A Comparison of Knowledge and Attitudes About Diet and Health Among 35- to 75-Year-Old Adults in the United States and Geneva, Switzerland

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ABSTRACT

Objectives. This study compared responses of US and Geneva residents to items on analogous questionnaires concerning knowledge and attitudes about diet and health.

Methods. Comparable data were available from 2 population-based sample surveys: the Cancer Control Supplement of the 1987 National Health Interview Survey and the 1994 Bus Santé 2000 in Geneva, Switzerland. Samples included 10 366 US respondents and 698 Geneva respondents, aged 35 to 74 years. The analysis involved descriptive statistics, contingency tables, and linear regression models.

Results. In both the United States and Geneva, health consciousness was greater among women and more highly educated persons than among other groups. Compared with Americans, Genevans assigned more importance to avoiding salt, sugar, and overweight (odds ratio = 1.6, 2.9, and 5.9, respectively) and less importance to lowering cholesterol (odds ratio = 0.6). Genevans were more likely to recognize the relatively high fiber content of lettuce, carrots, and apples. Recognition of low-fat foods was slightly better in the United States.

Conclusions. Knowledge and attitudes differed despite high general diet and health awareness in both populations. Identifying why generally similar dietary guidance messages are embraced to different extents across cultures may facilitate global implementation. (*Am J Public Health.* 2001;91:418–424)

For decades, US government and voluntary organizations have recommended qualitative changes in the American diet to reduce chronic disease risks,[1–8] and similar dietary recommendations are made in many European and other countries.[9–12] Common elements in these guidelines are advice to eat a variety of foods; consume less fat, particularly saturated fat and cholesterol; consume more vegetables, fruits, and grain products; use sugars and salt in moderation; drink alcoholic beverages only in moderation; increase physical activity; and maintain a healthy weight.

Public education campaigns have been undertaken to increase awareness of and adherence to these dietary recommendations.[9–11,13–16] However, a sizable gap exists between what is recommended and what is practiced by consumers.[14,17–20] Some who might benefit from making dietary changes may not perceive a need to do so,[18,21,22] or some individuals may know what changes to make but not how to make them.[23,24] Broader social and cultural factors also play an important role in shaping food choices.[25] The lag in consumer implementation of health-related dietary guidance in the face of a high burden of degenerative diseases gives new impetus to population-based research on consumer eating behavior.[17,24,26,27]

International comparisons may provide insight as to how diet and health messages are embraced by target populations in different cultural and nutrition policy contexts.[18,21,22,28–32] For example, a systematic survey of attitudes and beliefs about food, nutrition, and health in the 15 member states of the European Union found marked cross-national differences in the salience of health as an influence on eating patterns.[28] The proportion of "precontemplators" (individuals who indicated that they had not given consideration to making health behavior changes) also differed across countries.[21] A Dutch–American comparison of employed men and women found that the Dutch adults were much less fat conscious than those in the United States.[18] With some interesting exceptions,[18,33] however, analyses by demographic variables such as sex and education found similar associations across countries—for example, women and more educated individuals usually were more nutrition and health conscious and motivated to make health-related changes than were men or less educated individuals. The association of age with diet and health attitudes is less consistent.

This study compared Americans and Geneva Swiss on diet and health issues. Parallel and between-population comparisons were made with data from the population-based 1994 Bus Santé 2000 in Geneva, Switzerland,[34] and results of the 1987 Cancer Control Supplement to the US National Health Interview Survey (NHIS),[35] on which the Bus Santé 2000 survey was based. Analyses addressed the awareness of diet and health associations, the personal importance of selected nutrition issues, the self-reporting of low-fat or high-fiber diets, and the recognition of low-fat and high-fiber foods. Differences by sex, age, education, and overweight status were explored.

Methods

Analysis Samples

The 1987 NHIS Cancer Control Supplement was based on a national probability sam-

ple survey conducted by household interview; the methodology has been described elsewhere.[35] With appropriate sampling weights, the data were representative of the entire US population and included a total of 22 043 adults older than 18 years. Weight and height were ascertained by self-report. To match the age range of the Geneva sample, only NHIS respondents aged 35 to 75 years were included (n = 10 366).

