

Nutrition knowledge and attitudes of cardiac patients

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ABSTRACT

Objective Despite the importance of dietary factors in treating and preventing heart disease, relatively little work has explored how well cardiac patients understand the nutrition information they are given. This study was designed to assess the nutrition knowledge and attitudes of cardiac patients.

Design An onsite survey was administered to patients who were waiting to see their cardiologists. The survey focused on patients' medical history, attitudes toward nutrition, and knowledge of "heart-healthy" dietary information.

Setting Cardiology practices in New England, Southern California, and the Midwest.

Subjects A total of 606 patients completed the survey (roughly 74% of those approached).

Results Most patients rated dietary factors as extremely important in treating and preventing heart disease, and 67.0% of those who had experienced a heart attack reported believing that diet had played a contributing role. Nonetheless, nutrition knowledge was marginal. Despite the fact that 92.4% of patients reported receiving dietary literature, overall accuracy rates on responses to nutrition questions did not exceed chance levels. Only 30.5% of the patients who were given dietary literature reported understanding it completely.

Conclusions Nutrition counseling should receive higher priority, both in medical training and in patient care, and cardiac patients should be referred to dietitians on a more routine basis. Physicians should not assume that patients who are given dietary information understand the materials they receive. *J Am Diet Assoc.* 1995; 95:442-446.

Critics of health care in the United States have long noted that more should be done to educate the public, physicians, and the food industry about "the dangers to health that occur from our current diet" (1, p 2095). Nowhere is this danger more evident than in the case of coronary heart disease (CHD). Despite recent declines, CHD still claims roughly 550,000 lives annually — more than any other disease and more than all forms of cancer combined (2). Approximately 5 million Americans suffer from symptomatic CHD, 1.5 million experience a heart attack within a given year, and 300,000 undergo coronary bypass surgery (3). CHD is not limited to men or the elderly, as is sometimes supposed. CHD is the leading cause of death among American women, accounting for nearly 250,000 deaths per year (3). And 25% of cardiovascular deaths and disabilities occur in people younger than 65 years of age, resulting in a net loss of more than 1.5 million years before the age of 65 (4).

Although estimates vary as to the effect of dietary modification, there is general agreement that a low-fat, low-cholesterol diet can substantially reduce the risk of CHD (5-7). Indeed, reductions in serum cholesterol levels are responsible for an estimated 30% of the recent decline in CHD mortality rates (8). Most Americans can reduce their serum cholesterol levels by 10% through dietary modification, which would yield an overall reduction in CHD risk of 20% to 30% (2,3,9). Among people at high risk for CHD, modest reductions in serum cholesterol level are associated with an increase in life expectancy of up to 1 year (10). Similarly, modest reductions of fat intake by the general public (to 30% of all energy) would save an estimated 42,000 lives each year — roughly the number who die annually in motor vehicle accidents (11).

Several studies have examined the nutrition knowledge and attitudes of physicians (12-20) and members of the general public (21,22), but to our knowledge no large-scale surveys have focused on cardiac patients. Our study explored four interrelated issues: Do cardiac patients consider diet an important factor in preventing and treating heart disease? Do cardiac patients feel they

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understand the dietary information given to them? In general, how knowledgeable are cardiac patients about nutrition? Is nutrition knowledge related to demographic factors (such as age or sex), attitudinal factors (such as whether diet is viewed as important), or medical conditions (such as whether patients have had a heart attack or heart surgery)? To address these questions, we surveyed 606 cardiac patients from various parts of the United States.

METHODS

Patient Sample

Patients were drawn from cardiology practices in New England, Southern California, and the Midwest. These sites were selected with diversity in mind. The New England site was a medium-sized private practice with 6 cardiologists and a patient population that was roughly 90% white, 5% black, and 5% Latino/other. Approximately 50% of these patients were covered by Medicare, 45% were privately insured, and 5% were covered by Medicaid. The Southern California site was a hospital-based practice with 5 cardiologists and a patient population that was roughly 50% black, 30% white, 10% Asian, 5% Latino, and 5% other. Approximately 60% of these patients were covered by Medicare, and the remainder were split evenly between private insurance and Medi-Cal (for low-income patients). The Midwest site was a hospital-based practice with 15 to 20 cardiologists and a university affiliation. Roughly 75% of these patients were white, 10% were black, 10% were Latino, and 5% were other. In the Midwest, approximately 65% of the patients were covered by Medicare, 25% were privately insured, and 10% were covered by Medicaid.

