

Research and Practice Innovations

Knowledge of Dietary Fats among US Consumers

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ABSTRACT

Dietary advice emphasizes that some dietary fats increase the risk of heart disease, whereas other dietary fats decrease risk if they are substituted for more risk-increasing fats. Thus, it is important that consumers understand the differences between dietary fats. Existing evidence in the United States suggests troublesome consumer misunderstanding. As part of its continuing effort to promote public health, the US Food and Drug Administration measured consumer awareness and understanding of dietary fats in its Health and Diet Survey—2004 Supplement. After cognitive interviews and pretests of the questionnaire, telephone interviews of randomly selected noninstitutionalized adults aged 18 years and older in the United States were conducted between October 12, 2004, and January 21, 2005. Using cross-sectional data collected from 1,798 respondents who completed the survey, this study estimated the prevalence of awareness and understanding of six dietary fats among US adults and identified the characteristics of adults with different levels of awareness and understanding. Descriptive analyses were used, along with logistic regression models, developed to accommodate the survey design and responses. There was a wide disparity among US consumers in their awareness and understanding. Saturated fat was most recognized and understood, whereas awareness of other fats was much lower. Most importantly, having heard of a fat did not necessarily mean understanding its relationship to heart disease. Only half of those who had heard of *trans* fat and n-3 fatty acids understood that the fats raise and lower the risk of heart disease, respectively. Only a minority of those who had heard of partially hydrogenated oil and polyunsaturated fat knew the fats raise and lower the risk of heart disease, respectively. Many admitted being uncertain about how a fat relates to the risk of heart disease. College or more-educated adults had better awareness and understanding. Nonwhite adults were less knowledgeable. Findings on the awareness and understanding and how they are related to

individual characteristics can inform deliberations about educational messages, nutrition programs, and food labeling about dietary fats to promote public health. *J Am Diet Assoc.* 2010;110:613-618.

Dietary fats and oils are part of a healthful diet, but the types of fat make a difference to heart health, and the total amount of fat consumed is also important (1-3). Saturated fat, *trans*-fatty acids (or *trans* fat), and partially hydrogenated oils can increase the risk of coronary heart disease, whereas n-3 fatty acids, polyunsaturated fat, and monounsaturated fat can decrease the risk if they are substituted for saturated fat and *trans* fat (3,4). Dietary advice therefore emphasizes that different dietary fats have different relationships with the risk of heart disease (3,5-8). Existing evidence suggests that many consumers may not understand the differences between dietary fats. Many Americans say they are trying to consume less polyunsaturated fat (9) and think monounsaturated fat, polyunsaturated fat, and n-3 fatty acids are unhealthy (10,11). In addition, some consumers may regard all fats as bad (12).

Better nutrition knowledge, especially knowledge about diet-disease relationships, can help promote more healthful dietary choices (13,14) and enhance health literacy among consumers by improving health information processing and promoting more healthful behavior (13,15-17). Better awareness and understanding of different fats may also help increase the usefulness of food labels. Currently, disclosure of saturated and *trans* fats is mandatory on the labels of most packaged foods sold in the United States (4). Disclosure of polyunsaturated and monounsaturated fats is optional and found only on some products, such as cooking oils and cereals. The four fatty acids, when presented on a given label, are displayed indistinguishably in terms of their health effects. Thus, the usefulness of the fatty acid information on food labels may depend on consumer knowledge of the differences between these fats.

There is little information in the literature about the characteristics of Americans who are aware or unaware of the various types of fats and the extent to which they understand the different effects of fats on the risk of heart disease. The purpose of this study was to provide estimates of dietary fat awareness and understanding among US adults (used interchangeably with consumers hereinafter), and to examine the relationships between characteristics of adults and fat awareness and understanding. It was hypothesized that the probability of awareness and understanding is higher among consumers with better education, who are older, white, female (18-22), overweight or obese (9), primary grocery decision makers in the household, and who experienced or think they are at risk of one or more chronic illnesses (13). It was also

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hypothesized that there are different levels of fat awareness and understanding between different geographic regions (18).