The Geneva survey was conducted by the Clinical Epidemiology Division at the University Hospitals of Geneva in 1994 and included a representative sample of 698 noninstitutionalized residents of the canton of Geneva, aged 35 to 74 years.[34] The sample was derived from the Geneva official registry of residents and stratified by age, sex, and race/ethnicity with appropriate sampling weights to ensure representation of the total Geneva population.[36] The selected individuals were contacted by letter or telephone and invited to participate in the survey. Data were collected at a mobile examination center, the *Bus Santé 2000*, with a questionnaire that was patterned after the NHIS 1987 Cancer Control Supplement. (The translated French and English back-translation of the questionnaire is available from the first author.) Questionnaires were self-administered and then checked by trained technicians. Weight and height were measured in a standard manner without outer clothing or shoes as a part of the physical examination.

Statistical Analyses

The combined data set used in the analyses included all Geneva respondents aged 35 to 74 years and those US respondents aged 35 to 75 years. To incorporate sample weights and perform multiple linear regression, analyses were conducted with SAS, Version 6.10 (SAS Institute, Inc, Cary, NC). Categoric variables were created for age (35–44, 45–54, 55–64, 65–75 years), education, and body mass index (BMI, calculated as weight in kg/[height in m]^2). The NHIS questionnaire assessed education as the years of school completed (0 to ≥19), but these data were categorized to match responses in the Geneva survey, which were ascertained as level of school completed, as follows: first cycle/primary school (<12 years), second cycle/secondary school or *apprentissage* (technical training) (12 years), or third cycle/*maturité* (baccalaureate) or more (>12 years). Overweight was defined according to the US National Center for Health Statistics criteria: BMI of 27.8 or higher for men and 27.3 or higher for women.[37]

For questions about fat and fiber in specific foods, the fat or fiber content of foods was verified by reference to food composition tables.[38]

The percentage distribution of responses to all questions was tabulated according to personal characteristics (age, sex, education, and overweight) within a country. Multiple linear regression analyses were then conducted to obtain adjusted odds ratios (ORs) for each of these characteristics adjusted for the other 3. Note that if the prevalence of positive responses is greater than 20%, the odds ratio cannot be interpreted as a good approximation of the relative risk but simply as a measure of association. Alternative answers were "no" and "don't know." Fewer than 1% of the responses to any given US question were "don't know," and fewer than 1% to 13% of the responses to any given Genevan question were "don't know." These responses were excluded from the calculations. Because statistical significance was attained more often in the much larger US sample, we focused on the size of the observed differences or the strength of the association to assess potential public health importance. For example, an absolute difference in proportions of less than 10%, or an odds ratio between 0.7 and 1.4, was not considered noteworthy except when examining trends across categories.

Responses to equivalent items also were compared directly between the 2 populations in multivariate analyses. For these analyses, we first determined which interactions of demographics with knowledge and attitude variables by population were necessary in the model by using plots of observed proportions by population or demographic variable. We then fitted a logistic regression model for each knowledge or attitude variable, adjusting for country, age, sex, education, and BMI and adding any important interactions.

Results

Sample Characteristics

Demographic data are presented in Table 1. Of note are the greater percentage of Americans with less than 12 years of education and the markedly higher prevalence of overweight in the United States in 1987 than in Geneva in 1994.

Overall Awareness of the Associations of Dietary Factors and Chronic Diseases

In both surveys, respondents were asked whether they believed that what people eat and drink has an effect on or can prevent major diseases. All US respondents agreed that eating the right kinds of food can reduce the chances of developing major diseases.

Multiple linear regression analyses of these responses by personal characteristics indicated an effect for some of the diet and disease associations, as shown in Table 2. Although the comparisons within each country are valid, comparisons cannot be made between the 2 populations because of differences in survey question format. Americans were asked open-endedly to name major diseases that might be related to what people eat and drink. Geneva respondents, however, were prompted with a multiple-response checklist of 5 conditions that might be related to diet.

