritional Knowledge in a Food Bank Setting

(Reference Appendix A above for pre/post intervention assessment).

Figure 1 shows the results of the first five questions of the pre/post assessment. Questions 1-5 assess participants nutritional knowledge. A paired T-test was run to assess participants knowledge pre and post intervention. The nutritional knowledge questions assessed participant's knowledge related to complete proteins, fiber, lean proteins, carbohydrates and blood sugar maintenance in terms of foods available at the food bank. The results display an increase in average test scores post intervention insinuating increased knowledge, thus significance of the nutrition interventions ($p=.001$) (Fig. 1).

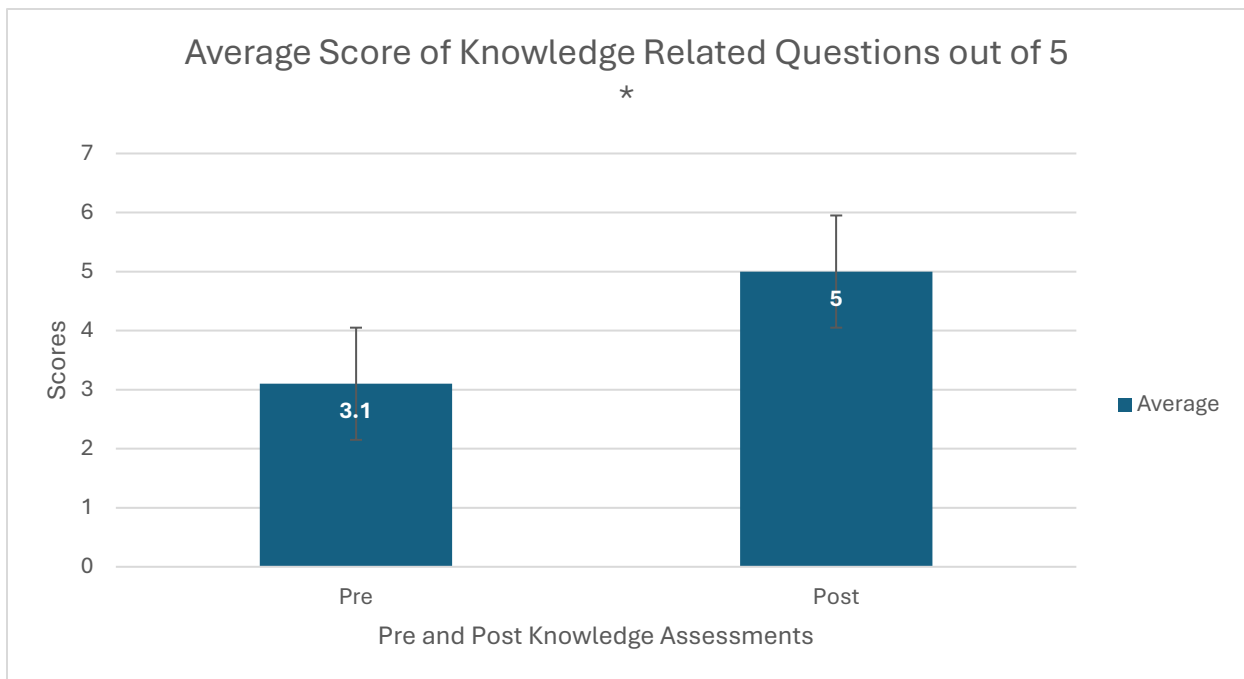


Figure 1. Changes in mean participant scores from pre to post intervention assessment for nutritional knowledge related assessment. Mean scores are based on questions #1-5, and the average points earned by each participant ($n=10$) out of a total possible 5 points (1 point per question). The changes in mean scores from pre – post assessment was statistically significant ($p=.001$). * = $p<0.05$.

CONFIDENCE

(Reference Appendix A above for pre/post intervention assessment).

Figure 2 shows the results of the second five questions of the pre/post assessment.

Questions 6-10 assess participant's confidence in receiving nutritious food from the food bank, their knowledge of different methods to make nutritious meals and their confidence in their ability to execute these methods, and lastly their confidence in the proposed nutritional interventions. The results indicate no change per the paired T-test (Two-sided p value = .091).

