

Med Instead of Meds Curriculum Demonstrates Effectiveness for Behavior Change

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Abstract

Adherence to the Mediterranean diet reduces the risk of many chronic diseases and effectively manages cardiometabolic disorders. The MED instead of MEDS, a 6-lesson curriculum developed by North Carolina State University and North Carolina State Division of Public Health, was implemented in Florida and evaluated for its effectiveness. Following a 4-session training of educators, the program was evaluated in eight counties. Post-series surveys showed participants increased knowledge of the Mediterranean dietary pattern and its health benefits and confidence with its implementation. Additionally, skill development, such as label reading, preparation of healthful meals, and positive changes in overall health were reported.

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Adherence to healthful dietary patterns, providing vegetables, fruits, unsaturated vegetable oils, nuts, legumes, and fish, decreases the risk of cardiovascular disease (Chiavaroli et al., 2019), type 2 diabetes, cancer, and overall mortality (Wang et al., 2023). Additionally, healthful diets have been associated with less cognitive impairment and dementia (Boushey et al., 2020) and such dietary patterns continue to support cognitive health well into older adulthood (Aridi et al., 2017; Martínez-Lapiscina et al., 2014; Morris, Tangney, Wang, Sacks, Barnes, et al., 2015; Morris, Tangney, Wang, Sacks, Bennett, et al., 2015; Munoz-Garcia et al., 2020; Shakersain et al., 2018; Tangney et al., 2014). The Mediterranean dietary pattern, specifically, is associated with reduced risk of cardiovascular disease (Rosato et al., 2019), type 2

diabetes (Kotzakioulafi et al., 2023), kidney disease (Hansrivijit et al., 2020), autoimmune disease (Alfredsson et al., 2023), and cognitive decline and dementia (Scarmeas, Stern, Mayeux, et al., 2006; Scarmeas et al., 2009; Scarmeas, Stern, Tang, et al., 2006). Moreover, adopting a Mediterranean dietary pattern effectively manages glycemia and cardiovascular risk factors (Esposito et al., 2015).

Given the overwhelming evidence supporting the health benefits of adhering to healthful dietary patterns such as the Mediterranean diet, evidence-based Extension programming is needed to promote increased adherence and a concerted movement away from the Western dietary pattern to reduce chronic disease burden. In Florida, due to its preponderance of older adults (U.S. Census Bureau, 2023), there is an urgent need to mitigate not only cardiometabolic disease morbidity and mortality but also the burden of cognitive decline (CDC, 2021b) and dementia (CDC, 2021a), as efficacious medical therapies are lacking. Diet, as a modifiable risk factor for cardiometabolic and neurodegenerative diseases, is a logical and practical Extension target for behavior change.

Nutrition and health professionals with North Carolina State University and North Carolina Division of Public Health developed the MED instead of MEDS curriculum, outlining "7 simple steps to eating the Med Way' (North Carolina State Extension, n.d.-a). The curriculum is described as a "six-session class series focused on eating a healthy Mediterranean-style eating pattern" and includes a curriculum guide, five evaluation tools, eight editable marketing tools, six PowerPoint presentations with educator scripts, and recipe cards (North Carolina State Extension, n.d.-b). Delivery of the MED instead of the MEDS curriculum may be a feasible and effective way of increasing adherence to the Mediterranean dietary pattern, thus potentially reducing the burden of chronic disease.

Objective

This study aimed to assess the effectiveness of

the MED instead of MEDS curriculum in promoting healthful dietary patterns and, specifically, adherence to the Mediterranean dietary pattern. Secondary objectives were to assess how participation in the six-lesson MED instead of MEDS series impacted knowledge, implementation confidence, and healthful meal preparation related to the Mediterranean dietary pattern, as well as skill acquisition, behavior change, and health outcomes (e.g., weight loss, blood pressure, and medication reduction).

