

Commentary

The Importance of Promoting a Whole Grain Foods Message

Julie M. Jones, PhD, Marla Reicks, PhD, RD, Judi Adams, MS, RD, Gary Fulcher, PhD, Glen Weaver, Mitch Kanter, PhD, and Len Marquart, PhD

College of St. Catherine (J.M.J.), Department of Food Science and Nutrition, University of Minnesota (M.R., G.F.), St. Paul, General Mills Inc., Bell Institute of Health & Nutrition, Minneapolis (L.M.), Nutraceuticals Business Unit, Cargill Co., Wayzata (M.K.), Minnesota, Wheat Foods Council, Parker, Colorado (J.A.), ConAgra Inc., Omaha, Nebraska (G.W.)

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Despite mention in the Dietary Guidelines for Healthy Americans and in Healthy People 2010, the lack of a coordinated campaign promoting whole grain foods and their health benefits may be contributing to low consumption. Fiber consumption in the U.S. likewise falls below recommended levels, in part, as a result of suboptimal intake of whole grain foods. Research findings suggest that whole grain is related to reduced disease risk, and that whole grain foods have relevant biological activity in humans. This necessitates a call to action to help Americans increase whole grain consumption as a strategy for health. The establishment of a whole grain coalition could promote increased consumption by developing consumer messages; partnering with health professionals; advocating whole grains to government agencies; seeking funding for scientific research and market research; and educating consumers, as well as health professionals, food manufacturers and millers, about the value and benefit of whole grains.

Key teaching points:

- Both whole and enriched grains are necessary in a healthy diet.
- Whole grains, specifically the bran and germ of the grain, contain significant amounts of functional, biologically active compounds.
- A diet that includes whole grains has been associated with reduced risk for heart disease, stroke, diabetes, and certain cancers.
- Additional consumer education, scientific research, and government policy are needed to reinforce the whole grain health claim.

Introduction

Large scale education and communication programs have successfully reached consumers with nutrition messages. Among the best examples is the National Cancer Institute's (NCI's) 5 A Day program. A nationally representative, random digit dial survey conducted in 1997 found that reported knowledge of the 5 A Day message was associated with a 22 percent increase in fruit and vegetable consumption [1]. Efforts to increase whole grain consumption have been sporadic and much less intense. Despite mention of whole grains in the Dietary Guidelines for Healthy Americans and in Healthy People 2010, the lack of a coordinated campaign promoting whole grain foods and their health benefits may be contributing

to low consumption. This necessitates a call to action to help Americans increase whole grain consumption as a strategy for health. The "Grains for the Health of It" conference, convened on September 20 and 21, 2001, in Minneapolis, gathered experts from industry, academia, the medical community, and trade associations to address the challenge of moving forward in promoting a grains and whole grain foods message.

Consumption data

Disappearance data indicate that consumption of processed and whole grain products averaged about 10 servings per person per day in 1999 [2]. CSFII data put the consumption at 6.7 servings per day. Of those daily servings, less than one was

Address reprint requests to: Julie M. Jones, PhD, Professor, College of St. Catherine, MS4121, 2004 Randolph Avenue St. Paul, MN 55105. E-mail: jmjones@stkate.edu. Presented in part at "Grains for the Health of It," convened on September 20 and 21, 2001, in Minneapolis and sponsored by General Mills, the Wheat Foods Council, The Quaker Oats Co., American Bakers Association, Cargill, ConAgra, Sara Lee Bakery Division, Hodgson Mills, Kellogg, National Barley Foods Council, Kansas Wheat Commission, North American Millers, University of Minnesota and endorsed by the American Association of Cereal Chemists.

of a whole grain product. Although whole grain breads are among the most accessible whole grain food products in the U.S., 20 percent of adults and 40 percent of teens and children in a 2001 telephone survey reported that they never eat whole grain bread [3].

Fiber consumption in the U.S. likewise falls below recommended levels, in part as a result of suboptimal intake of whole grain foods. Data suggest that Americans consume between 12 and 15 grams daily of fiber [4]. Consumption of fiber among the elderly is higher, approximately 18 grams daily [5], but also falls below the general recommendation of at least 25 grams of fiber per day. The Health Professionals Study found that individuals in the lowest quintile for fiber intake consumed 12.4 grams of fiber daily, with 2.2 grams from cereal [6]. Intake in the highest quintile was 28.9 grams, with 9.7 grams from cereal.