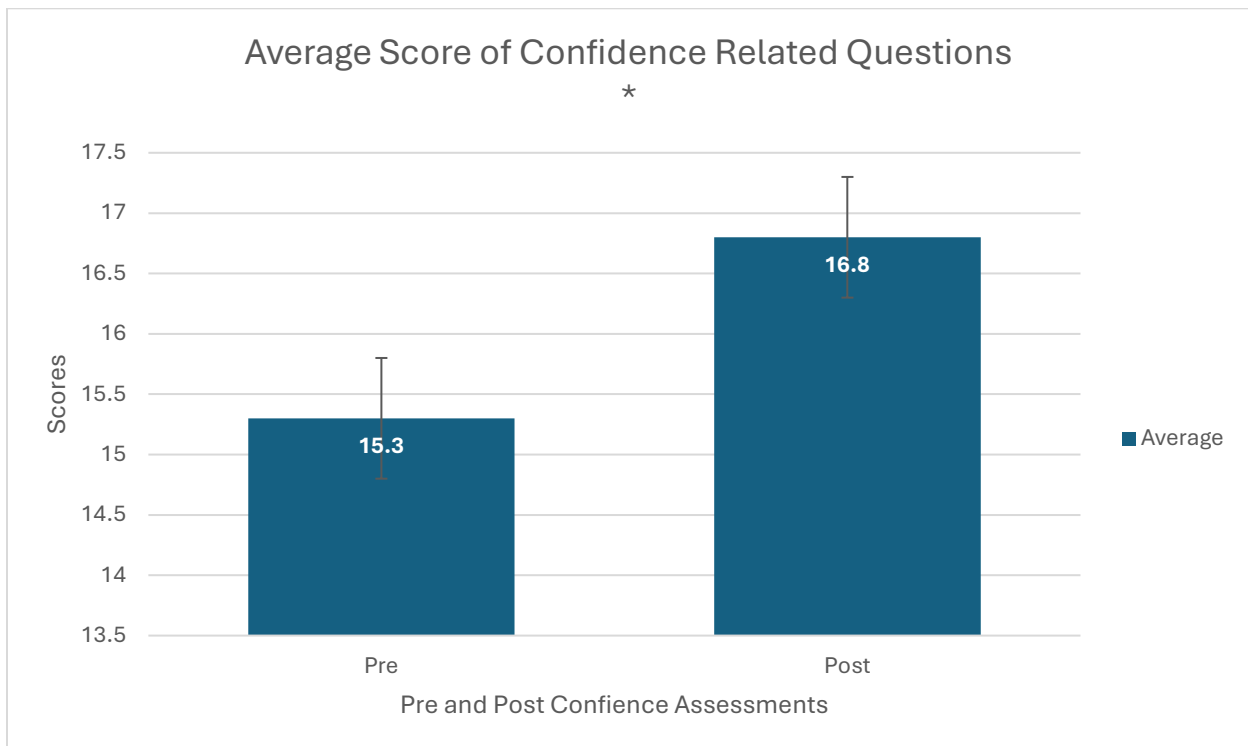


Figure 2. Changes in mean participant scores from pre to post intervention assessment for assessment related to participant confidence in their ability to produce nutritious meals

with food received from the food bank. Mean scores are based on questions #6-10, and the average points reported by each participant (n=10). Scores were calculated based on Likert scale values, based on responses of A-D. “A” answers indicate the least amount of confidence, “B” somewhat confident, “C” moderately confident and “D” very confident. A=1 point, B=2 points, C=3 points and D=4 points. The changes in mean scores from pre – post assessment were not statistically significant (Double sided p value=.091). *p<0.05.

OPEN RESPONSE

Question eleven was open response and provided participants the opportunity to expand on their perception of their reported confidence to produce nutritious meals with food provided from the food bank. Participants were asked “Do you feel able to create and cook healthy meals with the food you receive from the food bank? Please Explain:” Not all participants opted to answer, but seven participants did. All seven responses affirmed that they feel able to create and cook health meals with the food received. Explanations included feeling that they received nutritious foods to make balanced meals, they receive salads, nuts, beans, fruit and gluten free foods and that they have the appropriate appliances to create nutritious foods. The table below displays one such response:

Do you feel able to create and cook healthy meals with the food you received from the food bank? Please Explain:

1. I do. I am able to make balanced healthy meals.
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DISCUSSION

The above results indicate that while the proposed nutritional interventions increased nutritional knowledge related to making nutritious meals with the food available in the food bank, they did not significantly increase participants confidence to prepare a nutritious meal with the food they received.