Methods In-service Training

n April 2023, a state-wide virtual in-service training (IST), "MED instead of MEDS Curriculum IST: A Focus on Culinary Medicine and Science for Health," was offered to Family and Consumer Sciences educators interested in delivering and evaluating the program. The one-hour sessions included the following topics: 1) a Mediterranean culinary demonstration by an executive chef, 2) an overview of the MED Instead of MEDS curriculum, 3) a research update on the evidence related to the Mediterranean diet and cardiovascular and brain health, and 4) an introduction collecting valid and reliable dietary change data using dietary screeners. Following the training, an anonymous Qualtrics[®] survey (Institutional Review Board Exempt Protocol ET00018574; Approval date: 04/20/2023) was sent out to participants to evaluate perceived knowledge gains and planned applications.

Med Instead of Meds Series Evaluation

Amily and Consumer Sciences educators from eight Florida counties participated in the statewide evaluation of MED instead of MEDS series, using the tools developed by North Carolina State University. The evaluation tools included a "Pre-Series Med Adherence Tool" and "Post-Series Med Adherence Tool" with a standardized answer key for scoring, and the pre-post "Evaluation Survey," which

was designed to rate participants' knowledge of the "Mediterranean-style eating pattern (i.e., the Med Way of eating)," "strategies for implementing the Med Way of eating in daily life," "mindful eating," and "mindful eating strategies for implementing mindful eating in daily life" using a rating scale from "very low" to "very high" (North Carolina State Extension, n.d.-b). Meal preparation behavior change, skills learned, and change in overall health were assessed using open-ended questions. The Pre-post and evaluation surveys, approved by the Institutional Review Board as an Exempt Protocol (ET00019674; Approval date: 07/19/2023), were primarily completed on paper by program participants, and results were later entered into Qualtrics² for analysis. Descriptive data of means and standard deviations were calculated. Unpaired t-tests were used to compare the Med Adherence score between the pre-program and post-program assessments and pre-post differences in perceived knowledge and confidence. A 5% Type I error rate was set as significant.

Results In-service Training

he IST series was attended by 9 or 10 educators per session (n = 38 aggregate attendance) and recorded and posted online for educators' additional review. Educators who attended were asked, "What was your most significant gain from the MED Instead of MEDS IST sessions?" The main themes were the cooking demonstration, the research update, and the curriculum overview. Specific responses included "Med diet resources and cooking demonstration," "Deeper understanding of the benefits of this dietary pattern, as well as the latest research and developments related to it," "The importance of the [M]ed diet for promoting gut health and ultimately brain health," "applicable material to implementing the curriculum." In response to the statement, "As a result of the MED instead of MEDS IST, I increased my knowledge related to ...," attendees selected culinary medicine and the nine points of the Mediterranean Diet (n

= 8), tips for making Mediterranean food that is affordable, delicious, and nutritious (n = 9), commonly used methods for assessing adherence to a Mediterranean-Style Diet (n = 7), simple recipes using easy-to-find ingredients for satisfying meals (n = 8), limitations of methods commonly used to assess adherence to a Mediterranean-Style Diet (n = 5), and differences between the typical American diet and the Mediterranean Diet (n = 7). Six attendees increased their knowledge of how the traditional Mediterranean diet differs from the Dietary Guidelines for Americans, eight on how the Mediterranean diet impacts heart health, and seven on how the Mediterranean diet impacts brain health. Most attendees also increased their knowledge of successfully implementing the MED instead of MEDS curriculum (n = 6).

The attendees planned to apply the knowledge gained to teach using the MED instead of MEDS curriculum (n = 9), answer questions related to the Mediterranean diet (n = 7), teach or present on topics related to the Mediterranean diet and health (n = 6), and create blogs, newsletter articles or social media content (n = 5). Two of the attendees planned to provide training and support to Extension paraprofessionals. As a result of the MED instead of MEDS IST, attendees increased their ability to discuss the topic with clientele (n = 9), increased their confidence in discussing the topic with clientele (n = 9), and planned to integrate the information into my Extension programming (n = 10). The target audiences for implementation of the MED instead of MEDS curriculum included working, older, and retired adults. One attendee specified older adults in rural communities.