Survey data were collected between February and May 1993. Patients were asked to complete the survey while waiting for their appointments to begin, and they were requested to refrain from consulting with others until after the survey was completed. Patients were also asked not to fill out a survey if they had completed one in the past (to prevent people from submitting multiple responses). The study was approved by the Wesleyan University Human Subjects Committee.

Questionnaire

Each patient was given an anonymous, self-administered questionnaire and was assured that all answers would be held in strict confidence. In the first part of the survey, patients were asked their sex, age, whether they had been diagnosed as having heart disease, whether they had been diagnosed as having a heart defect (such as a murmur), whether they had experienced a heart attack (and if so, whether they thought their diet had been a contributing factor), whether they had undergone heart surgery, and what their cholesterol level was (if known). In the second section, patients were asked to rate how important they thought diet was in *preventing* heart disease (on a 9-point scale ranging from 1="not at all" to 9="extremely"), how important they thought diet was in *treating* heart disease (on the same 9-point scale), and how understandable the dietary information was that they had been given by physicians and other health professionals (on a 5-point labeled scale ranging from 1="completely understandable" to 5="not understandable at all," with a separate category "was not given information").

The last section of the survey included a 10-item true-false nutrition quiz and three additional knowledge questions. The nutrition quiz contained eight questions on dietary fat and cholesterol, one question on sodium, and one question on dietary fiber (the topics most often contained in dietary literature for cardiac patients). These items were designed to probe a variety of practical questions confronting persons who wish to follow a heart-healthy diet. All questions were extensively pilot-tested for clarity, and all answers were independently confirmed by two

Table 1
Characteristics of survey respondents

Characteristic	New England sample (n = 194)	Southern California sample (n = 116)	Midwest sample (n = 296)	Total (N = 606)
Female (%)	48.8	58.6	49.3	51.0
Male (%)	51.2	41.4	50.7	49.0
Age (y)	58.6	62.1	57.3	58.6
Mean reported cholesterol level (mg/dL) ^a	214.6	203.1	210.0	210.4
Heart attack victims (%)	26.7	35.1	41.7	36.0
Diagnosed with heart disease (%)	44.6	70.5	51.9	53.4
Diagnosed with heart defect (%)	29.9	39.1	33.3	33.5
Have had heart surgery (%)	14.9	34.5	35.5	29.2

^aTo convert mmol/L cholesterol to mg/dL, multiply mmol/L by 38.7. To convert mg/dL cholesterol to mmol/L, multiply mg/dL by 0.026. Cholesterol of 5.00 mmol/L = 193 mg/dL.

registered dietitians. In addition to these questions, patients were asked: "Is it true that hardening of the arteries does not occur in women until after menopause?" [correct answer=no]; "The government recommends getting no more than what percentage of your calories from fat?" [correct answer=30]; and "The fat in a Burger King Whopper with cheese is equal to the fat in how many pats of butter?" [correct answer=12]. The first of these questions was designed to see whether respondents realized that young women are not immune to CHD. The second question was used as a moderator variable to see whether patients who knew the government recommendation on dietary fat were more knowledgeable about nutrition than other patients. The third question was designed to test whether respondents could quantify the fat content of a common high-fat food (pretesting on this question revealed that "pats of butter" was a more intuitively appealing unit of measurement than grams or teaspoons of fat).

Throughout the data collection phase, physicians and staff members in each office followed standard procedures concerning dietary advice and nutrition counseling (eg, distributing fact sheets and brochures from the American Heart Association). Answers to the nutrition quiz were not discussed with patients until after data collection had ended.

Statistical Analyses

Survey data were analyzed by means of the BMDP PC90 statistics package (1990, BMDP Statistical Software, Los Angeles, Calif). Frequency information was analyzed using χ^2 , mean values were compared using *t* tests and analysis of variance, and tests of association were based on Pearson correlation coefficients. All statistical tests used a two-tailed α level of .01.

