

# Awareness, Perception, and Knowledge of Heart Disease Risk and Prevention Among Women in the United States

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**Context:** One of 2 women in the United States dies of heart disease or stroke, yet women are underdiagnosed and undertreated for these diseases and their risk factors. Informed decisions to prevent heart disease and stroke depend on awareness of risk factors and knowledge of behaviors to prevent or detect these diseases.

**Objective:** Assess (1) knowledge of risks of heart disease and stroke and (2) perceptions of heart disease and its prevention among women in the United States.

**Design and Setting:** Telephone survey conducted in 1997 of US households, including an oversample of African American and Hispanic women.

**Participants:** One thousand respondents 25 years or older; 65.8% white, 13.0% African American, and 12.6% Hispanic.

**Main Outcome Measures:** Knowledge of heart disease and stroke risks, perceptions of heart disease, and knowledge of symptoms and preventive measures.

**Results:** Only 8% of the respondents identified heart disease and stroke as their greatest health concerns; less than 33% identified heart disease as the leading cause of death. More women aged 25 to 44 years identified breast cancer as the leading cause of death than women 65 years or older. Women aged 25 to 44 years indicated they were not well informed about heart disease and stroke. Although 90% of the women reported that they would like to discuss heart disease or risk reduction with their physicians, more than 70% reported that they had not.

**Conclusions:** Most women do not perceive that heart disease is a substantial health concern and report that they are not well informed about their risk. Age influenced knowledge to a greater extent than ethnicity. Programs directed at young women that address the effects of lifestyle behaviors on long-term health are needed. Better communication between physicians and patients is also warranted.

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**C**ARDIOVASCULAR disease (CVD) is the leading cause of disability and death in both men and women in the United States.<sup>1,2</sup> Annually, CVD accounts for about \$274 billion in direct health costs and indirect costs, including lost productivity, and for more than 505 000 deaths among women in the United States alone.<sup>1</sup> In contrast, the average annual number of deaths from all cancers for women in the United States is 265 900, including 43 300 deaths from breast cancer.<sup>3</sup> Surveys of women in the United States have found that their perception of the effect of CVD is not in agreement with the severity of the known consequences of CVD on morbidity and

mortality.<sup>4,5</sup> Lack of awareness of the risk of CVD may impede preventive efforts as well as the adoption of positive lifestyle changes.

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The National Council on Aging (Washington, DC) recently reported that only 9% of women between the ages of 45 and 64 years said that the condition they most feared was heart disease; this is in contrast to 61% of these women who reported that they most feared breast cancer.<sup>4</sup> In 1995, Pilote and Hlatky<sup>5</sup> reported results from a random survey of 337 women, aged 48 to 52 years, who gradu-

## PARTICIPANTS AND METHODS

Study participants were obtained from a national random sample of women 25 years and older. A base sample was created using a random digit database, where samples of random numbers were systematically selected with equal probability across all eligible blocks in the United States. All blocks within a county were organized in ascending order by area code, exchange, and block number. A sampling interval was then calculated for each county in the United States. From a random start, blocks were systematically selected in proportion to their density of listed households. Once a block was selected, a 2-digit random number ranging from 00 to 99 was appended to the exchange and block to form a 10-digit telephone number. The margin of error for this base sample was  $\pm 3.4\%$  (95% confidence interval).

To ensure that adequate numbers of African American and Hispanic women were represented in the sample, a targeted random digit database sample was created to supplement the base sample. An exchange/tract coding system was employed in which each US directory-listed household was assigned a density code that reflected the probability of either a Hispanic or African American household for the census tract in which the household resided. For this study, a minimum density of 30% and a maximum density of 100% were used. The margin of error for this sample was  $\pm 8.5\%$  (95% confidence interval).

Within each household, the interviewer asked to speak to a woman if one did not answer. The respondent was then queried to confirm that she was 25 years or older. To eliminate any potential bias or the provision of proprietary information, subjects who were employed with an advertising agency, a public relations firm, or a market research firm were excluded from the study; women who had relatives or close friends employed in these work settings were also excluded.

