By Steven Masley, MD

Enhancing Dietary Compliance: How Can We Do A Better Job?

Physicians can influence dietary compliance by delivering brief messages to their patients. Providers' impact on patients' dietary compliance can also be enhanced by family and partner involvement; by strict reduction of fat intake within a detailed, individualized menu plan and possibly as part of a vegetarian diet. Group treatment settings, intense teaching about diet, and frequent monitoring of dietary compliance are also effective. Medical providers can and should help to decrease their patients' fat intake and increase their consumption of grains, vegetables, and fruits.

Introduction

Clinicians can greatly influence people's eating habits by using short, precise messages. We can learn from our success with tobacco cessation techniques and apply it to nutrition counseling: Studies show that brief smoking cessation techniques are effective when applied by members of a health care team.[1] Similarly, a single brief recommendation from physician to patient can result in major dietary changes, including reduced use of high-fat dairy products, eggs, and margarine and increased consumption of fruits, vegetables, and high-fiber grains.[2]

"The National Cancer Institute and the US Public Health Service have announced three dietary goals for the year 2000 ... Reaching these dietary goals would prevent 160,000 new cancer cases annually (a 30% reduction), and would save $25 billion annually in costs associated with cancer.[3]"

The National Cancer Institute and the US Public Health Service have announced three dietary goals for the year 2000: consumption of five or more servings of fruits and vegetables per day; six or more servings of bread, cereals, and legumes per day; and fat intake to equal no more than 30% of total calories daily. Reaching these dietary goals would prevent 160,000 new cancer cases annually (a 30% reduction) and would save $25 billion annually in costs associated with cancer.[3]

Likewise, the American Heart Association wants Americans to limit their consumption of fat to no more than 30% of total calories daily. A 10% decrease in total fat intake and a 4% decrease in intake of saturated fat has been estimated to reduce incidence of coronary artery disease by 15%. Browner et al[4] estimated that decreasing fat intake 10% and decreasing intake of saturated fat 4% would result in a 15 mg/dl reduction in serum cholesterol levels and a 7% to 8% decrease in total cholesterol levels. Moreover, because a 1% decrease in serum cholesterol is associated with a 2% reduction in coronary heart disease incidence,[5] a 15% reduction in coronary heart disease would be expected from a 10% decrease in total fat intake.

Unfortunately, data indicate that we are far from achieving this goal. In l991, when these recommendations were made, only 27% of the US population consumed three or more servings of vegetables per day, and only 9% reached the five-a-day goal for fruits and vegetables.[6] As of 1998, we have seen only modest improvement, and half the American population haven't reached the five-a-day goal.[7] Unfortunately, too, 40% of the vegetables eaten are consumed in the form of French fries and mashed potatoes, and only one in ten people eat a dark green or deep yellow vegetable serving on any given day.[7]

Despite this overall lack of national progress, some studies do show dramatic success in decreasing total fat intake and in increasing consumption of fiber, fruits, and vegetables. Brown et al,[8] Franklin et al,[9] Gorbach et al,[10] Henderson et al,[11] Thuesen et al,[12] and Ornish et al[13] all reduced their intervention groups' total fat intake to between 7% and 22% of total calories and maintained that reduction for the duration of their 1- to 2-year studies. Not surprisingly, consumption of grains, fruits, and vegetables increased as fat intake decreased. In contrast to popular medical opinion, "motivated patients" found these strict diets as acceptable as the American Heart Association Step I diet.[9,14] Even more striking is the finding that motivated patients appear to have better compliance with a dramatic dietary change than with a Step I diet.[9,14]

Fifty percent of patients who were invited to enroll in the above programs chose to participate. This statistic indicates that nearly half of patients have contemplated dietary improvement and are willing to make major changes if offered adequate support for doing so. Identifying and motivating patients who are contemplating dietary change is critical to improving health outcomes and should be encouraged in all health care settings.

However, providers do encounter many patients who lack the willingness even to consider strict diet changes; for these patients, small dietary changes might be more successful.