Med Instead of Meds Series Evaluation

he MED instead of MEDS series evaluations from eight Florida counties were included in the analysis. All but four of the program participants included in the statewide evaluation attended the program in person (n = 118). Demographic information of the series participants is provided in Table 1. Following the 6-session series, participants reported a significant increase in the primary outcome, Mediterranean dietary adherence score, from 5.35 ± 2.12 pre-program (n = 101) to 6.88 ± 2.76 post-program (n = 34) out of a possible 13 points (p < 0.001), as assessed by the Pre-Series and Post-Series Med Adherence tools. Following the program, 100% of reporting participants used olive oil as their main culinary fat, consuming an average of 2.6 tablespoons per day, and 83% preferred to eat chicken or turkey instead of beef, pork, hamburger, or sausage. Additionally, participants reported an average daily intake of 2.9 cups of vegetables and 2.6 cups of fruit, and a weekly intake of 1.5 cups of beans.

The pre-post knowledge assessment showed significant increases in all items assessed, including the Mediterranean-style eating pattern and its health benefits and mindful eating (Table 2). Similarly, perceived confidence in participants' ability to implement various dietary changes, such as limiting highly processed foods and planning healthy Mediterranean-style meals, showed significant improvements (Table 3). Responses to the stem, "As a result of this program, I now..." are shown in Table 4. Most participants noted they used olive oil in food preparation, planned healthy Mediterranean-style meals more often, and consumed vegetables, fruit, nuts and seeds, and whole grains more often. There were also significant improvements in flavoring foods with herbs and spices, portion control, and using food labels to choose healthy foods.

Participants were asked to share one or more ways that the MED instead of MEDS program helped them prepare more healthful meals for themselves and their families. Participants responded, "It helps because I am more mindful of what to cook along with the provided recipes. I plan with my family and they enjoy the meals. I enjoy seeing them change to a good lifestyle." Many comments were related to increasing consumption of beans. One participant commented, "I made the white [pinto] bean burgers and it was a hit. I learned that you don't always need meat to have a fulfilling meal." Other participants noted their incorporation of whole grains, fruits, and vegetables. Some comments included, "to be confident to cook with whole grains...to consciously make sure to eat more fresh fruits and vegetables," "be more mindful of incorporating fruits and veggies throughout the day," and "[the MED instead of MEDS program] introduced me to new types of fruits and veggies and how to use them."

Next, participants were asked about what the most helpful skill was they learned from the MED instead of the MEDS program. The most frequently noted skill was label reading, followed by cooking with whole foods/ingredients, using olive oil, herbs, and spices, and portion control. Mindful eating and meal planning were also highlighted. When asked whether participation in this program corresponded with any changes in their overall health, attendees primarily reported weight loss and improved blood pressure. Participants in the MED instead of MEDS program found various aspects of the program enjoyable and beneficial, i.e., what they liked best were the recipes and cooking demonstrations, instructor engagement, learning about the Mediterranean diet, hands-on activities, sharing knowledge and experiences, exploration of different foods and techniques, and the relaxed environment. Finally, participants provided some suggestions for potential improvements to the MED instead of MEDS program, although many expressed satisfaction with the program as it was. Suggestions for improvement included providing more recipes, preparing more warm main course meals, more details on label reading, and more information on herbs and spices. Overall, 98% of participants were very satisfied or satisfied with the program materials, and 96% were very satisfied or satisfied with the quality of the program. Similarly, 96% were very satisfied or satisfied with the quality of the instructors' presentations and knowledge of the instructors. Participants commented, "The instructor was amazing! Fun to listen to. She was very impressionable and encouraging to want to change your lifestyle to a healthy one," and "[the] instructor [was] supportive, knowledgeable and very encouraging in implementing the Mediterranean ways." physical activity guidelines for different life stages (95%), and exercising safely with osteoporosis (95%). Many noted increased confidence in setting up a home fitness center (77%). Survey respondents intended to increase bone-building exercises (82%), try an exercise they enjoy and fits into their life (64%), hydrate more often when exercising (55%), exercise safely with osteoporosis (42%), and purchase hand-held weights (18%).