Women generally were more aware of diet and disease associations than men were. No significant difference in awareness was found across age groups in either country. Being more

TABLE 1—Demographic and Body Mass Index Characteristics of Survey Respondents: United States and Geneva, Switzerland

	United States (n = 10 366)		Geneva (n = 698)	
	n	%	n	%
Sex*				
Male	4303	41.5	315	45.1
Female	6063	58.5	383	54.9
Age, y**				
35–44	3736	36.0	188	26.9
45–54	2229	21.5	213	30.5
55–64	2262	21.8	167	23.9
65–75[a]	2139	20.6	130	18.6
Education, y**				
<12	2268	21.9	40	5.7
12	3959	38.2	407	58.3
>12	4139	39.9	251	36.0
Body mass index, kg/m^2**				
Not overweight	7273	70.2	584	83.7
Overweight[b]	3093	29.8	114	16.3

[a]65–74 in Geneva.
[b]Overweight was defined as body mass index ≥27.8 for men and ≥27.3 for women.
*χ^2 test for between-population difference, *P* = .06.
**χ^2 test for between-population difference, *P* < .001.

TABLE 2—Adjusted Odds Ratios (ORs) for Identified Diet and Disease Relations and Associations With Demographic Characteristics and Overweight Status: United States and Geneva, Switzerland

	Cancer		Heart Disease		Diabetes		Hypertension		Obesity	
	US OR[a] (95% CI)	Geneva OR (95% CI)	US OR (95% CI)	Geneva OR (95% CI)	US OR (95% CI)	Geneva OR (95% CI)	US OR (95% CI)	Geneva OR (95% CI)	US OR (95% CI)	Geneva OR (95% CI)
Sex										
Female	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Male	0.5	1.2	0.7	0.5	1.1	1.3	1.2	0.7	1.0	0.6
	(0.4, 0.6)	(0.7, 2.3)	(0.6, 0.8)	(0.2, 1.3)	(1.0, 1.3)	(0.7, 2.6)	(1.0, 1.4)	(0.3, 1.9)	(0.9, 1.3)	(0.2, 2.0)
Age, y										
35–44	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
45–54	1.2	1.3	1.0	0.9	1.6	0.9	1.4	1.8	1.4	1.3
	(1.1, 1.3)	(0.9, 1.1)	(0.9, 1.1)	(0.4, 2.2)	(1.5, 1.8)	(0.6, 1.4)	(1.2, 1.5)	(0.9, 3.4)	(1.2, 1.6)	(0.6, 2.9)
55–64	0.8	1.0	1.0	0.9	1.0	1.3	1.2	1.0	0.9	0.7
	(0.7, 0.9)	(0.6, 1.8)	(0.9, 1.2)	(0.3, 2.2)	(0.9, 1.2)	(0.7, 2.3)	(1.0, 1.3)	(0.4, 2.7)	(0.8, 1.1)	(0.2, 2.2)
65–75[b]	0.6	0.9	0.9	0.5	1.0	1.5	1.2	0.5	1.0	0.6
	(0.5, 0.6)	(0.5, 1.5)	(0.8, 1.0)	(0.2, 1.3)	(0.8, 1.1)	(0.8, 2.7)	(1.1, 1.4)	(0.2, 1.4)	(0.8, 1.2)	(0.2, 2.0)
Education, y										
<12	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
12	1.2	1.0	1.4	1.9	1.0	1.0	0.9	3.5	1.2	4.5
	(1.1, 1.3)	(0.4, 2.5)	(1.2, 1.6)	(0.6, 5.9)	(0.8, 1.1)	(0.4, 2.7)	(0.8, 1.0)	(1.2, 10.6)	(1.0, 1.4)	(1.4, 14.1)
>12	1.4	1.7	2.4	2.4	1.1	1.1	1.0	3.4	1.7	3.3
	(1.3, 1.6)	(0.7, 4.1)	(2.1, 2.7)	(0.7, 8.0)	(0.9, 1.3)	(0.4, 3.1)	(1.0, 1.2)	(1.1, 10.9)	(1.3, 2.0)	(1.0, 10.9)
Overweight[c]										
Yes	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
No	1.0	0.9	1.1	0.9	0.8	1.0	0.9	0.7	0.8	1.6
	(1.0, 1.2)	(0.5, 1.6)	(1.0, 1.2)	(0.4, 2.2)	(0.7, 0.9)	(0.6, 1.9)	(0.8, 1.0)	(0.3, 1.0)	(0.7, 1.0)	(0.6, 4.1)

Note. CI = confidence interval.
[a] Odds ratios from multiple logistic regression for the association with each characteristic, within population, adjusted for the other characteristics in the table; the reference category is the first row within each characteristic.
[b] 65–74 in Geneva.
[c] Overweight was defined as body mass index (kg/m^2) ≥27.8 for men and ≥27.3 for women.

educated in the United States was associated with greater awareness of diet and cancer, diet and heart disease, and diet and obesity but not with diet and diabetes or hypertension. In the Geneva data, a similar influence of education was suggested in 4 of the 5 relations between diet and disease. BMI was not strongly associated with diet and disease awareness in either population.