Professional interviewers employed with a national opinion research company (Yankelovich Partners Inc, Norwalk, Conn) conducted the survey between May 12 and May 22, 1997. Subjects were informed that all responses were confidential and that the information they provided would be used to develop health communications for women similar to them. Interviews lasted approximately 10 minutes and were conducted in English. All telephone calls were made in the evenings and on weekends so women who

worked during the day were not excluded. Calls were monitored to ensure accuracy of the answers provided by the respondents.

A 38-item questionnaire was developed for use in this study. Open-ended and prompted questions were incorporated into 4 sections. The first section queried general awareness of women's health issues. Respondents were asked open-ended questions concerning the greatest health problems and leading cause of death in women today. They were also prompted for subjective ratings of their degree of concern about common health conditions; a 3-point Likert-type scale included the answers "worry a lot," "worry a little," or "do not worry at all." The second section assessed communications and behaviors related to heart disease prevention. This section contained a mixture of open-ended questions, recognition items (eg, true/false, yes/no), and questions that quantified how well informed the respondents saw themselves as being. These latter questions were posed to the respondents using a 4-point Likert-type scale that included the following options for response: "very well informed," "well informed," "moderately informed," or "not at all informed." For all questions that involved graded answers, the option "do not know/no response" was included. The means by which the women obtained their knowledge (eg, broadcast and print media and physicians) was also evaluated. The third section evaluated the respondents' specific understanding of heart disease among women using all of the types of questions identified in the previous sections. Knowledge of risk factors, lifestyle choices that may reduce these risks, and the early warning signs of heart attack and stroke were assessed. The final section contained questions about demographic characteristics.

A total of 3365 households were contacted for the random digit database sample. There were 946 ineligible contacts, 1551 refusals, and 867 eligible respondents, for an overall response rate of 36%. For the minority oversample random digit database, a total of 2018 households were contacted. The response rate was 15%, with 133 eligible respondents, 874 refusals, and 1011 ineligible contacts. Sampling was discontinued when 1000 participants were recruited.

A software program designed for market survey analysis (Quantum; Quantime Ltd, London, England) was used to analyze the data. Univariate relationships of the responses between each ethnic and age group were analyzed with *t* tests. Statistical significance was set at  $P < .05$ . Data are reported as percentages.

ated from Stanford University between 1967 and 1971. The authors noted that 73% of the respondents perceived that their risk of developing heart disease by age 70 years was less than 1%, and twice as many women reported being worried about breast cancer (59%) as heart disease (29%). Other surveys have also indicated that many women are unaware that they have symptoms of early heart disease or that they possess risk factors for developing CVD.<sup>6-8</sup> Legato et al<sup>9</sup> reported that 44% of

women in the United States surveyed believed that it was somewhat or very unlikely that they would suffer a heart attack, and 58% believed they were as likely or more likely to die of breast cancer than heart disease; yet 74% of these women rated themselves as fairly or very knowledgeable. Of those women who saw a physician regularly, 59% reported that their physician never spoke to them about heart disease, including 44% of women 60 years or older. Few of these studies have examined these issues in di-

**Table 1. Demographic Characteristics of Respondents**

Characteristic	Ethnic Groups, %		
	White (n=658)	African American (n=130)	Hispanic (n=126)
Age, y			
25-34	21	27	32*
35-44	23	26	26
45-64	31	28	26
≥65	24	16	10*
Marital status			
Single (never married)	12	40†	19
Married or living together	65	29†	58
Separated or divorced	9	16*	13
Widowed	12	14	5†
No. of children at home <18 y			
None	64†	49	45
1	15	26†	18
2	14	16	16
≥3	7	9	17*
Education			
≤High school graduate	42	41	50
Some college	32	28	22
College graduate or more	25	28	22
Employment status			
Employed (full-time or part-time)	52	65*	53
Homemaker	14	5†	17
Student	1	2	5*
Retired	26	20	14*
Household income, \$			
<20 000	16	19	34†
20 000-49 000	36	42	36
50 000-99 000	25†	12	8
≥100 000	4	1	5
Covered by insurance	88	85	71†
Type of coverage			
Managed care	48	56	46
Traditional/indemnity	33	18*	30
Medicare	16	18	18
Medicaid	2	5	3
Other	2	2	2
Personal history of disease			
Heart attack	3	4	2
Stroke	2	1	2

\*P&lt;.05 vs white.