Study results indicate that while the interventions served to improve nutritional knowledge, they were not enough to change/improve participant confidence. Reasoning for this result may be that a short-term intervention is not enough to improve participant confidence to prepare a nutritious meal with the food they receive from the food bank.

Nutrition based interventions in food bank settings have been studied resulting in various degrees of success.⁷⁻⁹ Previous studies have evaluated the effectiveness of traffic-light labels, nudge tactics, and healthy recipes as interventions to promote nutrition and offer support to clients in a food bank setting.⁷⁻⁸ The results of this study indicate similar results to other studies that indicate the proposed tactics increase participants ability to identify nutritious foods at the food bank.

Other research indicates that more involved and long-term interventions which involve training food bank staff as well as more detailed follow up with participants results in participants feeling more confident in their ability to acquire food for nutritious meals than in nutritional education interventions alone.^{7,10,11} These studies support the findings of this

study because whereas participants knowledge was improved by the nutrition education provided, their confidence in their ability to continue to produce nutritious meals was not significantly improved. These findings suggests that while education can improve participant knowledge, more long-term measures are required to implement meaningful and lasting change.

LIMITATIONS

Limitations of this study include a small sample size, short duration of intervention, and a possibly skewed view of true nutritional learning. The population for this study was 10 participants. A larger sample size would have resulted in more significantly meaningful results. The duration of said interventions was executed over two days. Research clearly indicates that more involved and long-term interventions result in more meaningful change to study participants. Lastly nutritional knowledge was evaluated based on only 5 questions on the pre/post assessment. Because only 5 questions were asked to evaluate knowledge, there is the chance the increased nutritional knowledge was more a result of memorization than true education alone.

FUTURE RESEARCH

Based on the findings of this study and others like it, future research should involve more long-term interventions consisting of multiple strategies including traffic light labeling, nudge tactics, recipe development, staff training and more involved participant follow up.

Support of both participants and food bank staff is a clearly identified factor important to supporting confidence to make necessary changes.

CONCLUSION

In conclusion traffic light labeling, recipe development, and food demonstration provided at the Delaware Opportunities Food Bank significantly improved participant nutritional knowledge related to the food available but did not significantly increase participant confidence to create nutritious meals moving forward.

APPENDIX A

Food Bank Assessment

1. Which combination of foods results in a complete protein?
 - a. Rice and Beans
 - b. Chickpeas and asparagus
 - c. Sweet Potatoes and Rice
 - d. Salad with Walnuts

2. Which food has more fiber?
 - a. White Rice
 - b. Oatmeal

3. Which of the following is the leanest protein?
 - a. Hamburger
 - b. Tuna
 - c. Chicken with skin
 - d. Bacon

4. What is considered a “Complex Carbohydrate”?
 - a. Corn flake
 - b. Sourdough Bread
 - c. Sweet Potato
 - d. Tortilla

5. What food would result in a less significant blood sugar spike?
 - a. Banana
 - b. Yogurt
 - c. Rice
 - d. Fruit Juice

6. In your opinion, how nutritious are the meals you make using food from the food bank?
 - a. Not nutritious at all
 - b. Somewhat nutritious
 - c. Nutritious
 - d. Very nutritious

7. How knowledgeable do you feel with different methods to make nutritious meals using food from the food bank?
 - a. Not knowledgeable

- b. Somewhat knowledgeable
 - c. Moderately knowledgeable
 - d. Very knowledgeable
8. How confident are you in your ability to make nutritious meals using food you receive from the food bank?
- a. Not at all confident
 - b. Somewhat confident
 - c. Moderately confident
 - d. Very confident
9. How effective do you feel a categorization system would be where food is labeled as something that would be beneficial to eat often, sometimes, or rarely?
- a. Not very
 - b. Somewhat
 - c. Moderately
 - d. Very
10. How effective do you feel food demonstrations are when learning new recipes?
- a. Not effective
 - b. Somewhat effective
 - c. Moderately effective
 - d. Very effective
11. Do you feel able to create and cook and healthy meals with the food you receive from the food bank?

Please Explain:

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