METHODS

Data

As part of its continuing effort to promote public health, the US Food and Drug Administration (FDA) assessed consumer awareness and understanding of dietary fats as well as carbohydrate-related topics in its Health and Diet Survey—2004 Supplement (23). The random-digit-dialing telephone survey, conducted by Synovate, Inc (McLean, VA), between October 12, 2004, and January 21, 2005, targeted noninstitutionalized English- or Spanish-speaking adults, aged 18 years and older, from households in the 50 states and the District of Columbia. Households were selected from a nationally representative single-stage sample of telephone numbers generated from the GENESYS system (24). The eligible respondent in a multiple-adult household was selected using the most recent birthday method. The FDA developed the questionnaire, which included 43 multiple-choice and Likert-scale questions. As part of the validation process, cognitive interviews and pretests were conducted to refine the questionnaire prior to its use in the field. With 1,798 respondents completing the full questionnaire, the survey achieved a response rate of 34%, calculated per American Association for Public Opinion Research Response Rate 3 formula (25). The survey was granted an exempt status by the FDA Research Involving Human Subjects Committee.

Measures

This study examined six pairs of an awareness question and its follow-up understanding question in the survey, one pair for each of six dietary fats—saturated fat, *trans* fat, n-3 fatty acids, polyunsaturated fat, monounsaturated fat, and partially hydrogenated oil. Awareness was defined as recognition of the name of a fat, and understanding as recognition of the relationship between a specific fat and the risk of heart disease, if a respondent was aware of the fat. Awareness of a specific fat was measured by a response to the question: “Whether you had ever heard of” the fat. Those who were aware of a fat were then asked an understanding question: “As far as you know, does [NAME OF FAT] raise the risk of heart disease, lower the risk of heart disease, or have no effect on the risk of heart disease, or don’t you know?” Respondents could choose one of the four response options. The survey collected these respondent characteristics: age, education (0 to 11 years of education, high school graduate, 1 to 3 years of college, college degree, or postgraduate degree), sex, race/ethnicity, share of grocery shopping decisions in the household (all, most, some, or none), and self-reported height and weight. The survey also asked: “Have you ever been told by a doctor or other healthcare professional that you have any of the following health conditions? I don’t need to know which condition, just whether you have ANY of them.” The conditions included high blood pressure, diabetes, high cholesterol, heart disease, obesity, overweight, and cancer. Those who an-

swered no to the question were then asked: “Would you expect yourself to be at risk in the next 5 years for any of the health conditions I just read?” The survey also provided information on the geographic region of each respondent’s residence.

Statistical Methods

The PROC FREQ and PROC UNIVARIATE procedures in SAS (version 9.1, 2003, SAS Institute, Inc, Cary, NC) were used to generate descriptive statistics. The data were weighted to adjust for the probability of selection (number of residential telephone numbers and number of adults in the household) and to adjust the sample distributions to the race, education, age, and sex distributions in the 2004 Current Population Survey (26).

To examine the relationship between fat awareness and understanding and individual characteristics, awareness was coded as “aware”=1 or “unaware”=0 (including self-volunteered “don’t know” or “not sure”). Understanding was coded as “consistent with dietary advice”=1 or “otherwise”=0. “Consistent” answers were defined as: saturated fat, *trans* fat, or partially hydrogenated oil raises the risk of heart disease, and polyunsaturated fat, monounsaturated fat, or n-3 fatty acids lower the risk of heart disease, respectively. “Otherwise” answers included saturated fat, *trans* fat, or partially hydrogenated oil lowers or has no effect on the risk of heart disease, and polyunsaturated fat, monounsaturated fat, or n-3 fatty acids raise the risk of heart disease or have no effect on the risk, respectively; and “don’t know” and “not sure.” An index of illness was constructed to have a value of 2 if a respondent reported having had one or more health conditions, 1 if a respondent reported not having had any condition but expecting to be at risk for any of the health conditions, and 0 if a respondent reported neither having nor expecting any of the health conditions. Based on self-reported heights and weights, respondents whose body mass index was 25 or above were categorized as overweight.

Odds ratios (ORs) (27) and 95% confidence intervals (CIs) were calculated using bivariate logistic regression models that accounted for the special characteristics of the survey design and responses. All respondents were asked an awareness question on each of the six fats. Only those responding affirmatively to a specific fat were asked a follow-up question regarding their understanding of the effect of the fat on the risk of heart disease. This filtering approach would mitigate presupposition effects among the unaware, who might otherwise have misreported understanding (28). The approach also generated a sample of the understanding measures not truly representative of the population. To accommodate the survey design, a bivariate sample selection logistic regression model was developed and estimated for each of the six dietary fats. The model consisted of two binary-outcome equations, one for awareness and the other for understanding conditional on awareness (ie, defined only when a respondent was aware of a specific fat). The awareness equation estimated how the probability of awareness (or not) for each fat was related to individual characteristics, which were entered in the model as predictor variables. The understanding equation estimated how the probability of having an understanding that was consistent with di-