†P&lt;.05 vs all other groups.

verse populations of women, and these studies have not extensively evaluated knowledge about CVD risk factors and prevention practices.

The objective of this study was to assess perceptions of heart disease and how it affects women, and the current level of knowledge of risk factors and warning signs for heart disease and stroke in a diverse, random sample of women in the United States. The perceived role of the physician in communicating information about heart disease was also assessed. The survey was commissioned by the American Heart Association (Dallas, Tex) to provide baseline data about current knowledge, awareness, and preventive behaviors related to heart disease

and stroke prior to the implementation of a national education campaign on heart disease and stroke in women.

## RESULTS

### DEMOGRAPHICS

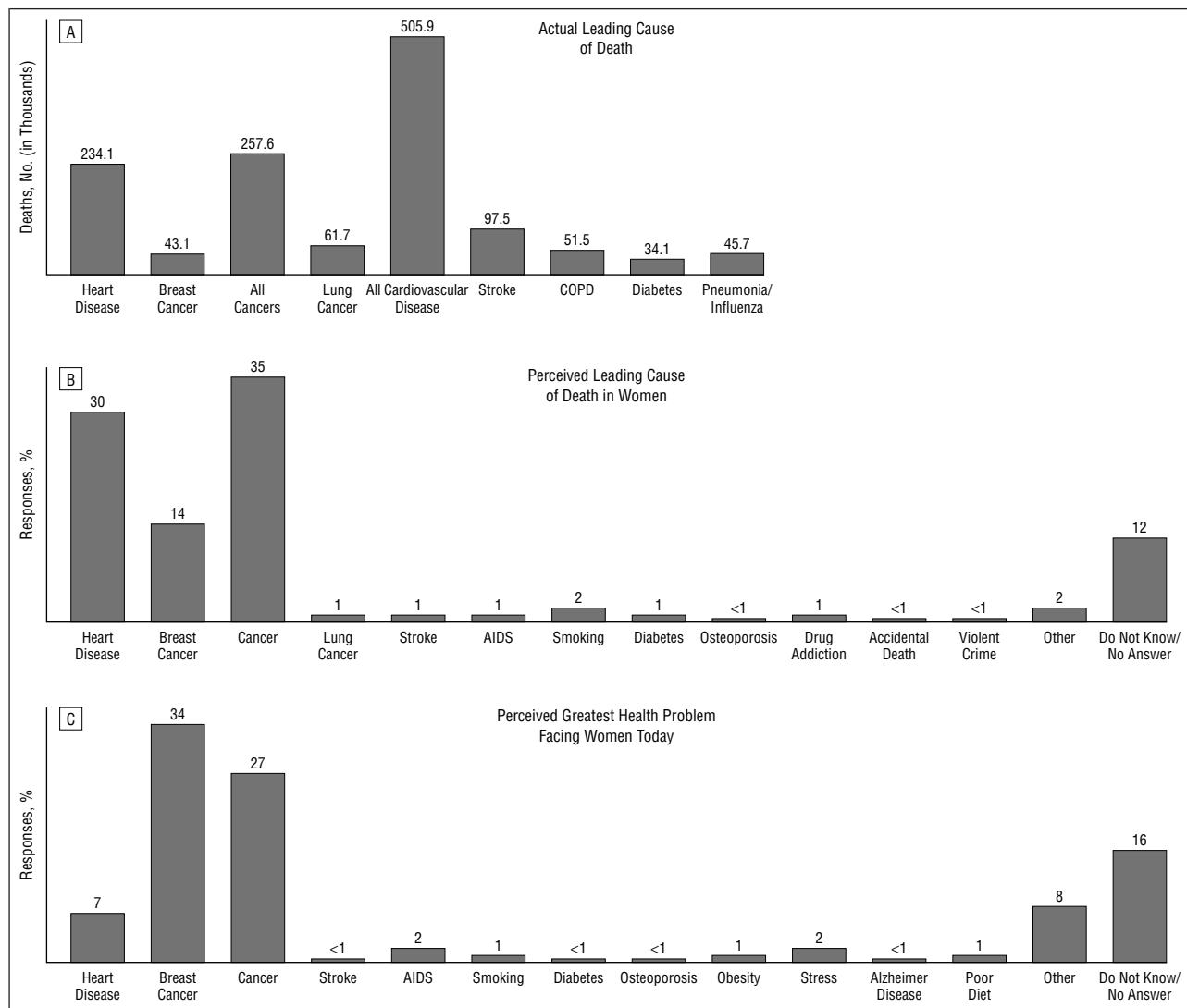
The demographic characteristics of the respondents are given in **Table 1**. There were 86 respondents who, when queried for ethnic category, identified themselves as "other." Because less than 2% of these respondents specifically identified an ethnic group (Asian or Native American), we excluded these women from the statistical analyses. The ethnic composition of the remaining 914 eligible participants was 66% white, 13% African American, and 13% Hispanic. Differences among ethnic groups were noted for age distribution, marital status, number of children at home, employment status, household income, and health insurance coverage. In contrast, education and personal history of heart disease were similar among the groups (Table 1). The South had the largest representation (33.4%), followed by the West (29.3%), the Midwest (24.9%), and the Northeast (12.4%).