RESULTS

Respondents

A total of 606 cardiac patients (approximately 74% of all patients who were approached) completed the survey. Characteristics of the respondents from each survey site are given in Table 1. No significant differences across survey sites were noted in gender composition, age, or cholesterol levels. χ^2 Analyses revealed differences in the likelihood of patients having had heart surgery ($\chi^2=23.78$, $df=2$; $P<.0001$), having had a heart attack ($\chi^2=10.30$, $df=2$; $P<.006$), and having been diagnosed with heart disease

Table 2
Percentage and number^a of respondents answering true, false, and not sure on each item of the nutrition quiz

Quiz item	True		False		Not sure	
	%	No.	%	No.	%	No.
Ounce for ounce, chicken contains roughly the same amount of cholesterol as beef.	7.3 ^b	43	78.6	464	14.1	83
Hydrogenated vegetable oil increases cholesterol levels more than nonhydrogenated vegetable oil.	38.9 ^b	228	23.0	135	38.1	223
If a 100-calorie portion of food contains 4 g fat, more than 30% of its calories are from fat.	36.6 ^b	211	17.7	102	45.7	263
No foods from animal sources contain dietary fiber.	36.6 ^b	214	32.7	191	30.7	179
Two eggs overlight contain more cholesterol than the daily limit recommended by the government.	55.6 ^b	321	21.3	123	23.1	133
To reduce your cholesterol level, it is more important to reduce the amount of saturated fat you eat than the amount of dietary cholesterol.	65.6 ^b	384	13.7	80	20.7	121
Plant foods contain no cholesterol.	43.6 ^b	254	31.7	185	24.7	144
An ounce of Corn Flakes cereal contains more sodium than an ounce of potato chips.	14.7 ^b	85	63.1	366	22.2	129
Two percent of the calories in 2% milk comes from milk fat.	49.7	286	22.7 ^b	131	27.6	159
A 3-oz serving of lean ground beef contains fewer grams of fat than a 3-oz serving of chocolate ice cream.	48.8	282	26.0 ^b	150	25.3	146

^aSummed frequencies add to less than the total sample size of 606 because of omitted responses.

^bCorrect answer.

($\chi^2=18.65$, $df=2$; $P<.0002$). In general, patients from New England were less likely than other patients to have had heart surgery or a heart attack, and they were somewhat less likely to have been diagnosed with heart disease. Patients from Southern California were relatively likely to have been diagnosed as having heart disease. No other significant differences were found.

Attitudes

Patients tended to view diet as important in both treating and preventing heart disease. The mean importance rating for treatment was 7.7 on a 9-point scale (52.8% of the patients selected 9, or extremely important), and the mean importance rating for prevention was 7.6 (51.8% of the patients selected 9). These ratings were not significantly related to sex, age, or medical condition (ie, whether patients had been diagnosed as having heart disease or a heart defect, had experienced a heart attack, or had undergone heart surgery). Moreover, of the 197 patients who had experienced a heart attack, 67.0% believed diet had played a contributing role. Thus, the majority of patients saw diet as an important factor in the treatment and prevention of heart disease.

Dietary Information

The dietary literature given to patients offered a wide array of recommendations. Patients were advised to choose lean meats and low-fat dairy products, avoid using butter or oils that are high in saturated fat, eat no more than two to three eggs per week, consume more fruits and vegetables, limit total fat intake to 30% of all calories, limit saturated fat intake to 10% of all calories, limit dietary cholesterol intake to 300 mg/day, and limit sodium intake to 3,000 mg/day. The practices in New England and Southern California relied primarily on fact sheets, brochures, and booklets prepared by pharmaceutical companies, and the Midwest site used customized materials supplemented by booklets from the

American Heart Association. In all, 92.4% of the patients reported receiving dietary information of some sort.

Of the 486 patients who evaluated the dietary information they were given, only 30.5% reported that the information was completely understandable. An additional 20.2% reported that the information was highly understandable, 39.7% reported that the information was only somewhat understandable, and 9.7% reported that the information was not very understandable or not understandable at all. These evaluations did not depend significantly on patients' sex, age, or medical condition. A significant difference was found across survey sites, however ($\chi^2=23.85$, $df=6$; $P<.0007$). Sixty-eight percent of the patients from Southern California rated their dietary materials as highly or completely understandable, compared with only 50.0% of the New England patients and 43.9% of the Midwest patients. Thus, depending on location, roughly one third of one half of the patients expressed dissatisfaction with the educational materials they received.