Table 1. Percent of US consumers who were aware of specific dietary fats and, among the aware, who reported various relationships between specific fats and the risk of heart disease (HD)

Consumer's belief	Saturated fat	Trans fat	Partially hydrogenated oil	n-3 fatty acids	Polyunsaturated fat	Monounsaturated fat
	←———— % of all consumers (n= 1,798) —————→					
Have heard	95	67	68	61	77	62
	←———— % among those who have heard of a fat ^a —————→					
The fat raises risk of HD	78	48	39	6	21	16
The fat lowers risk of HD	1	5	6	51	15	16
The fat has no effect on risk of HD	1	4	5	4	7	9
Do not know or not sure	19	43	50	39	57	59
n	1,737	1,323	1,330	1,206	1,476	1,204

^aColumns do not necessarily sum to 100 due to rounding.

etary advice, given awareness of a fat, was related to individual characteristics. This type of sample selection model has been used extensively in applied statistics, and has heretofore been estimated with the bivariate Gaussian distribution for the error terms of the two equations (29-32). Previous applications of this type of model ignored possible correlation between the two equations and violation of the distributional assumption. To mitigate the biases these potential problems may produce, the model used in this study assumed the type I generalized logistic distribution (33) and also linked the two equations using the bivariate normal copula (34). Further details on the model are available upon request. Significance of the relationships was reported at the 0.1%, 1%, and 5% levels. All model estimations and calculations were executed with GAUSS (version 8.0, 2006, Aptech, Maple Valley, WA). An auxiliary analysis indicated the statistical approach developed in this study performed better than other more conventional approaches.

RESULTS

The average age of respondents was 48.82±16.82 years. Most of the respondents (64%) had at least some college education, were non-Hispanic whites (75%), and were primary grocery decision makers in the household (70%). Four in 10 respondents were men. Many respondents (39%) resided in the southern region of the country. Forty-three percent of respondents were overweight, and the mean body mass index was 26.96±6.14. About half of respondents reported having one or more health conditions or expected to be at risk of at least one of them.

Table 1 presents the weighted distributions of awareness and understanding of six dietary fats among US consumers. Almost all (95%) and 77% of adults had heard of saturated fat and polyunsaturated fat, respectively. Awareness of the other fats was lower. Understanding of the effects of fats on the risk of heart disease was much more dispersed than awareness of the fats. Seventy-eight percent of adults who had heard of saturated fat said it raises the risk of heart disease. Recognition of the risk-raising effect of *trans* fat and partially hydrogenated oil was much lower. Among the three risk-lowering fats, n-3

fatty acids were best understood, with 51% among the aware recognizing that it lowers the risk. Less than 20% of those aware of polyunsaturated or monounsaturated fat recognized that it lowers the risk. Some consumers were also misinformed about certain fats. Among those who were aware of n-3, polyunsaturated, and monounsaturated fats, 6%, 21%, and 16%, respectively, thought that the fat raised the risk of heart disease.

The estimated ORs of individual characteristics for awareness of dietary fats are reported in Table 2. A consumer with college or more education was more likely to be aware of all but saturated fats, with ORs ranging from 2.61 (95% CI 2.03 to 3.20) for n-3 fatty acids to 3.45 (95% CI 2.51 to 4.39) for *trans* fat. African Americans, Hispanics, and consumers of other races were less likely to be aware of all six fats, compared to their white counterparts; the corresponding ORs were all notably lower than 1, ranging from 0.04 (95% CI 0.01 to 0.09) for saturated fat among the Hispanics to 0.63 (95% CI 0.36 to 0.89) for monounsaturated fat among individuals of other races. Men were less likely than women to be aware of *trans* fat (OR 0.72, 95% CI 0.50 to 0.95), n-3 fatty acids (OR 0.69, 95% CI 0.52 to 0.86), polyunsaturated fat (OR 0.62, 95% CI 0.37 to 0.87), and monounsaturated fat (OR 0.60, 95% CI 0.44 to 0.76). Age was also a factor. Being 10 years older in age meant a higher probability of being aware of polyunsaturated fat (OR 1.34, 95% CI 1.15 to 1.53) but a lower probability of being aware of saturated fat (OR 0.73, 95% CI 0.48 to 0.98), n-3 fatty acids (OR 0.92, 95% CI 0.85 to 0.98), and monounsaturated fat (OR 0.92, 95% CI 0.85 to 1.00). Other predictors (ie, being a primary grocery decision maker in the household, the illness index, overweight or not, and region) had little or no effect on the probability of awareness.