Factors that Enhance Dietary Compliance

Successful dietary intervention trials have used similar behavioral techniques. Reviewing trials that used dietary changes to reduce cardiac risk factors, Barnard et al[15] found that specific factors improved compliance with reducing fat intake. These factors included strict limits on fat intake, adherence to vegetarian diets, frequent (at least monthly) monitoring, family and partner involvement, strategies that target symptomatic patients, availability of an initial residential component, intensive nutritional instruction, and provision of food directly to patients. Growing evidence

STEVEN MASLEY, MD is a practicing family physician at Group Health/Kaiser Permanente in Olympia, Washington. Currently, he is researching the impact of group visits on lifestyle changes in treating a variety of medical conditions. He is the author of *The 28-Day Antioxidant Diet Program,* which he uses in many of his group-visit sessions.

shows that providing detailed menu plans and meeting with patients in group settings also improves dietary compliance (Table 1).

Dietary Recommendations, Counseling, and Monitoring

Strictly limiting fat intake is a simple idea for patients to understand. Three changes can limit total fat intake to less than 20% of total calories:

- Eliminate dairy products unless they are nonfat.
- Eliminate butter and margarine, preferably limit cooking oils to monounsaturated oils, and use no more than 1 tsp. oil per person per serving for cooking.
- Eliminate all high-fat meat and poultry products (eg, hotdogs, sausage) and high-fat snacks, and preferably limit lean meat and poultry consumption to 2-3 servings per week.

Vegetarian diets can very successfully help patients to reduce fat intake and increase their consumption of whole grains, fruits, and vegetables. Vegetarian diets that use nonfat dairy products have achieved major dietary improvements without requiring patients to either measure portions or analyze food content.[8,9,13]

An advantage of strictly reducing intake of fat is that patients either feel better or note major changes in their risk factors. For example, in the Ornish intervention group,[13] low-density lipoprotein (LDL) cholesterol was reduced 37.4%—a reduction equivalent to that achieved by drugs (eg, pravastatin)—and anginal symptoms decreased more than 90% within the first few months of therapy. This improved well-being gives patients reinforcement for continuing their dietary changes.

The drawback of recommending either strict reduction in fat intake or change to a low-fat vegetarian diet is that patients who accept the recommendations need help finding new recipes and cookbooks, and learning new shopping skills. Clinicians can counter this challenge by offering group cooking and shopping sessions.

Most people are interested in food content and read food labels. Unfortunately, food labels deceive more than half of all patients who read them.[16]

Dietary compliance is improved by intense initial nutrition counseling. Some programs have used a residential component which was effective but added significant expense to the program. Other investigators simplified their recommendations by teaching patients to count the grams of fat they were eating.[10,17] Group cooking and shopping classes are less expensive than are residential training programs and are also effective.

Monthly monitoring of food intake can be a powerful tool in improving compliance. Patients who use one-, four-, or seven-day food records are forced to analyze their food intake and to assess their fat intake. Monthly records not only reinforce dietary compliance, but also help patients to become experts on the fat content of commonly eaten foods.[10] Simplified for patient convenience, the record can be modified to count only servings of high-fat foods, whole grains, vegetables, and fruits.

Social Support Systems and Motivational Techniques

Family involvement can "make or break" dietary compliance, especially if a partner does the shopping or cooking. Inviting spouses and companions to nutrition classes improves dietary compliance.[15] In addition, food preparation is easier when only one meal is made, and the stigma of changing diets is lessened when the family changes eating habits together. In a managed care environment, inviting family has the added value of improving the health outcome for two or more people for the price of treating one.

Most dietary intervention programs have targeted symptomatic patients in the belief that such patients are more motivated to change. One prominent study,[10] for example, selected female patients who were at increased risk for breast cancer. After dietary intervention, the women decreased their initial fat intake from 39% to 22% of total calories in one year. Reduced consumption of three food groups—dairy products (unless nonfat), meat, and fats or oils—accounted for 70% of this reduction. Devices used to increase dietary compliance included four-day food records for monthly monitoring of fat intake, family involvement, and intensive group classes that emphasized shopping skills and food preparation. The take-home message from this study is that if patients can be sufficiently motivated to decrease fat intake by a family history of breast cancer, where the relation to fat intake is weak, clinicians should be able to bring at least as much motivation to patients who have diseases

"Strictly limiting fat intake is a simple idea for patients to understand. Three changes can limit total fat intake to less than 20% of total calories."