### PERCEPTIONS OF DISEASE CONDITIONS

The distribution of all responses to the questions concerning the greatest health problems and leading cause of death for women today are shown in **Figure 1**. Approximately 61% of the women noted cancer as the greatest health problem for women, whereas only 8% reported heart disease or stroke. When identifying the leading cause of death, 31% of all respondents reported heart disease or stroke. This was lower than the response rate for all cancers (50%). These perceptions are contrasted against the actual statistics for the leading causes of death for women in the United States (Figure 1).<sup>1</sup>

Responses by age and ethnic groups are reported in **Table 2**. Differences among age groups in their responses for the greatest health problem facing women today were identified for all cancer categories, heart disease or a heart attack, stress, being overweight or obese, and smoking. Almost 25% of the women in the youngest age group did not know or did not respond to this question. Similar responses for the greatest health problem facing women were noted among the ethnic groups, with the exception that more Hispanic women perceived stress as the greatest health problem compared with African American women.

Differences between age and ethnic groups were also observed in the responses for the leading cause of death for women today (Table 2). Women at the extremes of age were more likely to respond that they did not know the leading cause of death or did not answer the ques-



**Figure 1.** Perceptions of health problems and leading causes of death vs actual causes of death. Distribution of respondents' perceptions regarding the greatest health problem facing women today (C) and the leading cause of death in women (B). A, Actual leading causes of death. An attempt was made to match categories across all topics where possible. AIDS indicates acquired immunodeficiency syndrome; COPD, chronic obstructive pulmonary disease.

tion compared with women aged 45 to 64 years. Interestingly, 16% of younger women (25-34 years) recognized heart disease as the leading cause of death for women, but only 4% perceived it as the greatest health problem among women. Even though older women more frequently cite heart disease as the leading cause of death, they still report breast cancer and cancer as a greater health problem. Only breast cancer and smoking were identified as the leading cause of death by a similar percentage of women in all ethnic groups. More Hispanic women identified cancer and acquired immunodeficiency syndrome, whereas more white women identified heart attack and heart disease as the leading causes of death in women.

The women were also queried about their concern about developing the following diseases: heart

disease, cancer, acquired immunodeficiency syndrome, diabetes, Alzheimer disease, breast cancer, stroke, osteoporosis, and heart attack. Although not shown, more Hispanic women responded that they "worried a lot" about all of the diseases compared with the other ethnic groups. Cancer, in general, was the disease that caused the greatest worry in the largest proportion of all women (30%), followed by breast cancer (28%), heart disease (22%), and a heart attack (20%). When responses that identified any concern for developing these diseases were combined ("worry a lot" plus "worry a little"), fewer African American women reported that they worried about developing any cancer, heart disease, osteoporosis, or Alzheimer disease compared with the other ethnic groups. White women were less concerned about developing ac-

**Table 2. Perception of Greatest Health Problem Facing Women and Leading Cause of Death for Women by Age and Ethnic Group of Respondent\***