ORs for understanding of fats' effects on the risk of heart disease, conditional on awareness, are presented in Table 3. Education again stood out as the leading predictor. Consumers with a college education or higher were more likely than consumers without college education to understand the relationships between all six fats and the risk of heart disease. ORs ranged from 1.89 (95% CI 1.37 to 2.41) for *trans* fat to 2.75 (95% CI 1.49 to 4.01) for

Table 2. Odds ratios (95% confidence intervals) of individual characteristics for awareness of specific dietary fats among US consumers

Variable	Saturated fat	Trans fat	Partially hydrogenated oil	n-3 fatty acids	Polyunsaturated fat	Monounsaturated fat
	← odds ratio (95% confidence interval) →					
Age/10	0.73 (0.48-0.98)*	0.94 (0.85-1.02)	1.08 (0.98-1.17)	0.92 (0.85-0.98)*	1.34 (1.15-1.53)***	0.92 (0.85-1.00)*
Illness	1.02 (0.52-1.53)	1.00 (0.83-1.17)	1.05 (0.88-1.22)	0.97 (0.84-1.11)	0.98 (0.75-1.20)	0.90 (0.77-1.03)
Decision maker	2.50 (-0.11-5.10)	1.24 (0.83-1.64)	0.91 (0.63-1.19)	1.17 (0.87-1.47)	1.33 (0.78-1.88)	1.40 (1.02-1.78)*
College	4.79 (-0.70-10.28)	3.44 (2.50-4.37)***	3.45 (2.51-4.39)***	2.61 (2.03-3.20)***	2.63 (1.59-3.66)**	2.83 (2.16-3.49)***
Male	0.75 (-0.05-1.54)	0.72 (0.50-0.95)**	0.88 (0.63-1.14)	0.69 (0.52-0.86)***	0.62 (0.37-0.87)**	0.60 (0.44-0.76)***
Overweight	2.00 (-0.24-4.23)	0.85 (0.59-1.11)	0.94 (0.67-1.20)	1.14 (0.87-1.42)	1.35 (0.80-1.89)	1.07 (0.80-1.34)
Race ^a						
African American	0.07 (-0.03-0.17)***	0.28 (0.17-0.39)***	0.29 (0.18-0.41)***	0.38 (0.24-0.52)***	0.23 (0.11-0.34)***	0.40 (0.26-0.54)***
Hispanic	0.04 (-0.01-0.09)***	0.15 (0.09-0.22)***	0.20 (0.11-0.29)***	0.35 (0.21-0.48)***	0.16 (0.07-0.25)***	0.36 (0.22-0.51)***
Other race	0.08 (-0.04-0.19)***	0.35 (0.19-0.52)***	0.43 (0.23-0.62)***	0.47 (0.28-0.67)***	0.38 (0.13-0.62)***	0.63 (0.36-0.89)**
Region ^b						
Northeast	1.68 (-0.80-4.16)	1.35 (0.79-1.91)	1.23 (0.76-1.69)	1.04 (0.71-1.38)	0.89 (0.45-1.33)	1.10 (0.73-1.47)
Midwest	1.13 (-0.17-2.43)	1.08 (0.70-1.45)	0.98 (0.66-1.31)	1.20 (0.86-1.54)	1.47 (0.69-2.24)	0.98 (0.70-1.26)
West	1.04 (-0.39-2.48)	1.09 (0.67-1.50)	1.30 (0.81-1.78)	1.33 (0.91-1.75)	0.96 (0.48-1.44)	1.18 (0.80-1.56)

^aWhite is the reference category.
^bSouth is the reference category.
**P*<0.05.
***P*<0.01.
****P*<0.001.

