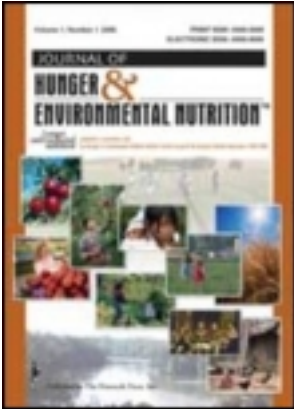


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Publisher: Taylor & Francis

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Journal of Hunger & Environmental Nutrition

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/when20>

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Available online: 29 Nov 2011

To cite this article: Mary M. Flynn & Andrew Schiff (2011): Research Brief: Food Insecurity Is Decreased by Adopting a Plant-Based, Olive Oil Diet, *Journal of Hunger & Environmental Nutrition*, 6:4, 506-512

To link to this article: <http://dx.doi.org/10.1080/19320248.2011.625727>

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Research Brief: Food Insecurity Is Decreased by Adopting a Plant-Based, Olive Oil Diet

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Low-income households spend a disproportionate amount of their food budget on meat and low amounts on vegetables and fruits. Diets high in plant products are related to lower rates of chronic diseases and lower body weight. Raising the Bar on Nutrition (RTB) is a program of the Rhode Island Community Food Bank that is teaching low-income households how to prepare plant-based meals that use extra virgin olive oil. The results show that households completing the program have an increase in measured food security and a decrease in food costs and report eating more vegetables and fruits at 6-month follow-up.

KEYWORDS *food insecurity, vegetarian, SNAP recipients*

INTRODUCTION

Approximately 40% of households in the United States with incomes below 130% of the federal poverty line were food insecure in 2009.¹ *Food insecurity* means that at least some household members cut the size of meals, skip meals, and may even experience hunger because there is not enough money to purchase adequate food. When a family does not have enough money to buy sufficient food, they tend to purchase less expensive food items that are energy dense but low in nutrients.² For example, 19% of low-income households do not purchase fruits or vegetables in an average week.³ In addition, fruit and vegetable purchases do not increase with slight increases in income; however, beef and frozen prepared food purchases do increase.⁴

This study was funded in part by a BlueAngel grant from RI Blue Cross Blue Shield.

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Meat purchases represent the largest portion of the food budget for a low-income household, with up to 50% of total food costs devoted to meat.⁵

Educating food insecure individuals on the preparation of meals that do not contain meat has the potential to extend their limited dollars for groceries. Furthermore, vegetarian meals are healthier than meals made with animal products due to their higher phytonutrient content. Vegetable-based meals may also improve the diet of food insecure individuals and, subsequently, their health.

The objectives of this study were to demonstrate (1) that individuals with incomes less than 130% of the federal poverty line will adopt plant-based olive oil meal for at least 3 meals per week after participating in a 6-week nutrition intervention that includes a weekly cooking demonstration; and (2) that the prescribed healthy diet is affordable and, when followed, reduces food insecurity.

METHODS

Study Participants

Potential participants were recruited at emergency food pantries and low-income housing sites. Inclusion criteria were access to transportation to attend study meetings and cooking classes, willingness to try new recipes, and the ability to be reached by telephone.

Protocol

The protocol is called "Raising the Bar on Nutrition" and it is a program of the RI Community Food Bank. The protocol was divided into 3 parts: baseline (4 weeks); 6 weeks of cooking class; and 6 months of follow-up that involved one meeting per month. For the cooking classes, participants observed the preparation and then tasted one of the 22 recipes that were provided. All of the recipes were made with olive oil, had at least 2 servings of vegetables, and did not contain meat/poultry or seafood. At the time of each cooking class, the participants were provided with a bag of groceries that contained most of the ingredients to make 3 of the provided recipes from the packet for their household members.