Personal Importance of Nutrition Issues

Of the US respondents, 76% ascribed importance to avoiding salt, 76% to avoiding sugar, 70% to lowering cholesterol, and 61% to avoiding overweight. In Geneva, the percentage responding similarly was 82% for salt, 89% for sugar, 52% for cholesterol, and 86% for overweight. Multivariate analyses (adjusted for age, sex, education, and BMI) indicated that the Geneva respondents were more likely than the US respondents to assign importance to avoiding salt and sugar (OR=1.6, 95% confidence interval [CI]=1.3, 2.0; OR=2.9, 95% CI=2.2, 3.6, respectively), substantially more likely to say that avoiding overweight was important (OR=4.5 before adjusting for BMI and OR=5.9, 95% CI=4.5, 7.2 when fully adjusted), and overall less likely to respond that

lowering cholesterol was an important concern (OR=0.6, 95% CI=0.5, 0.7).

Within one or both populations, the importance of avoiding sugar and salt, lowering serum cholesterol, and avoiding overweight varied with age, sex, education, and BMI but not always in the same direction (Table 3). For example, more women than men in the United States thought that lowering cholesterol was important, and the reverse was true in Geneva.

High-Fat or Low-Fiber Diet

All US respondents and most Geneva respondents (87%) had heard of fiber. In both populations, about 1 in 5 respondents thought that their diets were high in fiber (23% in the United States and 22% in Geneva). More US than Geneva respondents (41% vs 28%, respectively) reported consuming diets that were low in fat. Relatively few (11% in the United States and 8% in Geneva) reported having diets that were high in fat.

As shown in Table 4, the multiple logistic regression analyses generally indicated that persons older than 44 years and women reported having a diet high in fiber and low in fat in both populations. Also, in both populations,

being overweight was associated with a lesser likelihood of reporting a low-fat diet.

Recognition of the Fat and Fiber Content of Selected Foods

US and Geneva respondents were asked to indicate which of 5 foods (white bread, soda, broiled fish, bananas, cold cuts or ham) were high in fat and which of 5 different foods (red meat, lettuce, carrots, white rice, apples) were high in fiber. In both populations, responses were correct more often for fat than for fiber. The proportion of "don't know" answers was notably higher in Geneva for both the fat and the fiber questions. In the analyses for fat (which excluded those who replied "don't know"), Genevans were less likely to recognize the relatively low fat content of broiled fish (OR=0.04) and bananas (OR=0.3) but more likely to identify cold cuts or ham as high in fat (OR=2.1, 95% CI=0.6, 2.6). In the analyses for fiber, Geneva respondents were more likely than US respondents to recognize the relatively high fiber content of lettuce, carrots, and apples (OR=3.5, 3.8, and 1.9, respectively) but less likely to recognize that red meat was not high in fiber (OR=0.2, 95% CI= 0.1, 0.2).

TABLE 3—Percentage of Respondents Indicating Specified Nutrition Concerns as Important[a] and Adjusted Odds Ratios (ORs) for Associations With Demographic Characteristics and Overweight Status: United States and Geneva, Switzerland