Discussion

he Western dietary pattern, dominated by processed and animal-sourced foods, is deeply entrenched in the United States. Although socioeconomic, cultural, accessibility, availability, and financial barriers impede the adoption of the Mediterranean diet (Tsofliou et al., 2022), the results of this study support the effectiveness of the MED instead of MEDS series to improve adherence to this healthful dietary pattern. Additionally, participants demonstrated highly significant increases in knowledge of the Mediterranean dietary pattern and its health benefits, confidence in their abilities to adopt behaviors supporting adherence, healthful dietary and meal preparation behavior changes, and some positive health outcomes. The program participants were primarily older adults. This was an expected finding given that some educators who attended the MED instead of MEDS Curriculum IST intended to target this age cohort. Regarding the overall program and instructor quality, participants were satisfied and had few recommendations for program improvement; suggestions generally focused on providing more recipes and more opportunities for meal preparation.

To our knowledge, this is the first systematic study on the effectiveness of the MED instead of MEDS series post-curriculum release. However, there is related educational research supporting educational programming to promote adherence to the Mediterranean dietary pattern. In a randomized controlled study, culinary medicine education was shown to improve Mediterranean diet adherence in diverse families (Razavi et al., 2021). Also, education on the Mediterranean diet demonstrated adherence scores of adolescents using the Mediterranean Diet Quality Index (KIDMED) (Sahingoz & Dogan, 2019). Additionally, there is evidence to support interventional studies, primarily utilizing nutrition counseling, on Mediterranean dietary adherence and healthy eating (Maderuelo-Fernandez et al., 2015); however, reach, efficiency, and costeffectiveness may favor Extension education.

As with all evaluation surveys, there are biases that may have impacted the findings. Participants in this study may not be representative of the population. Thus, the present findings for program delivery may not demonstrate external validity in other areas of the U.S. and elsewhere. Furthermore, most participants were middle-aged and older adults, and thus, comparisons to younger age groups were not possible. The effectiveness of the program may differ if delivered to young adults. Responding participants' overall impression of Extension, Extension agents, or the Mediterranean dietary pattern may have influenced their ratings. Responding participants may have provided answers they believe are socially acceptable or desirable rather than their true opinions or behaviors, which may have impacted the responses of this primarily older adult cohort. However, educators asked participants not to write their names on the surveys to help reduce bias. Additionally, participants who completed the post-program survey may differ from those who did not, leading to an unrepresentative sample.

There was an additional limitation to this study. Only four participants included in this evaluation attended the program virtually, which precluded a comparison between inperson and virtual attendance. It is possible that virtual attendance may not result in similar improvements in Mediterranean diet adherence and other outcomes, especially given participants' interest in and appreciation for hands-on meal preparation.

In conclusion, delivery of the MED instead of the MEDS curriculum was effective at improving adherence to the Mediterranean dietary pattern by increasing knowledge and supporting healthful meal preparation behaviors, skill development, and confidence. The findings suggest improved health outcomes; however, this data was self-reported through an open-ended, potentially leading question. Further research is needed to evaluate the MED instead of MEDS on long term dietary behaviors and quantitatively and qualitatively assessed health outcomes. Funding: This study was supported by the Institute of Food and Agricultural Sciences, University of Florida.

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Demographic characteristics of participants of the MED instead of MEDS series.