There were 3 study appointments: baseline, after the 6 weeks of cooking, and after 6 months of follow-up. At each appointment, participants had their height, weight, and waist measured. At the baseline and after 6 months of follow-up appointments, participants also completed the US Household Food Security Survey Module,⁶ using the timeframe of 1 to 6 months prior to the appointment. A food insecurity score was computed using standard measures.⁷ A study questionnaire assessed current Supplemental Nutrition Assistance Program (SNAP) benefits; size of household and age of members;

and current food habits and changes from the last appointment. Participants were reimbursed small amounts of cash for completing components of the study, such as attending meetings, providing grocery receipts, and completing the study visits. At every appointment, participants provided the grocery receipts for all foods purchased from the time of the last appointment.

STATISTICAL ANALYSIS

This pilot study used paired *t*-tests for the numeric variables (grocery receipts, body weight, waist measurement) and nonparametric Wilcoxon signed ranks test to compare the food insecurity scores at baseline to 6-month follow-up. We used an alpha probability of .05 as the threshold for statistical significance in 2-tailed comparisons. Means are presented with standard deviations (*SD*) throughout. All statistics were performed with PASW Statistics 18 (IBM SPSS Statistics 18 Faculty Pack for Windows).

This protocol was approved by the Internal Review Board of the Miriam Hospital (Providence, Rhode Island), a Brown University Medical School teaching hospital. Participants provided informed consent.

RESULTS

The results presented are for the 50 participants who completed the protocol as of May 2011, comparing the baseline values to the 6-month follow-up values. Participants were primarily women ($n = 42$), average age 49.7 ± 16.4 years; most were unemployed ($n = 41$), and the group was racially diverse (Caucasian, 33; African American, 4; Hispanic, 30; Native American, 6; and other, 4). The average household size was 2.4 ± 1.6 ; 26 of the participants had children under the age of 18 years living at home; and the mean SNAP benefits were $\$245.25 \pm 158.37$ at baseline.

Food Security Score

At baseline, 70% ($n = 35$) of the participants reported using a food pantry in the past month, compared to 48% ($n = 24$) at 6-month follow-up. The mean food security score was significantly higher at baseline compared to 6-month follow-up (3.1 ± 3.6 vs 1.96 ± 2.7 ; $P = .012$). Using a score of <2 as food secure, at baseline 28 (56%) were food secure and 35 (70%) were food secure at 6-month follow-up. For food insecure, using a score of >3 , at baseline 22 (44%) were food insecure and 15 (30%) were food insecure at 6-month follow-up. A score of higher than 8 denotes food insecurity with hunger; at baseline 7 (14%) had scores of 8 or higher, whereas 2 (4%) had scores of 8 or higher at 6-month follow-up.

Changes in Reported Diet

When asked how often they consumed meals that do not include meat/poultry/seafood each week, at baseline 4 reported 3 or more and 37 reported none; at 6-month follow-up, 32 reported 3 or more meals in an average week that were vegetarian; an additional 16 reported that at least 2 meals were vegetarian. When asked for changes in meat consumed and purchased since starting the program, 72% reported eating less meat and 60% reported buying less meat at 6-month follow-up.

Participants were also asked how many meals per week contained at least 1 vegetable and how many contained 2 or more. Compared to baseline, at 6-month follow-up participants reported more meals that contained 1 vegetable (at baseline 22 reported “all 7 meals” vs 34 at 6-month follow-up) and more meals containing 2 or more vegetables (at baseline 3 reported “all 7 meals” vs 12 at 6-month follow-up). When asked at 6-month follow-up to compare their current consumption and purchase of vegetables and fruits compared to baseline, 78% reported eating more vegetables and 76% reported buying more vegetables; 42% reported eating more fruit and 40% reported buying more fruit.

Seventy-four percent reported that the recipes were easier to prepare than their typical recipes, 76% reported that they took less time, and 96% responded “yes” when asked whether they planned to continue using the Raising the Bar on Nutrition foods.