Table 3. Odds ratios (95% confidence intervals) of individual characteristics for understanding of specific fats' effects on the risk of heart disease among US consumers who have heard of the fats

Variable	Saturated fat	Trans fat	Partially hydrogenated oil	n-3 fatty acids	Polyunsaturated fat	Monounsaturated fat
	← odds ratio (95% confidence interval) →					
Age/10	1.00 (0.92-1.08)	0.96 (0.89-1.03)	1.05 (0.97-1.14)	1.07 (0.98-1.16)	1.10 (0.99-1.22)	1.11 (0.98-1.24)
Illness	1.09 (0.92-1.26)	1.06 (0.92-1.21)	0.96 (0.83-1.10)	1.02 (0.87-1.17)	1.04 (0.87-1.22)	0.98 (0.79-1.17)
Decision maker	1.21 (0.84-1.57)	1.02 (0.73-1.31)	1.26 (0.89-1.63)	0.98 (0.69-1.27)	0.87 (0.56-1.17)	0.87 (0.50-1.25)
College	2.60 (1.89-3.31)***	1.89 (1.37-2.41)***	2.13 (1.55-2.72)***	2.54 (1.81-3.28)***	2.13 (1.36-2.91)**	2.75 (1.49-4.01)**
Male	1.09 (0.78-1.40)	0.85 (0.62-1.07)	0.71 (0.51-0.90)**	0.72 (0.52-0.93)**	0.88 (0.59-1.17)	0.96 (0.57-1.36)
Overweight	1.26 (0.91-1.61)	1.06 (0.81-1.31)	1.00 (0.75-1.24)	0.96 (0.71-1.20)	1.13 (0.78-1.47)	1.15 (0.75-1.55)
Race ^a						
African American	0.38 (0.23-0.54)***	0.56 (0.30-0.82)**	0.55 (0.28-0.82)**	0.73 (0.39-1.07)	0.79 (0.31-1.27)	1.35 (0.53-2.16)
Hispanic	0.72 (0.37-1.06)	0.74 (0.33-1.16)	0.66 (0.28-1.04)	1.01 (0.49-1.53)	1.33 (0.51-2.15)	0.97 (0.26-1.68)
Other race	0.60 (0.31-0.89)**	1.01 (0.53-1.49)	1.15 (0.61-1.69)	1.34 (0.67-2.00)	1.03 (0.40-1.66)	0.96 (0.30-1.61)
Region ^b						
Northeast	1.16 (0.75-1.57)	1.18 (0.80-1.55)	1.16 (0.78-1.54)	1.53 (0.99-2.07)	1.23 (0.74-1.73)	1.38 (0.74-2.01)
Midwest	1.34 (0.90-1.79)	1.06 (0.76-1.37)	1.00 (0.70-1.29)	1.19 (0.82-1.55)	0.93 (0.58-1.28)	1.28 (0.72-1.83)
West	1.25 (0.78-1.72)	1.16 (0.80-1.53)	1.21 (0.82-1.59)	1.42 (0.95-1.89)	1.03 (0.62-1.45)	1.05 (0.53-1.25)

^aWhite is the reference category for race.
^bSouth is the reference category for region.
***P*<0.01.
****P*<0.001.

monounsaturated fat. Racial differences in understanding were scant compared to those in awareness, with differences found only between African Americans and whites, where the former were less likely to understand that saturated fat raises the risk (OR 0.38, 95% CI 0.23 to 0.54), *trans* fat raises the risk (OR 0.56, 95% CI 0.30 to 0.82), and partially hydrogenated oil raises the risk of heart disease (OR 0.55, 95% CI 0.28 to 0.82). Compared to women, men were less likely to understand that partially hydrogenated oil (OR 0.71, 95% CI 0.51 to 0.90) increases the risk of heart disease, whereas n-3 fatty acids (OR 0.72, 95% CI 0.52 to 0.93) decrease the risk. In contrast to

its effects on awareness of some fats, age did not play a role in the understanding of the relationships between fats and the risk of heart disease. No regional difference was found.

DISCUSSION

As of the end of 2004, the awareness and understanding of six dietary fats in foods varied widely among US consumers. Most importantly, name recognition did not necessarily mean understanding a fatty acid's effect on the risk of heart disease. The disparity in awareness and

understanding was perhaps associated with the disparity in consumer exposure to information about various fatty acids. The relationship between saturated fat and heart health has long been one of the focal points in nutrition education and media coverage. In addition, many food products carry favorable statements about their saturated fat contents (35). None of the other fats has received a similar amount or duration of attention in communication with consumers. Only the declaration of saturated fat, and since 2006, *trans* fat, is required on food labels. Partially hydrogenated oil is included in the ingredient list on food labels, but with a smaller typeface. In recent years, there have been more statements regarding the health benefits of n-3 fatty acids on food labels (36). In contrast, few products feature polyunsaturated fat or monounsaturated fat; only some products list their amounts on the label. Thus, the different degrees of consumer exposure to various types of fatty acids on food labels or in mass media could be a cause of variations in the awareness and understanding of these fats and their effects on the risk of heart disease.