Table 1. Factors that enhance patients' dietary compliance

- Involving family members and partners
- Encouraging strict limits on fat intake
- Encouraging food monitoring
- Targeting cohorts of symptomatic or high-risk patients
- Providing either food or specific meal plans
- Providing instruction on cooking, shopping, and nutrition
- Enrolling patients in group visits
- Providing individualized, computer-generated diet instructions
- Encouraging adherence to vegetarian diets

such as cardiovascular disease, where the link to fat intake is strong.

Individualized, computer-generated handouts have also been used to improve dietary compliance. Campbell and coworkers[18] produced a questionnaire to screen stages of readiness for changing dietary behavior. The analysis included a food frequency assessment, stage-of-readiness diet, and psychosocial issues. A computer program was then used to generate an individually tailored, one-time packet of nutritional information suited to the patient. Each message addressed participants' readiness and motivations for dietary change and supplied nutritional feedback. Total fat consumption decreased by 23% using this single intervention. Because computer-tailored education can be less expensive than individual dietary counseling, this option is yet another way to offer nutritional counseling.

Table 2. Selected books containing meal plans

Book	Cuisine type	% Fat intake
Reversing Heart Disease[21]	Vegetarian	10%
The McDougall Program[22]	Vegan (no dairy)	10%
The 28-Day Antioxidant Diet Program[23]	Mediterranean, Oriental, and Southwest American	20% (featuring monounsaturated and omega-3 fats)
Dietary Treatment of Hypercholesterolemia[24]	Low-fat American (by the AHA)	30% (with AHA Step I and II diets)

Table 3. Foods to add and foods to avoid

Foods to add	Foods to avoid
≥5 servings of colorful fruits and vegetables daily (8-10 servings/day is best)	Snacks, sweets, high-fat chips
≥5 servings daily of whole-grain breads and pasta, brown rice, and bagels	White bread, white rice, white pasta
Nonfat or 1% milk	High-fat dairy products, such as 2% or whole milk, and products made from them
Herbs and spices (eg, garlic, green herbs, and ginger) daily	Salt (limit to 2.4 g daily)
Soy products (eg, soy burgers, veggie hotdogs, soy sausage, soy sandwich products, tofu, soy milk	Bacon, sausage, organ meats, high-fat sandwich meats
Olive or canola oil for cooking and baking	Butter and margarine
Fish (1-2 servings per week), beans (1 half-cup serving daily)	Limit meat and poultry to lean cuts and to only 2-3 servings per week.

Techniques to Specifically Direct Food Choices

Providing food directly to patients improves dietary compliance.[15,19] Although successful as an intervention, however, it adds cost to the program. In addition, because people are often hesitant to try new recipes,[10] successful programs that do not provide food often offer cooking and shopping classes. Some programs have arranged food tasting by scheduling potluck events featuring the menu plans provided.

Surprisingly, for motivated patients, providing specific meal plans has been shown to be as effective as providing food directly to patients.[20] Providing specific meal plans has been shown to improve eating habits for more than one year, suggesting long-term benefits. However, no evidence suggests that distributing meal plans itself fosters dietary change; instead, success stems from combining meal plans with instruction and support. Sample meal plans can be found in several health-promoting books[21-24] (Table 2).

Growing evidence suggests that patients can improve their lipid levels and decrease their number of cardiovascular events by adding specific foods to their diets.[25] Many patients might perceive such addition of foods as more palatable an idea than eliminating foods (Table 3).

Long-term Results of Major Intervention Trials

Contrary to popular medical belief, evidence from randomized intervention trials reveals that reductions in both total fat intake and serum cholesterol level persist long after the trials end. Hjermann et al[26] in reevaluating their patients three years after the end of a five-year trial, found that reductions in the intervention group's total fat intake and serum cholesterol levels persisted three years later.

After five years of follow-up, patients following the Ornish program who were randomized to lifestyle modification continued to show clinical benefits as compared with patients in a control group.[27] Modest

regression of coronary artery stenosis also persisted in the intervention group, even at the five-year poststudy mark.[27]

Most of the successful trials referenced here provided group education sessions for 15 to 30 patients at each lesson. Not only does group intervention provide cost-effective interaction, but the group's support dynamics, too, offer additional theoretical advantages that improve compliance.