Changes in Food Purchases

The grocery receipts provided throughout the study were divided into food purchased during the 4 weeks prior to the cooking program, food purchased during the 6 weeks of the cooking program, and food purchased for the 6 months of follow-up. The total receipts collected during each time period were averaged to receive an average amount spent per week. Grocery receipts indicated that the participants were spending significantly less per week at 6-month follow-up compared to baseline (baseline, \$70.86 \pm 44.97 vs 6-month follow-up, \$38.67 \pm 23.52; $P < .00$). The decrease in food expenditures was primarily due to decreases in meat purchases (baseline, \$17.12 \pm 18.02 vs 6-month follow-up, \$7.73 \pm 5.72; $P < .00$).

SNAP Benefits

Forty of the participants were receiving SNAP benefits at baseline (average monthly benefit: \$245.25 \pm 158.37) and 38 at 6-month follow-up (average monthly benefit: \$242.45 \pm 159.64). SNAP recipients regularly recertify for these benefits and the amount of SNAP benefits for a household can be

recalculated based on changes in income and other factors. Sixteen of the 40 households were receiving more SNAP benefits at baseline compared to 6-month follow-up ($\$235.00 \pm 157.36$ vs $\$283.06 \pm 164.93$) and 13 were receiving less ($\$305.15 \pm 187.81$ vs $\$251.69 \pm 180.31$).

At 6-month follow-up, 30 of the 38 receiving SNAP benefits reported that their benefits were lasting longer since they started the program.

Changes in Body Weight

The participants were weighed at the study appointments, which occurred at various times during the day. They were not required to fast for the weigh-in because it was not a primary focus of the study. Due to the anticipated uncontrolled variables of seasonal clothing and recent food/fluid consumption, waist size was also measured. Though BMI did not differ at the 6-month follow-up (baseline, 33.5 ± 8.7 vs. 6-month follow-up, 33.2 ± 8.8 ; $P = .29$), 22 (44%) of the participants had 6-month follow-up weights that were lower than their baseline weight (mean weight loss: 5.5 ± 5.6 kg) and there was a significant decrease in waist size at 6-month follow-up (baseline, 97.2 ± 17.2 vs 6-month follow-up, 94.7 ± 16.7 ; $P = .036$).

DISCUSSION

The results indicate that participants adopting a plant-based, olive oil diet for some meals each week become more food secure. The cooking demonstration classes taught the participants how to prepare nutritious meals for their families at low cost and they continued to prepare vegetarian meals 6 months after the cooking classes ended. Participants were increasingly able to afford adequate food, reducing the overall amount spent on groceries and stretching limited food dollars and SNAP benefits. Total food costs after 6 months were 54% of baseline accompanied by significantly less money spent on meat.

The Thrifty Food Plan assumes that meat/poultry/seafood and dairy will be purchased, and these foods represent expensive items in a food budget.⁵ However, they are not needed for health, and weekly meat consumption is related to many chronic diseases, including heart disease⁸ and cancer.⁹ A diet that includes daily animal protein would provide more protein than required, and higher protein diets have been related to higher body weight.¹⁰ Though body weight was not an intended variable in this study, participants were weighed because the population studied tends to be overweight. This study indicates that in addition to decreasing food costs, participants adopting a plant-based, olive oil diet for approximately 3 main meals per week can expect to lose weight.

The plant-based, olive oil diet used in this study was developed by one of the authors (M.M.F., 2003). It has been tested for weight loss and improvement in biomarkers in women with breast cancer¹¹ and in men with recurrent prostate cancer.¹² Participants in these earlier protocols improved their body weight and metabolic biomarkers, which were the study focus. Many of the participants remarked that the diet was economical, which led to the current protocol. Extra virgin olive oil has numerous health benefits and daily use of 2 tablespoons has been shown to lower blood pressure,¹³ decrease blood levels of glucose and insulin,¹⁴ increase insulin sensitivity,¹⁵ and decrease a number of risk factors for heart disease¹⁶ and several cancers.¹⁷ When price per tablespoon is considered, extra virgin olive oil is an economical substitution for meat in a meal. Using olive oil to prepare vegetables improves the taste of the vegetables and can increase vegetable consumption, compared to a lower fat diet that does not use olive oil to prepare vegetables.¹¹

The results of this study indicate that low-income households will find plant-based, olive oil recipes acceptable and they will prepare them following a 6-week cooking demonstration intervention. In addition, a plant-based diet decreases overall spending on food, food insecurity, and body weight. It is possible that other factors contributed to the improvement in food security, due to the limits of the study's pre/post design. Future research is needed to replicate the results using a control group.