Knowledge

Perhaps the most central question of this study was how patients performed on the nutrition quiz (Table 2). Of the 543 respondents who answered all 10 questions of the nutrition quiz, the mean score was 3.5 items correct. Fewer than 1 in 20 patients answered more than 6 items correctly, and fewer than 1 in 3 answered more than 4 items correctly. Scores on the nutrition quiz were not significantly related to patients' sex, age, cholesterol level, attitudes about the importance of diet, or reported understanding of dietary literature, and they did not differ significantly across the three survey sites.

Additional analyses were conducted to see whether quiz scores varied as a function of medical condition. Because patients with serious heart problems are relatively motivated to understand dietary advice, we hypothesized that these patients would score

higher on the nutrition quiz than other patients. Two groups were formed to test this hypothesis. The first group included patients who had experienced a heart attack, undergone heart surgery, or been diagnosed as having heart disease ($n=292$), and the second group included patients without any diagnosed heart problem ($n=154$). All other patients were excluded from this analysis. A t test between the two groups indicated that patients with a major heart problem did indeed score higher (3.8) than patients without any diagnosed problem (3.1; $t=3.52$, $df=444$; $P<.0006$). This difference was not due as much to greater accuracy, however, as to the fact that patients with heart problems checked “not sure” approximately once less often on average. When “not sure” responses were excluded, patients with major heart problems averaged 48.8% correct, compared with 46.3% for patients without heart problems. The difference between these averages is not significant, and neither figure is above the 50% rate that would be expected from chance guessing.

One further attempt was made to identify patients who performed above chance levels on the nutrition quiz. The mean percentage of correct answers (after excluding “not sure” responses) was calculated for 124 patients who met the following criteria: they had experienced a major heart problem, as defined previously; they were given dietary information by their physician or by other health professionals; and they rated the importance of diet in treating heart disease as 9 on the 9-point scale. Of all respondents, these patients were considered most likely to be knowledgeable about dietary fat and cholesterol. Nonetheless, after excluding “not sure” responses, the mean percentage of correct answers given by these patients was 50.1% — virtually the same as would be expected by chance alone.

Answers to the three supplemental knowledge items showed similar gaps in patient awareness. For example, 50.3% of the patients did not realize that hardening of the arteries can occur in women before menopause. Although women answered this question correctly more often than did men (57.7% vs 42.0%; $\chi^2=13.50$, $df=1$; $P<.0003$), roughly two of every five women surveyed did not know the answer to this question. Similarly, only 25.1% of the patients knew that the government recommends getting no more than 30% of calories from fat. The percentage of patients answering this question correctly did not vary significantly by sex, age, cholesterol level, or whether patients had experienced a major heart problem. Patients who knew of the 30% limit did not score higher than others on the nutrition quiz (they averaged 49.3% correct, after excluding “not sure” responses). In answer to the final knowledge question, patients underestimated the fat content of a Burger King Whopper with cheese by approximately 35%. These estimates did not vary significantly by patients’ sex, age, or cholesterol level. They did vary by medical condition, however; on the average, heart attack victims estimated the fat in a Whopper with cheese as equal to only 5.0 pats of butter, compared with a mean of 10.0 given by patients who had not experienced a heart attack.

DISCUSSION

To our knowledge, this is the first survey specifically designed to assess the nutrition knowledge and attitudes of cardiac patients. The results indicate that cardiac patients view diet as important in treating and preventing CHD, but that their knowledge of nutrition is marginal. Despite the fact that more than 90% of the survey respondents reported receiving dietary information, mean scores on the nutrition quiz did not exceed chance levels. Indeed, even among recipients of dietary information who had a major heart problem and believed that diet was extremely important in treating heart disease, performance on the nutrition quiz did not significantly exceed the percentage of correct answers expected from the toss of a coin.