Response	Age Group in Years				Ethnic Group		
	25-34 (n = 188)	35-44 (n = 294)	45-64 (n = 308)	≥65 (n = 195)	White (n = 658)	African American (n = 130)	Hispanic (n = 126)
<b>Greatest health problem</b>							
Breast cancer	41	40	34	20†	34	38	34
Cancer (general)	19	26	26	37†	27	28	26
Heart disease/heart attack	4	5	11‡§	8	8	6	9
Stress	2	3	1	1	2	<0.1	3¶
Acquired immunodeficiency syndrome	2	1	1	3	2	1	2
Obesity/overweight	<0.1	2‡	2‡	1	1	3	1
Smoking	1	<0.1	2§	1	1	<0.1	<0.1
Other	8	10	12	10	10	12	10
Do not know/no answer	23§	12	12	18	16	13	16
<b>Leading cause of death</b>							
Breast cancer	20  #	18#	12	9	14	18	16
Cancer (general)	38	33	36	35	33	41	43**
Heart disease/heart attack	16†	28	38§	34	33†	15	20
Smoking	3	2	1	2	2	1	1
Acquired immunodeficiency syndrome	1	1	<1	<1	<1	1	4**
Violent crime	1	<0.1	1	<0.1	<1¶	2	1
Other	2	2	1	2	2	2	2
Do not know/no answer	15	11	7	14	11	14	11

\*All data are given as percentages.

†P<.05 vs all groups within category.

‡P<.05 vs 25 to 34 years age group.

§P<.05 vs 35 to 44 years age group.

||P<.05 vs 45 to 64 years age group.

¶P<.05 vs African American group.

#P<.05 vs 65 years or older age group.

\*\*P<.05 vs white group.

quired immunodeficiency syndrome and diabetes than were women in the other ethnic groups. Concern reported by respondents for developing a stroke (58%) or a heart attack (62%) was similar among the groups.

### KNOWLEDGE OF HEART DISEASE

The respondents' rating of their knowledge of heart disease, including stroke, are given in **Table 3**. There were no ethnic group differences for any category rating for either heart disease or stroke. Less than 20% of women in each ethnic group responded that they were very well informed about heart disease. Even fewer women in each group (<15%) responded that they were very well informed about stroke. Age differences in perception of knowledge about heart disease were found. Most of the women in all groups responded that they were moderately well informed (51%). Few women among all groups (≤2%) did not know or did not answer this question.

Perceived knowledge of stroke was also influenced by the age of the respondent (Table 3). Less than 15% of women overall identified themselves as very well informed; however, women 45 years or older were more likely to respond that they were well informed compared with their younger counterparts. Significantly more

younger women (<45 years) reported that they were not at all informed about stroke compared with women older than 45 years.

The respondents were asked to spontaneously list warning signs associated with having a heart attack or stroke. Approximately 67% of all respondents identified chest pain as a warning sign for a heart attack; more white women (71%) identified chest pain compared with African American (57%) and Hispanic (53%) women. Other warning signs identified by at least 10% of all respondents were shortness of breath, pain in the arm, tightness in the chest, and nausea. No ethnic differences were noted for any of these additional warning signs. Age differences were not observed for the heart attack warning signs. Approximately 7% of women overall responded that they did not know or did not respond to this question.

A reduced awareness of the warning signs for stroke was apparent for all respondents. Approximately 36% of all women identified sudden weakness or numbness on one side of the body as a warning sign. No differences were noted among ethnic groups, although fewer women 65 years or older (28%) identified this warning sign. Additional warning signs for a stroke that were identified by at least 10% of the respondents included sudden vision problems, headaches, slurred speech, and unex-

**Table 3. Perception of Knowledge of Heart Disease and Stroke by Age and Ethnic Group of Respondents\***

Rating of Self-Knowledge	Age Group in Years				Ethnic Group		
	25-34 (n = 188)	35-44 (n = 294)	45-64 (n = 308)	≥65 (n = 195)	White (n = 658)	African American (n = 130)	Hispanic (n = 126)
<b>Heart disease</b>							
Very well informed	8	10	18†‡	23†‡	14	17	17
Well informed	13	21†	23†	20	19	22	17
Moderately informed	52	52	53	44	52	47	48
Not at all informed	28§	17	5§	10	14	12	16
Do not know/no answer	1	<0.1	1	2‡	1	2	2
<b>Stroke</b>							
Very well informed	6	11	14†	13†	10	14	11
Well informed	12	12	18‡	24†‡	16	19	19
Moderately informed	41	46	50	44	47	43	42
Not at all informed	41§	31  ¶	16	15	26	24	28
Do not know/no answer	<0.1	<1	<1	2‡	1	<0.1	<0.1

\*All data are given as percentages.