	Avoid Too Much Salt				Avoid Too Much Sugar				Lower Cholesterol				Avoid Overweight			
	US		Geneva		US		Geneva		US		Geneva		US		Geneva	
	%	OR[b] (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Sex																
Male	71.2	1.0	78.1	1.0	69.9	1.0	84.8	1.0	66.4	1.0	56.4	1.0	55.5	1.0	86.6	1.0
Female	79.0	1.5 (1.4, 1.7)	84.5	1.5 (1.0, 2.2)	79.4	1.7 (1.6, 1.9)	91.9	1.8 (1.1, 2.9)	72.4	1.3 (1.2, 1.5)	48.2	0.6 (0.4, 0.8)	65.0	1.6 (1.5, 1.8)	86.1	0.8 (0.5, 1.3)
Age, y																
35–44	71.4	1.0	69.7	1.0	75.5	1.0	88.3	1.0	65.1	1.0	38.5	1.0	62.9	1.0	82.9	1.0
45–54	74.5	1.2 (1.0, 1.3)	84.9	2.3 (1.4, 3.8)	74.8	1.0 (0.9, 1.1)	89.2	1.0 (0.5, 2.0)	70.0	1.3 (1.1, 1.4)	54.0	1.9 (1.2, 3.0)	62.5	0.9 (0.8, 1.1)	87.3	1.5 (0.8, 2.6)
55–64	79.3	1.5 (1.3, 1.7)	86.1	2.5 (1.4, 4.4)	76.6	1.1 (1.0, 1.2)	89.2	1.1 (0.5, 2.2)	74.2	1.6 (1.4, 1.8)	56.7	1.9 (1.2, 3.0)	62.2	0.9 (0.8, 1.0)	89.2	1.9 (1.0, 3.7)
65–75[c]	81.0	1.7 (1.5, 1.9)	87.7	3.1 (1.6, 5.8)	74.9	1.0 (0.9, 1.1)	87.7	1.1 (0.5, 2.2)	73.6	1.5 (1.4, 1.7)	61.5	2.6 (1.5, 4.3)	55.2	0.6 (0.6, 0.7)	86.2	1.2 (0.6, 2.3)
Education, y																
<12	78.8	1.0	97.5	1.0	73.6	1.0	90.0	1.0	70.6	1.0	41.0	1.0	60.5	1.0	87.5	1.0
12	75.0	0.9 (0.8, 1.0)	81.7	0.1 (0.0, 1.0)	74.9	1.1 (0.9, 1.2)	88.4	0.9 (0.3, 2.8)	69.2	1.0 (0.9, 1.1)	53.5	1.7 (0.8, 3.6)	61.4	1.1 (0.9, 1.2)	85.9	1.1 (0.4, 3.1)
>12	74.9	1.0 (0.9, 1.1)	78.9	0.1 (0.0, 0.9)	77.1	1.3 (1.2, 1.5)	88.8	1.0 (0.3, 3.1)	70.2	1.2 (1.0, 1.3)	51.0	1.8 (0.8, 3.9)	61.0	1.2 (1.1, 1.4)	86.9	1.3 (0.5, 3.8)
Overweight[d]																
Yes	80.6	1.0	82.1	1.0	78.8	1.0	85.8	1.0	72.6	1.0	63.1	1.0	84.9	1.0	92.9	1.0
No	73.7	0.7 (0.6, 0.8)	81.5	1.1 (0.6, 2.0)	74.1	0.7 (0.7, 0.8)	89.2	1.5 (0.8, 2.7)	68.8	0.8 (0.8, 0.9)	49.7	0.6 (0.4, 1.0)	50.9	0.2 (0.2, 0.2)	85.1	0.3 (0.1, 0.8)

Note. CI = confidence interval.
[a]Alternative answers were "no" and "don't know." Fewer than 1% of the responses to any given US question were "don't know," and fewer than 1% to 13% of the responses to any given Genevan question were "don't know"; these responses were excluded from the calculations of the odds ratios.
[b]Odds ratios from multiple logistic regression for the association with each characteristic, within population, adjusted for the other characteristics in the table; the reference category is the first row within each characteristic.
[c]65–74 in Geneva.
[d]Overweight was defined as body mass index (kg/m²) ≥27.8 for men and ≥27.3 for women.

Multivariate analyses of perceived fat and fiber content of foods by demographic characteristics and BMI gave mixed results both within and across populations. In both groups, higher education was associated with more correct answers about both fat and fiber. Age, sex, and BMI were not related to responses about fat or fiber consistently in either population.

Discussion

The need for dietary change among the 2 groups is relatively similar. Diets in both Geneva and the United States are high in salt, fat, and sugar and low in dietary fiber and complex carbohydrates,[12,14] although the chronic disease morbidity and mortality profile of Switzerland is better than one would expect given its dietary pattern.[12] This analysis provided some insights into possible similarities and differences in diet and health awareness in the target populations.

The data for Switzerland refer to only the Geneva area, an urban, French-speaking area with a diverse population that includes about 25% non-Swiss people. Studies in the areas of Switzerland with stronger German or Italian influences might have had different results. In this comparison, location may be a proxy for other factors related to diet and health awareness, including underlying cultural food patterns, preventive orientations and perceived threats to health, and exposure of the population to various types of dietary advice and to related advertising or counteradvertising over time.