This study raises doubts about the notion that many consumers believe all fats are bad, as suggested by previous qualitative research. Nonetheless, the study findings do provide strong evidence of consumer confusion. Similar to earlier findings (5,9-11,18), this study suggests that, other than saturated fat, a large majority of consumers have only vague ideas about the implication of dietary fats on heart health. Other surveys either did not distinguish between awareness and understanding (10,11) or asked about awareness only (5,18). None of the previous surveys asked about the effects of these fats on the risk of heart disease.

Similar to previous findings, our study suggests that better fat knowledge is associated with better education, older age, being a woman, and being non-Hispanic white. Contrary to expectations, primary grocery decision makers in the household do not have different levels of awareness or understanding of dietary fats than other household members. This study does not provide evidence that those who are supposedly more motivated toward being knowledgeable about dietary fats have a higher probability of awareness or understanding. However, these expectations are not always confirmed in the literature (17,37).

Study limitations should be noted. The survey data were self-reported and subject to reporting errors and cognitive influences, such as social desirability bias, despite inputs from cognitive interviews and pretests conducted before the survey. Telephone interviews might have produced different information than if the interviews were conducted on paper or computer where respondents could see the questions. The study has identified key individual characteristics that affect consumer awareness and understanding of different types of fats. The response rate of the survey (34%) might affect how generalizable the observed patterns of awareness and understanding are to the population. The illness variable did not distinguish between different health conditions; a heart disease-specific analysis might have produced different results. Finally, the survey did not ask why respondents gave the answers they did, especially in terms of the relationships between a fat and the risk of heart disease.

CONCLUSIONS

The findings can inform deliberations about educational messages, nutrition programs, and labeling. First, it is not only useful to promote awareness of different fats in nutrition education but also important to enhance understanding of their implications on heart health. Most consumers recognize the names of dietary fats. Awareness of fats does not automatically translate into understanding of how they affect the risk of heart disease. In addition, there is a wider disparity among consumers in their understanding than awareness. Consumers have much poorer understanding of unsaturated fats than saturated fat. Knowledge of the different effects of fats on the risk of heart disease may motivate adoption of, and adherence to, recommended nutrition advice, which emphasizes differentiating risk-increasing and risk-decreasing dietary fats. Moreover, substitution of unsaturated fats (eg, polyunsaturated fat and monounsaturated fat) for saturated fats may have protective effects on heart health. Therefore, nutrition education can be more effective by helping consumers understand that fats have different health implications and the benefit of substitution.

Second, it might be useful to explore alternative presentations of fat information on food labels to help consumers recognize that not all fats are the same. At present, some food labels list polyunsaturated and monounsaturated fats in the same manner as saturated and *trans* fats. Since many consumers cannot distinguish between different types of fats, these labels are not as helpful to consumers as they can be. Labels should be more helpful if they separate information about fats that may help reduce the risk of heart disease from information about other fats.

Third, the findings provide a context for interpreting consumer surveys. Specifically, debates about dietary fats, such as proposals to ban *trans* fat from restaurant foods, often cite survey-based consumer support. Nevertheless, surveys do not always ascertain that the opinions are expressed by people who are aware of the existence of the fat. When there is not a one-to-one correspondence between awareness and knowledge of dietary fats, some collected opinions may be biased because they include guessing by uninformed respondents. Because such opinions are used in public debates, they should be examined and interpreted with caution.

Fourth, the study identifies several demographic subgroups that may need more attention in increasing their awareness and understanding of dietary fats. Nutrition education should focus on adults who do not have at least a college education because they are less likely to be aware of dietary fats and to have an understanding of the effects of different fats on the risk of heart disease that is consistent with dietary advice. More efforts also need to be devoted to non-Hispanic African Americans, Hispanics, and adults of other races. This is particularly important because of ethnic disparities in heart disease (38,39). In addition, younger adults need help to enhance their awareness and understanding of fats, especially understanding of the beneficial effects of n-3 fatty acids, polyunsaturated fat, and monounsaturated fat.

Our study highlights various degrees of awareness of dietary fats and poor understanding about n-3 fatty acids,

polyunsaturated fats, and monounsaturated fats. The results suggest a need for educational programs that promote not only higher awareness of dietary fats, but also better understanding of their implications on the risk of heart disease. Such programs should target non-white, younger, male, and less-educated consumers.

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