†P < .05 vs 25 to 35 years age group.

‡P < .05 vs 35 to 44 years age group.

§P < .05 vs all groups within category.

||P < .05 vs 45 to 64 years age group.

¶P < .05 vs 65 years or older age group.

plained dizziness. More white women (18%) identified vision problems compared with the other ethnic groups, whereas more African American women (21%) reported headaches as a warning sign of stroke. Fewer women 65 years or older identified headaches or dizziness as warning signs compared with younger women. In contrast, fewer women aged 25 to 34 years (10%) identified that slurred speech was a warning sign. A higher proportion of women in the youngest (39%) and the oldest (38%) age groups did not identify the warning signs of stroke compared with women aged 35 to 64 years (~25%).

#### PERCEPTIONS OF HEART DISEASE RISK FACTORS AND HEART DISEASE PREVENTION

Respondents provided spontaneous answers when asked about the major causes of heart disease (**Table 4**). Being overweight, not exercising, smoking, and high cholesterol were the most cited responses by the women overall. In contrast, 5% or less of the respondents identified a high-fat diet, racial heritage, alcohol consumption, poor nutrition, low levels of estrogen, high triglyceride levels, menopause, stroke, or aging as causes of heart disease. Minimal differences were found among the age groups in these responses. Fewer women 65 years or older identified that a sedentary lifestyle was a major cause of heart disease compared with all other groups, and fewer women aged 25 to 34 years noted that high blood pressure was a leading cause of heart disease compared with the other groups. When ethnic groups were compared, fewer African American women identified being overweight or obese as a major cause of heart disease com-

pared with the other groups. Also, fewer white women than African American and Hispanic women identified stress and a high-fat diet as causes of heart disease. Approximately 11% of the women did not respond or did not know the answer.

The percentage of correct responses (true or false) to statements concerning CVD risk and prevention are given for age and ethnic groups in **Table 5**. Overall, 91% of the respondents knew that heart disease develops gradually over many years and can easily go undetected, although age and ethnic differences were found. When questioned about stroke, 87% of all respondents recognized that some forms of heart disease may result in a stroke. These responses were similar among all age and ethnic groups. Fewer women 65 years or older were able to correctly identify that women are more likely to get heart disease after menopause than before compared with all other age groups, and fewer African American women recognized the postmenopausal increase in heart disease compared with the other groups. In contrast, more African American women compared with the other groups correctly responded that African Americans were more likely to die of a heart attack or stroke than whites. All respondents were least informed with respect to sex differences in heart disease. For example, 45% of the respondents did not agree with the statement "Once men are diagnosed with heart disease, they are more likely than women to become seriously ill or die." Fewer women 65 years or older correctly answered this question compared with women younger than 65 years. Only 8% of all women agreed with the statement, "There is nothing I can do to help prevent myself from getting heart disease."

**Table 4. Knowledge About Heart Disease Risk and Prevention by Age and Ethnic Group of Respondents\***

Causes of Heart Disease Given as Responses	Age Group in Years				Ethnic Group		
	25-34 (n = 188)	35-44 (n = 294)	45-64 (n = 308)	≥65 (n = 195)	White (n = 658)	African American (n = 130)	Hispanic (n = 126)
Being overweight	33	33	37	30	36	17†	35
Not exercising	35	38	29	19†	33	17	22
Smoking	26	36	37	20	33	21	21
High cholesterol	25	30	30	26	30	26	16
Stress	18	24	21	20	18†	28	26
Family history of coronary heart disease	18	19	23	17	21	8	13
High blood pressure	9†	16	19	19	17	16	12
High-fat diet	7	5	3	1	1†	15	12
Racial heritage	4	4	5	2	4	2	2
Drinking alcohol	1	4	4	5	4	1	3
Diabetes	2	2	2	1	2	<0.1	4
Low levels of estrogen	1	<0.1	2	1	1	1	1
Other	2†	9	8	8	9	10	8
Do not know/no answer	17	7	6	17	10	18	16

\*All data are given as percentage of respondents who spontaneously reported causes.  
 †P < .05 vs all groups within category.