Market research and consumer research have identified several barriers to increasing whole grain food consumption. Whole grain foods have limited availability. It has been estimated that only five to 10 percent of retail grain products are made with whole grain [7]. Of the top 10 largest selling supermarket baked goods, based on unit sales, only one contains whole grain and few are all whole grain [8]. Children often reject the taste and texture of whole grain breads, a significant barrier since children are major influencers of family bread purchases, especially of white bread [9]. Reasons given for not purchasing whole grain bread include the color of inside of the loaf, price, softness, texture, moisture content, and taste, according to a 2001 Telenation survey.

Health Profile of Whole Grain Foods

The health profile of whole grain foods has benefited from public health and government measures to enhance and communicate the grain food nutrition package. In the 1940s, enrichment of flour to replace B vitamins lost in milling began as a way to correct nutrient deficiencies that were prevalent among the U.S. population. The 1960s spotlighted all grain foods as part of the Basic 4 Food Groups that made up a healthful diet. In the 1990s, the Food and Drug Administration (FDA) developed an approved list of health claims linking food with disease prevention. Grain foods were among the foods approved to carry a health claim. Grains gained renewed importance as a vehicle for food fortification in 1998, with the addition of folic acid to enriched grain products in the United States. The folate fortification of enriched grains has decreased neural tube defects in the U.S. 19 percent since that time, resulting in an additional 800 healthy babies per year [10]. The relationship between grains and health is shown in the three following government documents on dietary advice: (1) in the Food Guide Pyramid grains form the base, (2) in the most recent version of the Dietary Guidelines for Healthy Americans there is a separate guideline suggesting the inclusion of grains and especially whole grains, and (3) in *Healthy People 2010*

there is a recommendation for three servings of whole grain per day as part of the grain servings.

Whole grains deliver a unique nutrient package. Rich in phytonutrients, whole grains contain vitamins and minerals, unsaturated fatty acids, tocotrienols, tocopherols, insoluble fiber, phytosterols, stanols, sphingolipids, phytates, lignans, and antioxidants like phenolic acids [11] (Fig. 1). The average antioxidant activity in whole grain cereals and whole grain breads is at a level similar to that of fruits and vegetables, on a per serving (Table 1) or a 100 gm basis (Fig. 2) [11]. The milling process removes the nutrient-rich bran and germ from the grain kernel, extracting out a high percentage of the phytonutrients in the whole grain kernel [12]. While vitamins and minerals can be added through fortification, the synergy of phytonutrients in the whole grain kernel is difficult to recreate.

Whole Grains and Heart Disease

Whole grain consumption has been associated with reduced risk of coronary heart disease (CHD) and stroke. A meta-analysis of 12 studies showed that regular intake of whole grain foods was associated with a 26 percent reduction in risk for CHD [13]. The Harvard Nurses Study evaluated over 75,000 women aged 38–63 years at the time of enrollment and followed for 10 years [14]. Relative risks of heart disease associated with increasing quintiles of whole grain intake were 1.0 (reference), 0.92, 0.93, 0.83, and 0.75 (p for trend = 0.01) after adjustment for body mass index, alcohol intake, and other potentially compounding variables. Median whole grain intake ranged from 0.13 servings daily in the lowest quintile to 2.7 servings daily in the highest quintile. Study data also demonstrated a 36 percent drop in risk of ischemic stroke in women eating approximately three daily servings of whole grain foods [14]. In the Harvard Health Professionals Study of 43,757 males 40 to 75 years of age, age-adjusted relative risk of myocardial infarction (MI) was lowest among the highest quintile of total dietary fiber intake (median, 28.9 g/day), as compared to men in the lowest quartile (median, 12.4 g/day) [6]. In that study, cereal fiber was the factor most strongly associated with reduced risk of MI. The Iowa Women's Study of 34,492 women, 55 to 69 years, found that adjusted relative risk of death from CHD decreased with increased daily intake of

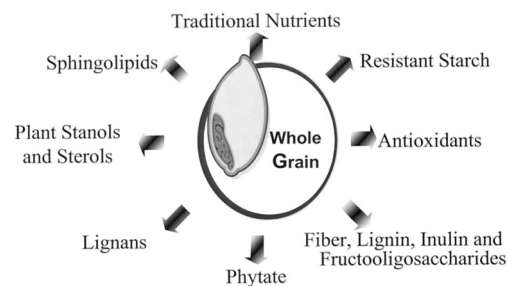


Fig. 1. Whole grain components.

