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Dietary Intervention Targeting Increased Fiber Consumption for Metabolic Syndrome

Philip A. Merriam, MSPH [Assistant Professor of Medicine],

Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-5848 (phone), 508-856-2022 (fax)

Gioia Persuitte, MPA [Research Assistant],

Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-5195 (phone), 508-856-2022 (fax)

Barbara C. Olendzki, MPH, R.D. [Assistant Professor of Medicine],

Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-5195 (phone), 508-856-2022 (fax)

Kristin Schneider, Ph.D. [Assistant Professor of Medicine],

Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-7561 (phone), 508-856-3840 (fax)

Sherry L. Pagoto, Ph.D. [Associate Professor of Medicine],

Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-2094 (phone), 508-856-3840 (fax)

Judy Palken, RD, MS [Nutritionist],

Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-5195 (phone), 508-856-3840 (fax)

Ira S. Ockene, M.D. [Professor of Medicine], and

Division of Cardiovascular Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-3907 (phone), 508-856-4571 (fax)

Yunsheng Ma, M.D., Ph.D. [Associate Professor of Medicine]

Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655. 508-856-1008 (phone), 508-856-2022 (fax)

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Corresponding author: Philip A. Merriam, MSPH, Assistant Professor of Medicine, Division of Preventive and Behavioral Medicine, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655.

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Philip A. Merriam: Philip.Merriam@umassmed.edu; Gioia Persuitte: Gioia.Persuitte@umassmed.edu; Barbara C. Olendzki: Barbara.Olendzki@umassmed.edu; Kristin Schneider: Kristin.Schneider@umassmed.edu; Sherry L. Pagoto: Sherry.Pagoto@umassmed.edu; Judy Palken: Judy.Palken@umassmed.edu; Ira S. Ockene: Ira.Ockene@umassmed.edu; Yunsheng Ma: Yunsheng.Ma@umassmed.edu

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Introduction

Metabolic syndrome is highly prevalent in the U.S. and is a harbinger of diabetes and cardiovascular disease (CVD). With the staggering rise of diet-related chronic diseases such as diabetes and CVD, simple and effective dietary intervention strategies are needed. National dietary recommendations are ever-changing and complex, which can be overwhelming and confusing for individuals who are trying to prevent or manage a chronic condition. Some evidence suggests that healthy changes in one area of diet are associated with healthy changes in other untargeted areas of diet (1, 2). There is an opportunity to bridge a dietetics research gap by testing a simple dietary message focusing on fiber intake to improve risk factors of the metabolic syndrome.

Dietary Fiber and Metabolic Syndrome

Dietary fiber is the edible portion of a plant, classified as carbohydrates that undergo complete or partial fermentation in the large intestine (3, 4). A lower prevalence of metabolic syndrome is associated with dietary patterns rich in dietary fiber including fruits, vegetables, and whole grains; as well as foods not containing fiber such as dairy products, and unsaturated fats (5). Dietary fiber exerts protective cardiovascular benefits on several aspects of metabolic syndrome, including waist circumference, blood glucose, dyslipidemia, blood pressure, insulin control, and regulation of certain inflammatory markers (6–8).

Dietary Intervention for Increasing Fiber

Since dietary fiber has shown to be beneficial with regard to metabolic syndrome, this dietary component was selected to test a hypothesis that a simple dietary recommendation promoting fiber may result in improving overall dietary quality and weight loss for patients with metabolic syndrome. As part of an ongoing four-year randomized clinical trial entitled *A Simple Dietary Message to Improve Dietary Quality for Metabolic Syndrome*, (Clinical Trials Gov identifier: NCT00911885) (9) a fiber-focused dietary intervention was developed. This intervention focuses on educating individuals about fiber, and how to can increase consumption by eating a variety of fiber-rich foods. Individuals are instructed to gradually increase fiber intake to 30 or more grams a day, whereas Americans currently consume about 16 grams daily (10). The study protocol was approved by the University of Massachusetts Medical School Institutional Review Board and the intervention is ongoing.

The dietary fiber intervention contains four primary elements: didactic education, guided questions, experiential and exploratory tasting of foods high in fiber, and problem solving. Timing and topics of each session are included in Table 1. Group 1 is 90 minutes long whereas the remaining groups are 60 minutes. The first individual visit is 60 minutes and the second individual visit is 30 minutes. Meals are provided in Groups 9–11, and there is a pot-luck supper in group 12 where individuals are invited to bring dishes high in fiber. Snacks are provided at each of the remaining groups. The intervention length and numbers of groups were chosen to match the amount of time needed to deliver the dietary elements of the control arm.

An anticipated 120 individuals are expected to participate in the fiber arm of the study, each receiving a manual containing intervention materials organized by session, home activity worksheets, resources, recipes, and suggestions for choosing high fiber meals in restaurants. Participants are taught to make high fiber substitutions (i.e. using barley instead of white rice, whole grain breads and pasta instead of the white refined varieties, and consuming legumes in place of some of the meat in their diets) (See Table 1). Individuals are asked not to rely on fiber supplements, fiber bars, or any one food to increase their daily fiber, but rather to obtain fiber from a variety of foods. They are encouraged to gradually reach their fiber goal of ≥ 30 grams/day, while self-monitoring their daily fiber intake using food diaries. Dietary assessment is conducted using multiple 24-hour dietary recalls.

Improvements to previous dietary recommendations and practices

Lifestyle interventions have proven difficult to implement for the management of metabolic syndrome, with no single dietary recommendation.(11) This intervention may assist dietitians and other health care professionals in delivering an effective yet simple dietary change message by encouraging a shift from the common Western diet of processed and white flour foods to one of fiber-rich foods, in contrast to the seven complex AHA dietary guidelines for healthy living. If proven successful, this method may offer a novel dietary intervention and establish future dietary guidelines for those with metabolic syndrome. Baseline results will be available in 2012 with outcome results available in 2013.

Conclusion

It is clear that high dietary fiber intake exerts clinical benefits on components of metabolic syndrome including, but not limited to weight loss (12). This study has the potential to deliver a different but straightforward message to current complex dietary guidelines, thereby benefiting the nutrition and dietetics community. Future research will continue to explore the benefits of less complex dietary messaging as it relates to the efficacy in the management of metabolic syndrome and other chronic diseases.

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Table 1**Dietary Intervention for Increasing Fiber**

Month/Session	Topic
Month 1/ Group 1	Orientation/Getting Started with High Fiber Eating
Month 1/Individual Visit #1	Individual Consultation
Month 2 /Group 2	Hunger, Satiety and Appetite
Month 3 /Group 3	High Fiber Meal Planning: Being a Fiber Detective & Focus on Whole Grains
Month 3/ Group 4	Savvy Super Marketing: Supermarket Tour
Month 4 /Group 5	3 Ways to Eat More Fiber, Menu Makeover
Month 5/Group 6	Losing Weight the High Fiber Way
Month 6/Group 7	How to Counter Hunger with High Fiber Eating
Month 7/Group 8	Four Keys to High Fiber Eating Out
Month 8/Group 9	The Science of Taste
Month 9/Group 10	Motivation and Long Term Changes
Month 10/Group 11	How to Improve Dietary Quality
Month 11/Group 12	Pot luck Supper: Not Just Lucky, It's a Plan
Month 12/Individual Visit #2	Individual Consultation