**Table 5. Perceptions About Cardiovascular Disease Risk and Prevention by Age and Ethnic Group of Respondent\***

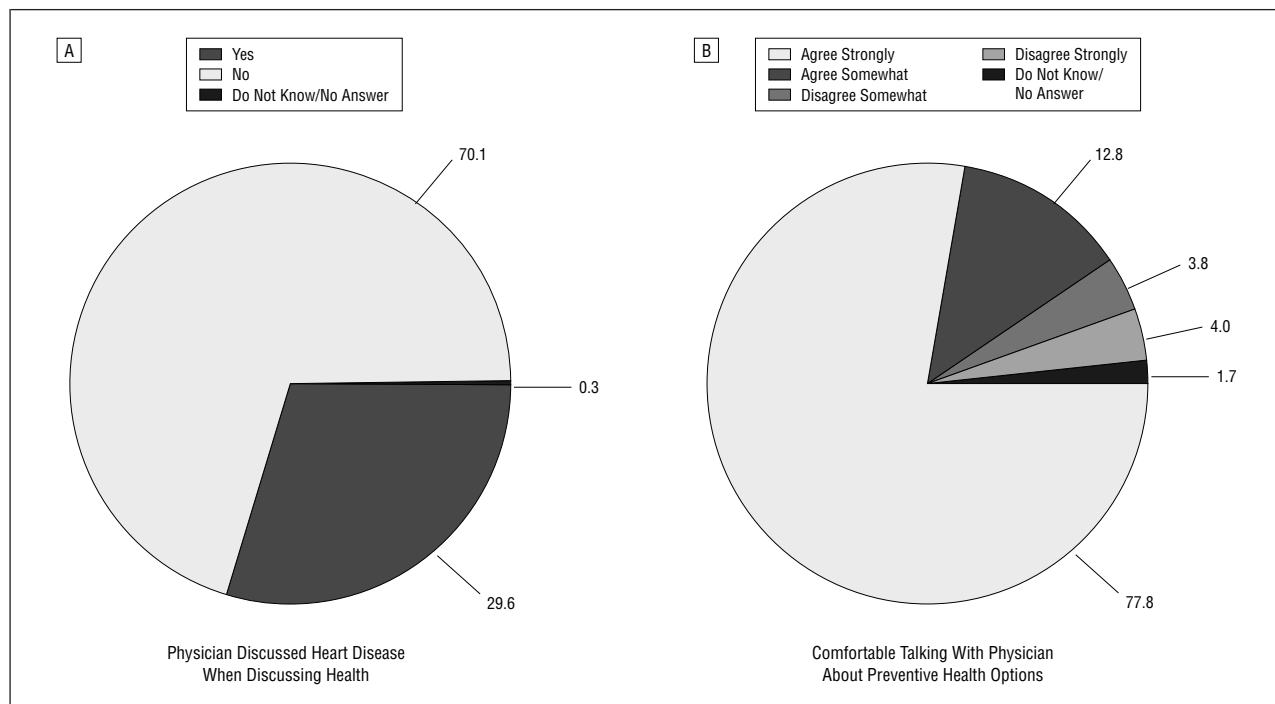
Questions	Age Group in Years				Ethnic Group		
	25-34 (n = 188)	35-44 (n = 294)	45-64 (n = 308)	≥65 (n = 195)	White (n = 658)	African American (n = 130)	Hispanic (n = 126)
General perceptions							
Heart disease develops gradually over many years and can easily go undetected (true)	91	94†	93†	84	92‡	86	82
Some forms of heart disease may result in a stroke (true)	87	89	86	87	87	87	90
Menopause							
Women are less likely to get heart disease after menopause than before (false)	64	71§	60	48‡	64	46‡	59
Ethnic differences							
African American women are more likely than white women to die from a heart attack or stroke (true)	46	48	48	48	47	62‡	34
Sex differences							
Once men are diagnosed as having heart disease, they are more likely than women to become seriously ill or die (false)	51	53	48	24‡	47	38	36

\*All data are given as percentage correct. "True" or "false" within parentheses indicates correct response.  
 †P < .05 vs 65 years or older age group.  
 ‡P < .05 vs all groups within category.  
 §P < .05 vs 45 to 64 years age group.  
 ||P < .05 vs Hispanic group.