Table 1. Antioxidant Activity Per Serving

Product	Serving (grams)	Trolox Equivalents/Serving
Whole grain cereal	41*	1,150*
Vegetables	120	540
Fruit	120	1,440
Whole Wheat Bread	50	1,000

* Average for eight whole grain breakfast cereals.

whole grain foods (RR = 1.0, 0.96, 0.71, 0.64, 0.70 in ascending quintiles) [15]. Mechanisms of action are not fully understood and are thought to be a function of several factors: content of soluble fiber, antioxidants, and phytoestrogens; the synergy of nutrients in whole foods; alteration of LDL oxidation; vascular reactivity, coagulation, and fibrinolysis by bioactive compounds in fiber; and changes in insulin sensitivity.

Whole Grains and Diabetes

Whole grain consumption appears to alter the incidence of diabetes. In the Iowa Women's Health Study, total grain, whole grain, dietary fiber, and cereal fiber intakes were inversely associated with incidence of diabetes; women in the highest consumption for whole grain intake had a 22 percent lower risk for type 2 diabetes [16]. The Harvard Women's Health Study demonstrated that eating approximately three daily servings of whole grain foods was associated with a 27 percent drop in risk of type 2 diabetes [17]. A whole grain crossover feeding study of 11 overweight, hyperinsulinemic, nondiabetic adults with six weeks of whole grain feeding and six weeks on refined grains demonstrated that fasting insulin and PAI-1 antigen levels dropped significantly by the second week of whole grain feeding as compared to the refined grain diet [18]. It has been proposed that the greater particle size, less refining, and high levels of soluble fiber in whole grains are associated with a lower glucose response and resultant lower risk of diabetes [19].

Whole Grains and Cancer

A relationship has been suggested between whole grain consumption and cancer. A meta-analysis of 40 studies on 20 cancers, along with colon polyps, demonstrated a 21 to 43 percent lower cancer risk with high intakes of whole grains [20]. Possible mechanisms of action include alterations in carbohydrate fermentation, transit time, fecal bulk, endogenous sex hormone production, and enterohepatic circulation.

Current Status of Label Claims

Several health claims pertaining to the relationship between whole grains and disease prevention have been approved since health claim regulation began in the 1990s under the FDA's National Labeling Education Act (NLEA). In order to be approved, a health claim must be supported by a sufficient body of research substantiating the food-health relationship. The whole grain claims that have been approved under the NLEA protocol include the relationships between oats and coronary heart disease, soluble fiber and coronary heart disease, and whole grains, fruits, and vegetables and cancer.

Under an alternate approval procedure, the FDA regulates "authoritative health claims statements" under an expedited process that requires a statement from a federal scientific body supporting the relationship between a nutrient and a disease or health-related condition. It does not relax scientific standards for NLEA health claims; instead, it accepts a scientific consensus statement as evidence of a relationship. In 1999, the FDA permitted the following whole grain health claim under the FDAMA: "Low fat diets rich in whole grain foods and other plant foods may reduce the risk of heart disease and certain cancers" (Fig. 3). Support from federal scientific publications includes the Food Guide Pyramid, 2000 US Dietary Guidelines, and 2010 U.S. Objectives for the Nation (Healthy People 2010), and the National Academy of Sciences Diet and Health Report.

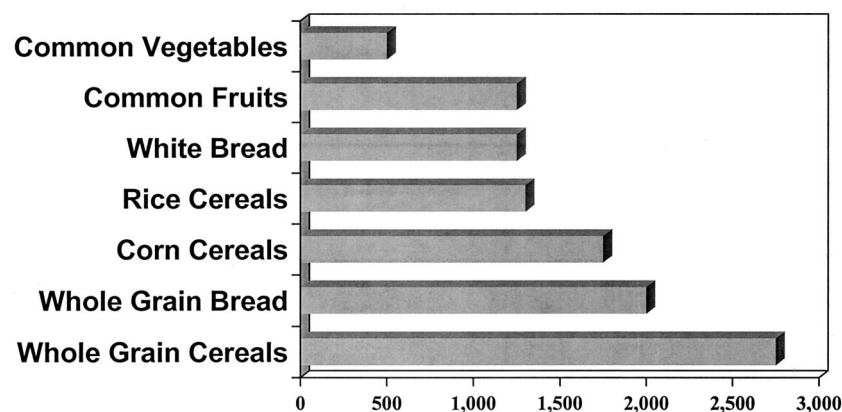


Fig. 2. Average antioxidant activity (trolox equivalents) per 100 g.

