USDA's Healthy Eating Index and Nutrition Information

Nearly two-thirds of the annual deaths in the United States are traceable to diseases associated with dietary excesses—for example, coronary heart disease, some cancers, stroke, and noninsulin-dependent diabetes mellitus. Estimates show that illnesses and premature deaths resulting from diet-related diseases and conditions cost Americans about $250 billion a year.

Greater knowledge of the nutrient content of foods and greater awareness of diet-health relationships will lead presumably to more healthful food choices. Improving diet quality through better information has been the goal of recent national campaigns such as USDA's Food Guide Pyramid, Dietary Guidelines for Americans, and the 5 A Day campaign. However, a large gap remains between actual and healthful diets.

In their efforts to achieve further dietary improvements, nutrition educators and public-health professionals face a lack of specifics concerning individuals' use of diet-health information. To understand factors slowing the adoption of healthful diets, these information multipliers need empirical knowledge of how diet-health information and its effect on dietary choices vary across the population. This knowledge can be used to target nutrition education programs, promote and market foods, and forecast food consumption trends.

This report estimates the effect of nutrition information on overall diet quality, as measured by the Healthy Eating Index (HEI). Researchers controlled for an extensive set of personal and household characteristics that influence both nutrition information and the HEI, simultaneously using several model specifications and estimation methods. The report provides the first look at the influence of socioeconomic characteristics, nutrition knowledge, and awareness of diet-disease relationships on dietary patterns.

Data

The report uses data from USDA's 1989-90 Continuing Survey of Food Intakes by Individuals (CSFII) and the Diet and Health Knowledge Survey (DHKS). The CSFII gathers data on what, when, where, and how much Americans eat. Each participant provides 3 consecutive days of dietary data. Social, economic, and demographic characteristics of the survey participants were also collected in the 1989-90 survey; 4,406 households provided information. Each food item eaten was recorded using a coding system containing about 6,700 food codes.

The DHKS obtains information about an individual's knowledge of and attitudes toward diet, health, and food safety issues. The respondent for a household is usually its main-meal planner. In 1989-90, 86.4 percent of the CSFII-participating households completed the DHKS. This study was limited to the main-meal planners of the sample households who responded to both the CSFII and the DHKS. The final sample consisted of 2,442 respondents.

USDA's Center for Nutrition Policy and Promotion developed the HEI—a summary measure—to assess overall diet quality in America. The instrument combines information on the amount and variety of food in the diet and compliance with specific recommendations of the Dietary Guidelines. A score on the Index represents the sum of 10 different dietary components, each with a range of 0 to 10. The Index's 10 dietary components and what they measure are as follows:

- Components 1-5: the extent to which a person's diet conforms to the Food Guide Pyramid serving recommendations for the grain, vegetable, fruit, milk, and meat groups.
- Component 6: total fat consumption as a percentage of total food energy intake.
- Component 7: saturated fat consumption as a percentage of total food energy intake.
- Component 8: total cholesterol intake.
- Component 9: total sodium intake.
- Component 10: the amount of variety in a person's diet over 3 days.

USDA developed a grading scale to rate overall diet quality, as measured by the HEI. The HEI rates scores over 80 as signifying a ''good'' diet, scores between 51 and 80 as signifying a diet that ''needs improvement,'' and scores less than 51 as signifying a ''poor'' diet. The table reports results of tabulating the HEI scores and the nutrition information variables against key socioeconomic groups (discussed later). Higher scores were associated with higher levels of income and education. Scores were also higher for females and for nonsmokers.

Nutrition Information Measures

Researchers developed measures of meal planners' nutrition information by using responses to two sets of questions in the DHKS. The first measure was called the ''nutrient content knowledge'' of meal planners. Respondents were

Nutrition information and the Healthy Eating Index across selected sociodemographic groups

	Nutrient content knowledge (NCK)	Diet-health awareness (DHA)	Healthy Eating Index (HEI)
HEI			
Less than 51	14.41	4.71	44.99
51-80	15.45	5.33	64.79
Greater than 80	16.55	6.04	88.09
Age			
Less than 30	15.09	4.84	59.28
31-49	15.67	5.64	61.51
50-69	15.68	5.44	67.17
Over 69	14.74	4.84	69.33
Gender			
Male	14.75	4.95	60.59
Female	15.56	5.39	64.79
Race			
White	15.74	5.49	64.78
Black	13.76	4.41	59.66
Other	14.12	4.47	63.56
Ethnic origin			
Non-Hispanic	15.55	5.37	64.04
Hispanic	13.56	4.60	64.11
Income per capita			
Less than $3,801	14.28	4.72	59.52
$3,801-$5,400	14.69	4.74	63.47
$5,401-$10,200	15.30	5.18	64.52
$10,201 or above	16.57	6.06	66.83
Education			
Less than high school	14.10	4.53	62.57
High school	15.56	5.20	62.97
More than high school	16.56	6.21	66.67
Vegetarian			
Vegetarian	15.61	5.18	67.21
Nonvegetarian	15.41	5.32	63.95
Smoking			
Smoker	15.04	4.93	58.63
Nonsmoker	15.55	5.45	65.98

Source: Variyam, J.N., Blaylock, J., Smallwood, D., and Basiotis, P.P., 1998, USDA's Healthy Eating Index and Nutrition Information, U.S. Department of Agriculture, Technical Bulletin No. 1866.

given a series of binary-choice questions about sources and occurrences of various nutrients in common food items. The minimum score was 0, and the maximum was 21. Respondents correctly answered an average of 15.4 questions.