Although critics may attribute these results to our choice of particularly difficult or arcane questions, there is reason to doubt this explanation. First, as with other surveys of nutrition knowledge (21-23), the nutrition quiz covered a wide range of specific and general material — much of it drawn from standard dietary literature — and it was pretested extensively for clarity. Second, the results showed no trend toward general questions being easier to answer than specific questions. For example, most patients did not realize that plant foods do not contain cholesterol or that animal-based foods do not contain dietary fiber. And fewer than 1 patient in 13 knew that ounce for ounce, chicken contains roughly the same amount of cholesterol as beef. This type of information is central to a heart-healthy diet.

Given the difficulty of maintaining long-term changes in dietary behavior, a minimum of at least four nutrition counseling sessions is recommended for cardiac patients

Equally important, our results are consistent with other surveys of nutrition knowledge. For example, nationwide surveys sponsored by the National Heart, Lung, and Blood Institute have documented gaps in public knowledge similar to those found in our study (21,22). In 1986 and 1990, these surveys asked respondents a series of nine knowledge questions on cholesterol and dietary fat (such as whether saturated fat raises cholesterol levels, or whether hydrogenated fats are saturated). After exclusion of “not sure” responses, the mean percentage of correct answers in these surveys was 53.5% in 1986 and 57.8% in 1990. Thus, even on surveys with items other than those used in our study, the percentage of questions answered correctly was not substantially higher.

One other aspect of our results is important. Past surveys of the general public have left open the possibility that cardiac patients possess a good understanding of nutrition, even if members of the wider public do not (after all, cardiac patients are routinely given dietary information and/or nutrition counseling, and they are relatively motivated to modify their diets). Our study casts doubt on this possibility. Not only were most patients unable to correctly answer at least two thirds of the items in the nutrition quiz, but accuracy rates did not depend appreciably on whether patients were personally motivated to change their diet or, for that matter, whether they had been given dietary literature. Although these findings should be replicated before firm conclusions are drawn, it appears that many cardiac patients do not fully understand the educational materials they receive.

Why were the educational materials not more effective? One clue may lie in patients’ evaluations of these materials. Approximately half the patients rated the dietary information they received as, at best, only somewhat understandable. These negative evaluations may be the result of the high number and complexity of recommendations contained in standard nutrition literature. For example, after telling readers to eat more fruits,

legumes, vegetables, and grains, one popular guide (24) on dining out warned patients that health foods and vegetarian meals may be high in fat, and that "steakhouses, like seafood restaurants, may be a good choice." Likewise, a recipe booklet (25) for low-fat, low-cholesterol meals contained entrees such as "braised sirloin tips" and "turkey lasagna," which exceeded the booklet's recommended 10% ceiling on the percentage of calories from saturated fat. Although the booklet was careful to state that ceilings on fat should be applied to the total calories eaten per day (rather than to specific foods), patients may have been confused by the presentation of sirloin tips and lasagna as low-fat recipes. Furthermore, numeric ceilings (eg, on percentage of saturated fat, or milligrams of dietary cholesterol per day) have the disadvantage of being relatively abstract and intangible.

Another factor may be the reluctance of physicians to initiate dietary counseling, given the minor role of nutrition in medical training (19). In one survey of physicians, 78% of the respondents reported that their training in nutrition had not prepared them well to handle the problems of their patients, and only 10% reported using the services of a registered dietitian (15). In another, more than 75% of physicians nationwide indicated that medical schools should place a greater emphasis on nutrition (20). Since the late 1970s, however, surveys by the American Medical Association and the American Association of Medical Colleges have consistently found that only a fourth of American medical schools require a course in nutrition (26-30). Indeed, many physicians prefer not to initiate dietary counseling unless patients already have elevated serum cholesterol levels (31). If preventive cardiac treatment is to succeed, however, such trends must not continue.

APPLICATIONS

Several recommendations emerge from our study. First, dietary counseling should receive higher priority, both in medical training and in patient care, and dietitians should be consulted on a more routine basis. Given the difficulty of maintaining long-term changes in dietary behavior, a minimum of at least four nutrition counseling sessions per patient is recommended. Second, physicians should not assume that patients who receive dietary information understand the materials they are given; instead, patients should be encouraged explicitly to discuss any areas of confusion. Finally, future research should examine the reasons why dietary education material for patients is not more successful, and an effort should be made to design more effective materials. ■

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