The 1994 Bus Santé 2000 survey was undertaken to serve as a baseline for subsequent measurement of the effect of *La Fourchette Verte* ("the Green Fork"). *La Fourchette Verte* was an education campaign launched in 1994 by the Department of Social Action in Geneva to sensitize the general population to the relation between diet and disease. Although we had insufficient basis for advancing formal hypotheses, we expected a substantially higher level of awareness in the US population when compared with that in Geneva residents at the time *La Fourchette Verte* was being initiated because of the long-standing US public education efforts related to diet and health at the time the NHIS was conducted.

The Swiss Nutrition Council adopted dietary recommendations similar to the US dietary guidelines only in 1995.[12] Thus, even though this comparison used data for Geneva that were collected 7 years later than the US data, the timing of the data collection in relation to the existence of local (Geneva) and national (United States and Geneva) nutrition campaigns is of more relevance to this analysis. In addition, an analysis of US data on diet

TABLE 4—Percentage of Respondents Rating Their Diets as High in Fiber or Low in Fat and Odds Ratios (ORs) for Association With Age, Sex, Education, and Overweight: United States and Geneva, Switzerland

	High-Fiber Diet				Low-Fat Diet			
	US		Geneva		US		Geneva	
	%	OR[a] (95% CI)	%	OR (95% CI)	%	OR (95% CI)	%	OR (95% CI)
Sex								
Male	22.3	1.0	18.7	1.0	36.0	1.0	21.6	1.0
Female	23.8	1.1 (1.0, 1.2)	24.3	1.4 (1.0, 2.1)	44.9	1.5 (1.3, 1.6)	32.6	1.8 (1.3, 2.6)
Age, y								
35–44	19.5	1.0	16.5	1.0	31.7	1.0	22.3	1.0
45–54	22.0	1.3 (1.1, 1.5)	23.0	1.6 (0.9, 2.6)	37.1	1.4 (1.2, 1.5)	24.9	1.2 (0.7, 1.9)
55–64	26.6	1.8 (1.6, 2.0)	25.8	1.9 (1.1, 3.2)	46.8	2.1 (1.9, 2.4)	37.1	2.3 (1.4, 3.8)
65–75[b]	27.3	1.9 (1.7, 2.2)	22.3	1.6 (0.9, 2.8)	56.4	3.2 (2.8, 3.6)	27.7	1.6 (0.9, 2.6)
Education, y								
<12	19.0	1.0	12.5	1.0	42.5	1.0	20.0	1.0
12	20.6	1.2 (1.1, 1.4)	19.9	2.0 (0.8, 5.4)	38.6	1.0 (0.9, 1.1)	25.6	1.4 (0.6, 3.3)
>12	28.0	2.0 (1.8, 2.3)	26.3	3.0 (1.1, 8.3)	43.1	1.4 (1.2, 1.6)	32.3	2.0 (0.9, 4.8)
Overweight[c]								
Yes	22.0	1.0	22.8	1.0	33.6	1.0	16.7	1.0
No	23.7	1.1 (0.9, 1.2)	21.6	0.8 (0.5, 1.4)	44.5	1.7 (1.5, 1.8)	29.8	2.1 (1.2, 3.6)

Note. CI = confidence interval.
[a]Odds ratios from multiple logistic regression for the association with each characteristic, within population, adjusted for the other characteristics in the table; the reference category is the first row within each characteristic.
[b]65–74 in Geneva.
[c]Overweight was defined as body mass index (kg/m^2) $\geq$ 27.8 for men and $\geq$ 27.3 for women.

and health knowledge and attitudes collected in the 1992 NHIS reported essentially no change in awareness when compared with the 1987 data.[24] A limitation of our analysis in this respect is the absence of data on Genevans' exposure to dietary guidance from other sources (e.g., global media, other European countries). The comparisons are nevertheless informative with respect to the types of cross-cultural variations in diet and health knowledge and attitudes that are evident in countries with different degrees of formal policy activities related to this topic.