Gender, male/female, n	13/84	
Age, n, (%)	(n = 87)	
18-24 years	1	
25-34 years	1	
35-44 years	3	
45-54 years	11	
55-64 years	17	
65+ years	54	
Race, n	(n = 97)	
American Indian or Alaska Native	1	
Asian	2	
African-American/Black	9	
White	77	
Other	3	
Prefer not to answer	5	
Ethnicity, n	(n = 97)	
Hispanic	5	
Non-Hispanic	88	
Prefer not to say	4	

Perceived knowledge change of participants of the MED instead of MEDS series.

Please rate your knowl- edge of the following*	Pre-program (n=50)	Post-program (n=50)	p-value
The Mediterranean-style eating pattern (i.e., the Med Way of eating)	2.22 ± 0.86	4.40 ± 0.57	<0.001
Health benefits associat- ed with the Mediterra- nean-style eating pattern (i.e., the Med Way of eating)	2.46 ± 0.85	4.51 ± 0.58	<0.001
Strategies for imple- menting the Med Way of eating in daily life	2.02 ± 0.84	4.46 ± 0.61	<0.001
Mindful eating Strategies for implement- ing mindful eating in daily life	2.64 ± 0.93 2.42 ± 0.87	4.58 ± 0.57 4.52 ± 0.64	<0.001 <0.001

*Rating scale: 1, very low; 2, low; 3, moderate; 4, high; 5 very high.

Perceived confidence of participants of the MED Instead of MEDS series.

How confident were you in your ability to:*	Pre-program (n=50)	Post-program (n=5)	p-value
Choose healthy proteins	2.96 ± 0.80	4.58 ± 0.53	<0.001
Use olive oil in cooking and food preparation	3.28 ± 1.17	4.64 ± 0.52	<0.001
Eat 5 servings or more of fruits and vegetables a day	2.96 ± 1.18	4.60 ± 0.53	<0.001
Include nuts and seeds in meals and snacks	2.78 ± 1.08	4.60 ± 0.53	<0.001
Choose whole grain op- tions	2.92 ± 1.02	4.56 ± 0.54	<0.001
Limit the amount of added sugar you eat and drink	3.28 ± 1.22	4.72 ± 0.60	<0.001
Limit the amount of high- ly processed foods you eat and drink	3.20 ± 1.06	4.70 ± 0.54	<0.001
Use herbs and spices to flavor food	2.92 ± 0.96	4.56 ± 0.61	<0.001
Plan healthy Mediterra- nean-style meals	2.30 ± 0.98	4.38 ± 0.77	<0.001
Utilize mindful eating strategies	2.69 ± 1.07	4.47 ± 0.61	<0.001
Plan meals	2.86 ± 1.05	4.44 ± 0.73	<0.001
Right-size your portion	2.46 ± 0.98	4.54 ± 0.73	<0.001
Read food labels	2.94 ± 1.19	4.68 ± 0.51	<0.001

*Rating scale: 1, very unconfident; 2, unconfident; 3, neutral; 4, confident; 5, very

Health behavior changes of participants of the MED Instead of MEDS series.

As a result of this program, I now (check all that apply):	N = 50
Serve and eat healthy proteins more often (i.e. beans, legumes, nuts, seeds, fish, seafood, and white meat poultry)	46 (92%)
Use olive oil in cooking and preparing food more often	47 (94%)
Serve and eat vegetables more often	47 (94%)
Serve and eat fruit more often	46 (92%)
Serve and eat nuts and seeds more often	47 (94%)
Serve and eat whole grains more often	42 (84%)
Serve, eat, and drink added sugar less often	40 (80%)
Serve, eat, and drink highly processed foods less often	37 (74%)
Flavor foods with herbs and spices more often	39 (78%)
Plan healthy Mediterranean-style meals more often	45 (90%)
Serve and eat appropriately sized portions more often	39 (78%)
Use labels to select and serve healthy food choices more often	42 (84%)