REFERENCES

1. Nord M, Coleman-Jensen, A, Andrews M, Carlson S. *Household Food Security in the United States, 2009*. Washington, D.C.: US Department of Agriculture; 2010.
2. Drewnowski A, Darmon N. The economics of obesity: dietary energy density and energy cost. *Am J Clin Nutr*. 2005;82(1 suppl):265S–273S.
3. Blisard N, Stewart H, Jolliffe D. *Low-Income Households' Expenditures on Fruits and Vegetables*. Washington, D.C.: US Department of Agriculture, Economic Research Service; 2004.
4. Stewart H, Blissard N. *Are Lower Income Households Willing and Able to Budget for Fruits and Vegetables?*. Washington, D.C.: US Department of Agriculture; 2008.
5. Wiig K, Smith C. The art of grocery shopping on a food stamp budget: factors influencing the food choices of low-income women as they try to make ends meet. *Public Health Nutr*. 2009;12:1726–1734.
6. Economic Research Service, US Household Food Security Survey Module, Washington, D.C.: U.S. Food and Drug Administration, 2008.
7. Bickel GNM, Price C, Hamilton W, Cook J. *Guide to Measuring Household Food Security*. Rev. ed. Alexandria, Va: US Department of Agriculture; 2000.
8. Steffen LM, Kroenke CH, Yu X, et al. Associations of plant food, dairy product, and meat intakes with 15-y incidence of elevated blood pressure in young black and white adults: the Coronary Artery Risk Development in Young Adults (CARDIA) Study. *Am J Clin Nutr*. 2005;82:1169–1177; quiz 1363–1164.

9. Cross AJ, Leitzmann MF, Gail MH, Hollenbeck AR, Schatzkin A, Sinha R. A prospective study of red and processed meat intake in relation to cancer risk. *PLoS Med.* 2007;4(12):e325.
10. Vinknes KJ, de Vogel S, Elshorbagy AK, et al. Dietary intake of protein is positively associated with percent body fat in middle-aged and older adults. *J Nutr.* 141:440–446.
11. Flynn MM, Reinert SE. Comparing an olive oil-enriched diet to a standard lower-fat diet for weight loss in breast cancer survivors: a pilot study. *J Womens Health (Larchmt).* 19:1155–1161.
12. Flynn M, Mega A. Treating recurrent prostate cancer with a plant-based, olive oil diet. *J Am Diet Assoc.* 2010;110(9):A–12.
13. Ferrara LA, Raimondi AS, d'Episcopo L, Guida L, Dello Russo A, Marotta T. Olive oil and reduced need for antihypertensive medications. *Arch Intern Med.* 27 2000;160:837–842.
14. Madigan C, Ryan M, Owens D, Collins P, Tomkin GH. Dietary unsaturated fatty acids in type 2 diabetes: higher levels of postprandial lipoprotein on a linoleic acid-rich sunflower oil diet compared with an oleic acid-rich olive oil diet. *Diabetes Care.* 2000;23:1472–1477.
15. Ryan M, McInerney D, Owens D, Collins P, Johnson A, Tomkin GH. Diabetes and the Mediterranean diet: a beneficial effect of oleic acid on insulin sensitivity, adipocyte glucose transport and endothelium-dependent vasoreactivity. *QJM.* 2000;93(2):85–91.
16. Perez-Jimenez F, Ruano J, Perez-Martinez P, Lopez-Segura F, Lopez-Miranda J. The influence of olive oil on human health: not a question of fat alone. *Mol Nutr Food Res.* 2007;51:1199–1208.
17. Owen RW, Haubner R, Wurtele G, Hull E, Spiegelhalter B, Bartsch H. Olives and olive oil in cancer prevention. *Eur J Cancer Prev.* 2004;13:319–326.