The second measure was called the ''diet-health awareness'' variable; it measured the meal planners' awareness of diet-health problems. The eight questions took this general form: Have you heard about any health problems that might be related to how much of a particular nutrient (fat, fiber, salt, calcium, etc.) a person eats? The diet-health awareness measure was calculated by totaling the positive responses for the eight questions. The minimum score was 0, and the maximum was 8. The average score was 5.33.

Explanatory Variables

Three categories of explanatory variables were hypothesized to affect nutrition information and/or the HEI: Household characteristics, personal characteristics, and survey-related controls. The effect of income was uncertain—although higher income may provide more access to dietary information. Thus, higher income indirectly increases diet quality and intake of meats. Also convenience foods may rise as income increases, producing a negative direct effect on diet quality.

Household size, presence of children, household head status, and employment status of the meal planner were likely to influence both nutrition information and diet quality. Education was expected to have a positive indirect effect on diet quality. Women were expected to have more nutritional information than were men. Because smokers may value health less than do nonsmokers, researchers expected smoking to have a negative direct effect on diet quality. Researchers

also expected vegetarians to have higher HEI scores, compared with their counterparts and expected body mass index (BMI) to have a negative direct effect on HEI scores.

Researchers use four indicators to assess the meal planners' use of various sources of information: Whether the respondent watched television 5 or more hours daily (excessive watching); whether the respondent received dieting advice from a physician or dietitian; whether, when shopping, the respondent always compared nutrients in foods; and whether, when shopping, the respondent sometimes compared nutrients in foods. Excessive television watching was likely to hinder information gathering; whereas, both receiving dietary advice and comparing nutrients while shopping were expected to be correlated positively with nutrition information level.

Findings

A linear ordinary least squares (OLS) model, which did not include information variables, profiled a meal planner with a high HEI score as an older, White, nonsmoking, highly educated female, with high household income, low BMI, unemployed or employed part-time, and residing in the Northeast. Other OLS models included nutrition information—either nutrient content knowledge or diet-health awareness—as an explanatory variable. A higher information level was related to better diet quality, as measured by the HEI. Holding other explanatory variables constant, researchers found a 1-percent rise in the score for nutrient content knowledge resulted in a 0.155-percent increase in the HEI, and a 1-percent rise in the diet-health awareness score resulted in a 0.049-percent increase in the HEI. Other models indicated that much of the effect of the sociodemographic variables on the HEI occurred because of nutrition information. The role of education and income in determining diet quality, as measured by the HEI, appears to be totally information-related.

The estimated effects of gender, race, and ethnicity provided additional evidence about the informational effects of sociodemographic variables on the HEI. By holding all sociodemographic and household characteristics constant, researchers found that the HEI scores of a male meal planner and a female meal planner, both possessing the same level of nutrient content knowledge, did not differ significantly. When nutritional information was held constant, the HEI for Black meal planners was about three points higher than that for White meal planners. Meal planners of other races had HEI scores four points higher than did White meal planners; Hispanic meal planners' HEI scores were eight points higher than those of non-Hispanic meal planners.

However, when nutrition information was allowed to vary, Black and other non-White meal planners had significantly lower nutrient content knowledge than did White meal planners. Likewise Hispanic meal planners had lower HEI scores, compared with non-Hispanic meal planners. Non-White and Hispanic meal planners' relative lack of nutrition information reduced their ability to choose a better quality diet.

When informational effects are controlled, diet quality tends to improve with respondents' age. A latent variable (LV) model showed that 1 year added about one-fifth of a point to the HEI. Also, an additional BMI unit reduced the HEI by a similar amount, and smokers' HEI scores were about 3.5 points lower than nonsmokers' scores.

The HEI and information were unaffected by the presence of children, household size, or gender of the household head. Being a vegetarian produced insignificant effects. Watching more than 5 hours of television a day had a significant negative effect on nutrition information; whereas, the effects of receiving dietary advice from a physician or dietitian and the use of nutrition labels were all positively related to nutrition information. Income and education levels, race, ethnicity, and age also explained variations in HEI scores.

Conclusions

This report makes a strong case that information and knowledge are the keys to improving the American diet. Level of nutrition information has an important influence on the HEI. Researchers found that nutrition information has a significant role in determining diet quality, even after controlling for individual differences in a number of personal and household characteristics, including income, education, age, gender, race, ethnicity, smoking behavior, and body mass index.

Higher education promotes more healthful food choices through better attainment and use of health information. Findings suggest a continued role for nutrition education efforts to close the gap between actual and healthful diets. Main-meal planners who are Black, of ''other'' race, or Hispanic will benefit from additional nutrition information. These groups should be targeted for nutrition education and promotion efforts, and this should result in a significant improvement of their overall diet quality.

Source: Variyam, J.N., Blaylock, J., Smallwood, D., and Basiotis, P.P. 1998. *USDA's Healthy Eating Index and Nutrition Information.* U.S. Department of Agriculture, Economic Research Service. Technical Bulletin No. 1866.