With respect to the personal importance of specific nutrition concerns, the relatively lower importance assigned to overweight by Americans was particularly striking because the prevalence of overweight was nearly twice as high in the United States as in the Geneva sample and because "maintain ideal weight" has been included in the US dietary guidelines since 1980.[2] Americans were more conscious of dietary fat and more likely to rate their diets as low in fat (in keeping with recommendations) than were Genevans. Americans also were more aware of fiber issues than the Swiss and yet were more likely to rate their diets as low in fiber (contrary to recommendations).

Despite the high level of awareness of diet and health issues, a substantial proportion of respondents in both populations apparently lacked the ability to rank common foods as high or not high in fat or fiber. Similarly, most men and women 18 years and older surveyed in the United Kingdom in 1992 considered themselves well informed about healthy eating, but many were unable to correctly identify foods that were high in fiber or saturated fat.[23] In this study, the Genevans were less sure about fat and fiber contents of the foods queried; however, Genevans who answered the question were more likely to recognize high-fiber foods. US respondents may have been confused by the fact that the type of fiber in fruits and vegetables is sometimes considered less beneficial than the fiber in cereal and, thus, rated lettuce, carrots, and apples as lower in fiber on that basis. The somewhat greater recognition of fat in foods by the US respondents is to be expected, given the widespread US health promotion efforts to lower cholesterol.

As noted at the beginning of this article, associations of diet and health awareness with sex, age, and education often are similar within populations with different eating patterns and cultural characteristics and may be more consistent than differences related to culture.[28] In the current analysis, similar to findings in many other studies,[12,18,21–25,28,29,31] women in both populations generally were more aware of diet and health associations, more health conscious, and more knowledgeable about specifics than men were. One of the studies with similar findings, which involved a comparison across regions within Switzerland, found that sex-related differences or nutritional habits were much more pronounced than regional effects.[12]

The results from the Pan–European Union study, which included persons 15 years and older, suggested that the role of age in diet and health knowledge and awareness may be to distinguish younger (e.g., <35 years) from middle-aged or older adults, presumably because of the marked differences in lifestyle and outlook on health at younger ages.[21] Our findings suggest that persons older than 44 years differed from those aged 35 to 44 years on several variables, although the direction of the differences varied across issues and was not always the same across countries. One example is the age variation in the importance of avoiding overweight—it was rated higher after 44 years of age in Geneva, but this pattern was not found in the United States. Less concern about weight at older ages in the United States has been reported previously.[32,39,40]

As expected, those who were more educated were more aware of diet and disease relations and more likely to perceive themselves as following up on their awareness by adhering to a low-fat, high-fiber diet. Whether this reflects greater actual adherence to dietary recommendations cannot be judged from these data. We have no objective evidence of the validity of these self-perceptions; the data of Glanz et al.[18] suggest that in the United States, those who disproportionately underestimate their dietary fat intake include the well educated.

Because being overweight increases the risks of other diet-related chronic diseases, we might have expected people with higher BMI levels to be more knowledgeable. However, this was not observed. Aside from the observation that overweight individuals in both populations were substantially more likely to view overweight as important, associations of BMI with knowledge and attitudes about other diet

and health issues were generally absent. This has direct implications for the particular need to offer dietary guidance to those at higher risk.

In summary, the results suggest not only that educating populations about diet-related prevention is possible and feasible but also that population knowledge reflects differences such as governmental priorities or cultural differences. For example, the Geneva data reflect the low priority that has been given to the reduction of cholesterol compared with that of salt and sugar, whereas the converse is true for the United States, where much attention has been focused on reducing serum cholesterol.[14] The findings about overweight are consistent with the interpretation that Americans are less concerned about being overweight than are the Swiss, although this may change with the recent high level of attention being given to obesity as a health problem in the United States.[37,41]

Demographic differences observed within populations were in the direction expected on the basis of other studies of US or European populations (i.e., greater health consciousness among women and more highly educated persons), with more variable effects of age. However, an effect of the more long-standing diet-related health promotion campaigns in the United States compared with Switzerland is implied by the impression that, overall, fewer demographic differences were seen in the United States than in Geneva. Thus, although nutrition and dietary guidance policies may be converging globally, approaches to implementing these policies must remain sensitive to cultural differences. □

Contributors

S. B. Girois and S. K. Kumanyika planned the study, analyzed the data, and wrote the paper. A. Morabia designed and conducted the Geneva survey, including direct translation of the NHIS questionnaire. E. Mauger assisted with the statistical analyses.

Acknowledgments

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