Q Is there scientific evidence to support the common-sense advice about healthful eating behaviors that we've been giving consumers for years?

A In today's fast-paced world where we are just a click, dial or page away from headlines about the most recent nutrition findings, some of the practical advice offered to consumers by health professionals may not seem "new." Yet, it's important to heed! Scientific evidence suggests that healthful eating has important benefits. This article highlights one example: research findings supporting advice for children, teens and adults to start the day with a healthful breakfast.

Health professionals provide guidance on healthful eating patterns, as well as on wise food choices. Advice to eat breakfast is a key message. After a 10- to 14-hour overnight fast, the body needs to refuel. Thus, it is troubling that breakfast eating in the US has declined over the past several decades, from 89.7% to 74.9% in boys, 84.4% to 64.7% in girls and 86% to 75% in adults between 1965 and 1991 (1-2). More recently, 77% of adults (80.4% whites, 71.7% Hispanics, 68.7% African Americans) reported eating breakfast on a given day, but the rates varied considerably with age from 62.8% among 19- to 29-year-olds to 92.5% among adults 70 years of age and older (3). Reasons for skipping breakfast include too little time, lack of appetite, monotonous food choices, earlier start time for school or work, no one to prepare food and/or no interest in food preparation.

Numerous studies have reported benefits of eating breakfast. These include favorable intakes of nutrients, (4-8) more efficient physiologic performance for endurance activities (9) and improved cognition and learning in children (10-12). Also of interest is the observation that breakfast eating is characteristic among 78% of National Weight Control Registry participants (individuals who have maintained a minimum weight loss of 30 pounds for one or more years) (13).

Several recent studies have built on previous findings. Objectives were to confirm or extend understanding of the effects of eating breakfast and/or the effects of the type of foods eaten at breakfast, at all ages.

Mahoney and colleagues (14) compared the effects of eating two different breakfast foods (a sweetened ready-to-eat cereal or flavored instant oatmeal) versus not eating breakfast on cognition in two groups of school-age children (six- to eight-year-olds and nine- to eleven-year-olds). Results confirmed previous findings that eating breakfast improves cognitive performance. There were also favorable effects based on the type of breakfast food eaten. After eating oatmeal, which differed from the other cereal in protein, fiber content and rate of digestion, boys and girls in both age groups had better spatial memory; girls also had improved short-term memory. Further, the younger group also had improved auditory attention. The authors noted that previous research suggests that more slowly digested foods maintain a more sustained release of glucose, which may have a positive effect on cognition.

Other researchers analyzed data from the National Heart, Lung and Blood Institute Growth and Health Study (NHLBIGHS) for effects of breakfast eating. The NHLBIGHS was a nine-year, longitudinal study of African-American and white girls, who were nine or ten years of age at the start of the study. Food intake was determined by annual collection of three-day food diaries.

Affenito and co-workers (15) looked at frequency of breakfast eating and associations with intake of dietary calcium, fiber and body mass index (BMI). They found that girls ate breakfast less often as they grew older. Seventy-seven percent of white girls and 57% of African-American girls ate breakfast on all three days of data collection at the start of the study, compared with 32% and 22%, respectively, at the end. Additionally, days of breakfast eating were related to higher intakes of dietary calcium and fiber, even when data were adjusted for total calorie intake. Frequency of breakfast eating was also linked with lower BMI. Further, girls who reported eating cereal on all three days of data collection had a BMI about 0.1 point lower than did those who ate cereal zero, one or two days. Interestingly, after considering factors such as energy intake, physical activity and parental education, the effect of breakfast eating by itself was no longer significant. The researchers hypothesized that eating breakfast regularly may be a marker for other healthful practices and, thus, may be predictive of healthful behaviors that promote management of body weight.

Barton et al (3) analyzed changes in both breakfast and cereal intake of girls participating in the NHLBIGHS to explore the relation of breakfast eating and cereal eating to intake of key nutrients and BMI. Calculations for each girl at each age showed that number of days of breakfast eating and of cereal intake decreased with age. Regardless of whether cereal was eaten at breakfast or other times, girls had higher intakes of fiber, calcium, iron, folic acid, vitamin C and zinc, and lower intakes of fat and cholesterol on days when cereal was eaten. An analysis of

associations among breakfast eating, cereal intake and BMI showed that girls who ate cereal, rather than other foods, at breakfast were leaner than girls who did not eat cereal. Further, using a model of risk for overweight, girls who ate cereal had lower rates of risk than girls who did not. Calling for additional studies to extend their findings, the authors suggested the possibility that regular intake of cereal may be a marker for eating nutrient-rich foods and/or following a generally healthful lifestyle.