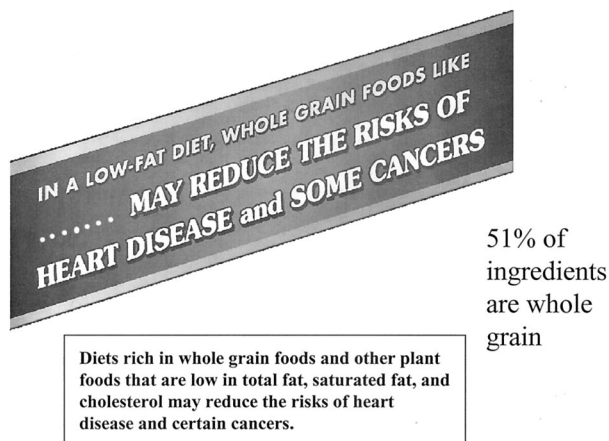


Fig. 3. Whole grain health claim.

Advocating for Whole Grain Foods

A whole grain consortium, consisting of representatives from academia, government, public and private agencies, and industry, should be developed to advocate for whole grains and address key whole grain issues. A coalition of this type offers strength in numbers to advance common goals, support research, gather expertise, and provide information to help consumers make informed food decisions.

Maintain Grains at the Base of the Food Guide Pyramid.

The positioning of grains, including whole grain foods, at the base of the Pyramid depicts the importance of this food group as the foundation of a healthful diet. The general grain message should include a goal of three daily servings of whole grains, a realistic and attainable target.

Encourage and Support Whole Grain Research.

Additional research is needed to better understand the relationship between whole grains and health. Improved methodology for estimating grain intake would better clarify whole grain intake and differences in intake among populations. Metabolic studies would further our understanding of the effects of grains on body processes. Disease prevention and intervention studies could tease out the protective roles of grains and whole grains, and their interrelationship with other foods. Research partnerships with associations like the American Heart Association and American Cancer Society can enable larger scale studies on the effects of grains on specific diseases. On the industry side, studies of processing effects on the bioavailability of nutrients will further the development of grain products that offer both maximal nutrition and desired taste.

Pursue Policy Support and Funding for Whole Grains Research.

Funding from government agencies is necessary to further the examination of the whole grains-health relationship and communicate that relationship to consumers. For example, a legislative agenda focused on increased funding for child nutrition programs and nutrition education could help reach consumers at an early age and guide them toward lifelong healthful habits. Partnerships to combat childhood nutritional

problems, such as obesity, allow the sharing of research and program expenses among government agencies, health organizations, and trade groups. Market research will help clarify consumer perceptions of whole grains, as well as barriers to consumption. This will enable the development of strategies to overcome these barriers.

Reach Consumers through Health Professionals and Other Vehicles.

Consumers often turn to health professionals for advice on nutrition and disease prevention. Once consumer messages have been developed and tested, they can be disseminated to physicians, dietitians, and other nutrition experts who communicate with consumers. A coordinated outreach campaign can link health professionals and industry experts with members of the media, who have the ability to reach large numbers of consumers.

Develop Child-Targeted Education Campaigns.

Children are a primary market because of their influence on household food purchases. A whole grain consortium could form a partnership with school food service and administration to develop health promotion programs. With the National School Food Service Association as a partner, new recipes for whole grain dishes could be disseminated to schools around the country. Coordinated education and promotion efforts are necessary to overcome competition from food sold in vending machines, a la carte, and in school stores.

Encourage the Whole Grains Industry to Take Action.

Lack of convenience impedes whole grain consumption. This calls for increased availability of whole grain foods in the market and in food establishments outside the home. A coordinated education program among manufacturers, retailers, and restaurants could drive innovation and increase consumer demand for whole grain products. Creative thinkers in the industry are vital for the development of new products that will be embraced by consumers of all ages.

Continued innovation in the food industry will offer consumers a wider array of tasty whole grain products. Ideal grain products would be processed to enhance the retention and bioavailability of nutrients and phytochemicals, and fortified with appropriate nutrients and active components. Taste and convenience are vital to the success of any product.

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