Unsuccessful dietary interventions did not use the combination of compliance factors we have discussed here. For example, control groups in the studies by Ornish et al[13] and Brown et al[8] used the American Heart Association diet. The Ornish control group started with a total fat intake of 30.1% of total calories and changed to 29.5% in one year—not a significant change. Further, angiography showed progression of plaque formation in their coronary arteries, whereas the intervention group had regression of plaque formation.[13] The Brown control group decreased their total fat intake from 40% of calories to 34% in one year[8]—clearly less than an adequate change.

The Multiple Risk Factor Intervention Trial (MRFIT) is another intervention trial that did not reach its goals. In that study, investigators hesitated to recommend a large reduction of fat intake, fearing that such a reduction would be too much to ask of participants in a six-year trial. Instead, the investigators recommended decreasing fat consumption modestly—from 38% to 30% of total calories. Patients in that intervention group reduced their fat intake from 38% to 34% of total calories.[15,29] The lesson from that study is that motivated patients who aim to decrease their total fat intake to a maximum of 20% of total calories may have greater compliance than if they aim for a maximum of 30%.

Why Don't People Change Their Diets?

Cotugna et al[29] found that the most common reason why patients choose not to make dietary changes is that people enjoy the food they currently eat. The second most common reason for shunning change is that people think they are eating healthy food already and that they therefore have no reason to change. The third most common reason why people continue their current dietary practices is that they find the proliferation of recommendations more confusing than helpful.

Goals

As this paper makes clear, our goal should be threefold: to educate our patients as to the importance of reaching the year 2000 dietary goals; to simplify this message so that it will be easier to follow; and—since taste is the #1 factor driving food choice in America,[30] we must teach that food that is good for you can also taste good. Specifically, we must communicate to patients simply, consistently, and clearly that they should eat at least five servings of fruits and vegetables and at least six servings of grains and legumes per day, limiting fat intake to <20% of total calories. Providers must also motivate patients from the precontemplation stage to action.

To accomplish these educational and motivational goals, providers and patients need the following resources:

- Simple pamphlets with motivational messages.
- Lists of resources for books, classes, and programs that assist patients in making changes. Motivated patients in particular should be offered healthy meal plans.
- Group classes that help patients address barriers and learn new skills for healthy shopping, cooking, and eating out.
- Computerized dietary assessment tools to provide dietary analysis and tailored advice.
- Follow-up plan with follow-up visits, telephone support, or chart reminders to reinforce change.
- Simple ways to track patients' dietary status and compliance.

The evidence supports that these goals are attainable. The tools to improve patient compliance are available. Therefore, medical providers and clinical systems need only spring from contemplation into action. ❖

Related material published in The Forum (Group Health Cooperative of Puget Sound), September 1996.

"Providing specific meal plans has been shown to improve eating habits for more than one year, suggesting long-term benefits."

"Since taste is the #1 factor driving food choice in America,[30] we must teach that food that is good for you can also taste good."

References:

1.Manley M, Epps RP, Husten C, Glynn T, Shopland D. Clinical interventions to tobacco control: a National Cancer Institute training program for physicians. JAMA 1991;266:3172-3.

2. Hunt JR, Kristal AR, White E, Lynch JC, Fries E. Physician recommendations for dietary change: their prevalence and impact in a population-based sample. Am J Public Health 1995;85:722-6.

3. Bal DG, Foerster SB. Dietary strategies for cancer prevention. Cancer 1993;72(3 Suppl):1005-10.

4. Browner WS, Westenhouse J, Tice JA. What if Americans ate less fat? A quantitative estimate of the effect on mortality. JAMA 1991;265:3285-91.

5. The Lipid Research Clinics Coronary Primary Prevention Trial results: I. Reduction in incidence of coronary heart disease. JAMA 1984;251:351-64.

6. Patterson BH, Block G, Rosenberger WF, Pee D, Kahle LL. Fruit and vegetables in the American diet: data from the NHANES II Survey. Am J Public Health 1990;80:1443-9.

7. Your guide to living healthier longer. Tufts University Health Nutr Lett 1997;15:1.

8. Brown GD, Whyte L, Gee MI, Crockford PM, Grace M, Oberle K, et al. Effects of two "lipid-lowering" diets on plasma lipid levels of patients with peripheral vascular disease. J Am Diet Assoc 1984;84:546-50.