In a similar vein, Song et al (16) used data from the National Health and Nutrition Examination Survey, 1999 – 2000, to determine whether breakfast eating is associated with BMI in US adults. Reported breakfast eaters were more likely to be older, female, white, nonsmokers, regular exercisers and trying to control their weight. In women, average daily calorie intake was higher among breakfast eaters than among those not eating breakfast; this was not true in men. For both men and women, average daily calorie intake did not differ significantly between those eating ready-to-eat cereal (RTEC) and those eating other options, but the type of food eaten at breakfast was associated with differences in macronutrient intake. RTEC eaters ate fewer calories from fat and had higher intakes of dietary fiber and calories from carbohydrate. Results showed an association between eating breakfast and eating RTEC with BMI of less than 25 (the top range for "healthy weight") in women, but not men. Female breakfast eaters were significantly less likely to have a BMI of 25 or higher than women who did not eat breakfast. However, when RTEC was factored in as a covariate, prevalence of BMI less than 25 was more strongly associated with eating RTEC than with eating other foods. The authors called for additional research to better understand possible links between choice of breakfast foods and likelihood of other healthful lifestyle choices.

Farshchi and colleagues (17) conducted a randomized crossover study with 10 healthy, lean women 19 to 38 years of age to look at effects of eating breakfast or skipping breakfast on calorie intake, energy expenditure and blood levels of insulin, glucose and lipids. There were two 14-day tests, eating breakfast (EB) and omitting breakfast (OB), separated by a 2-week period during which participants followed their typical diet and eating patterns. In the EB test, the women ate 45 g of whole-grain cereal with 200 ml of 2% reduced-fat milk between 7:00 – 8:00 AM and a 48 g chocolate-covered cookie between 10:30 – 11:00 AM, plus two meals and two snacks at predetermined times each day. In the OB test, the women ate the chocolate-covered cookie between 10:30 – 11:00 AM and the cereal with milk between 12:00 – 12:30 PM, plus two meals and two snacks at predetermined times each day. There was no difference in energy expenditure and body weight did not differ significantly before or after either test period. While intake records showed that average caloric intake was lower during the EB period than during the OB period, the percentage of calories from macronutrients did not differ significantly from one test to the other. Neither test had an effect on fasting blood glucose levels, but the OB test resulted in higher blood levels of total and LDL cholesterol and lower postprandial insulin sensitivity. Noting the short duration of this study, the authors called for additional long-term research to determine possible effects on body weight of the reported higher energy intakes when participants skipped breakfast.

Practical Applications

Several messages emerge from this research. Breakfast offers children and teens an important opportunity to get energy and essential nutrients needed for proper growth and development. For adults, especially women of childbearing age and for those establishing lifestyle habits, breakfast is a potential source of calcium, fiber and micronutrients. Patients and clients could also benefit from guidance on types of foods to eat at breakfast. This might include:

- Educating consumers on healthful foods that are nutrient dense relative to calories
- Promoting low-fat calcium-rich dairy foods, whole-grain cereals and breads and fruits (especially citrus fruits, berries and deep-yellow or orange choices)
- Offering advice on identifying whole-grain products by reading food labels (Read the ingredient statement, look for the words *source of whole grain, rich in whole grain or 100% whole grain* or this government-approved health claim: *Diets rich in whole-grain foods and other plant foods and low in saturated fat and cholesterol may help reduce the risk of heart disease and certain cancers* on food packages; additionally, some food manufacturers list the amount of whole grain in a serving on the package.)
- Suggesting prudent substitutions
- Providing tips on modifying preparation of some favorite breakfast options
- Finding solutions that help overcome obstacles to eating breakfast.

The emerging message seems clear: not only is breakfast important, what we eat for breakfast is important, too.

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