9. Franklin TL, Kolasa KM, Griffin K, Mayo C, Badenhop DT.

Adherence to very-low-fat diet by a group of cardiac rehabilitation patients in the rural southeastern United States. Arch Fam Med 1995;4:551-4.
10. Gorbach SL, Morrill-LaBrode A, Woods MN, Dwyer JT, Selles WD, Henderson M, et al. Changes in food patterns during a low-fat dietary intervention in women. J Am Diet Assoc 1990;90:802-9.
11. Henderson MM, Kushi LH, Thompson DJ, Gorbach SL, Clifford CK, Insull W Jr, et al. Feasibility of a randomized trial of a low-fat diet for the prevention of breast cancer: dietary compliance in the Women's Health Trial Vanguard Study. Prev Med 1990;19:115-33.
12. Thuesen L, Nielsen TT, Thomassen A, Baffer JP, Henningsen P. Beneficial effect of a low-fat low-calorie diet on myocardial energy metabolism in patients with angina pectoris. Lancet 1984;2:59-62.
13. Ornish D, Brown SE, Scherwitz LW, Billings JH, Armstrong WT, Ports TA, et al. Can lifestyle changes reverse coronary heart disease? The Lifestyle Heart Trial. Lancet 1990;336:129-33.
14. Barnard ND, Scherwitz LW, Ornish D. Adherence and acceptability of a low-fat, vegetarian diet among patients with cardiac disease. J Cardiopulm Rehabil 1992;12:423-31.
15. Barnard ND, Akhtar A, Nicholson A. Factors that facilitate compliance to lower fat intake. Arch Fam Med 1995;4:153-8.
16. Hrovat KB, Harris KZ, Leach AD, Russell BS, Harris BV, Sprecher DL. The new food label, type of fat, and consumer choice: a pilot study. Arch Fam Med 1994;3:690-4.
17. Boyar AP, Rose DP, Loughridge JR, Engle A, Palgi A, Laakso K, et al. Response to a diet low in total fat in women with postmenopausal breast cancer: a pilot study. Nutr Cancer 1988;11:93-9.
18. Campbell MK, DeVellis BM, Strecher VJ, Ammerman AS, DeVellis RF, Sandler RS. Improving dietary behavior: the effectiveness of tailored messages in primary care settings. Am J Public Health 1994;84:783-7.
19. Jeffery RW, Wing RR, Thorson C, Burton LR, Raether C, Harvey J, et al. Strengthening behavioral interventions for weight loss: a randomized trial of food provision and monetary incentives. J Consult Clin Psychol 1993;61:1038-45.
20. Wing RR, Jeffery RW, Burton LF, Thorson C, Nissinoff KS, Baxter JE. Food provision vs structured meal plans in the behavioral treatment of obesity. Int J Obes Relat Metab Disord 1996;20:56-62.
21. Ornish D. Reversing heart disease. New York: Ballantine Books; 1990.
22. McDougall JA. The McDougall Program. New York: Plume; 1990.
23. Masley SC. The 28-Day Antioxidant Diet Program. Steven Masley; 1997.
24. American Heart Association. Dietary treatment of hypercholesterolemia. Dallas, TX: American Heart Association; 1996.
25. Masley SC. Dietary therapy for preventing and treating coronary artery disease. Am Fam Physician 1998;57:1299-306.
26. Hjermann I, Holme I, Leren P. Oslo Study Diet and Antismoking Trial: results after 102 months. Am J Med 1986;80:7-11.
27. Gould KL, Ornish D, Scherwitz L, Brown S, Edens RP, Hess MJ, et al. Changes in myocardial perfusion abnormalities by positron emission tomography after long-term, intense risk factor modification. JAMA 1995;274:894-901.
28. Gorder DD, Dolecek TA, Coleman GC, Tillotson JL, Brown NB, Lenz-Litzow K, et al. Dietary intake in the Multiple Risk Factor Intervention Trial (MRFIT): nutrient and food group changes over 6 years. J Am Diet Assoc 1986;86:744-51.
29. Cotugna N, Subar AF, Heimendinger J, Kahle L. Nutrition and cancer prevention knowledge, beliefs, attitudes, and practices: the 1987 National Health Interview Survey. J Am Diet Assoc 1992;92:963-8.
30. Food Marketing Institute. Trends: consumer attitudes and the supermarket 1993. Washington, DC: Food Marketing Institute; 1993.

Experts

Always listen to experts. They'll tell you
what can't be done, and why.
Then do it.
Robert Heinlein