**COMMUNICATION WITH PHYSICIAN**

**Figure 2** shows the reported communication between the respondents and their physicians regarding heart disease and its prevention. Less than 30% of the women reported that their physicians ever discussed heart disease when discussing their health. When evaluated by ethnic group, more African American women (38%) reported discussing heart disease with their physicians com-

pared with white women (29%). Fewer women aged 25 to 34 years (14%) reported that their physicians discussed heart disease with them compared with all other age groups (27%-38%). More women aged 45 to 64 years reported that they discussed heart disease with their physicians (38%) compared with women aged 35 to 44 years (27%). Also shown in Figure 2, approximately 78% of all women stated that they agree strongly with the statement "I am comfortable talking with my doctor about



**Figure 2.** Respondents' answers to questions about communication with their physicians. All data are given as percentages.

prevention and treatment options regarding my health.” More African American women (85%) strongly agreed with this statement compared with white women (76%). When differences between age groups were evaluated, a smaller proportion of women aged 45 to 64 years (8%) responded that they agreed somewhat with the statement compared with women of other ages (14%-16%). Also, only 1% of women aged 25 to 34 years noted that they disagreed strongly with the statement compared with all other ages (4%-6%).

#### INFORMATION ABOUT HEART DISEASE

Fewer Hispanic women (57%) responded that they had seen, heard, or read information about heart disease within the past year compared with the other ethnic groups (71%-75%). This was also seen in women aged 25 to 34 years, as fewer (60%) responded that they had seen, heard, or read information about heart disease within the past year compared with the other age groups (71%-82%). Women aged 45 to 64 years responded with the highest awareness of information on heart disease (82%); this value was significantly higher compared with women 65 years or older (71%). Of those women who were aware of heart disease information, magazines were identified as the major source of information for all ethnic and age groups (43%). Television was identified by 24% of the respondents, followed by health care professionals (18%). Other sources of information included newspapers, brochures or books, friends or relatives, the radio, the In-

ternet, libraries, and other sources. With minor exceptions, responses were similar among all ethnic and age groups. For example, more African American women reported they heard the information from health care professionals (27%) or read it in a brochure (18%) compared with white women (16% and 6%, respectively). In contrast, more white women (46%) identified magazines as their source of information compared with African American women (28%). More Hispanic women (14%) reported that a friend or a family member was their source of heart disease information compared with women in the other groups (3%-5%). More women 45 years or older (22%-24%) identified the newspaper as their source of information about heart disease compared with the younger women (7%-13%). Although the radio was not a major source of knowledge, more women 65 years or older (4%) reported this source of information compared with women aged 25 to 44 years (<1%).

#### COMMENT

The key findings of this national survey were as follows: (1) a majority of women in the United States did not recognize heart disease as the leading cause of death in women and perceived breast cancer as a greater health problem; (2) a majority of women reported that they were not well informed about heart disease and stroke and did not know major risk factors for CVD; and (3) although almost 80% of women reported that they were comfortable discussing preventive health options with their phy-

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sicians, less than 33% had discussed heart disease with their physicians when discussing health. Furthermore, we determined that awareness, perception, and knowledge of heart disease risk and prevention often vary by age and ethnicity.

These results are in agreement with previous studies that have indicated women in the United States fear breast cancer far more than they fear heart disease.<sup>4,5,9</sup> Pilote and Hlatky<sup>5</sup> observed a similar lack of awareness of heart disease in women who had graduated from Stanford University. Although recent reports from the Framingham Heart Study suggest that the lifetime risk of developing coronary heart disease (CHD)<sup>10</sup> and death due to CHD<sup>11</sup> may be overestimated, especially in older persons, these findings do not negate the fact that CVD remains the number 1 cause of morbidity and mortality in the United States.<sup>1</sup>

The disparity in knowledge of heart disease and its risks that we observed between age groups was reported previously for stroke.<sup>12</sup> In a survey of men and women in the greater Cincinnati, Ohio, metropolitan area, respondents 75 years and older were less likely to correctly identify at least 1 stroke warning sign or 1 stroke risk factor compared with younger respondents (47% vs 65%, respectively). In the current study, a large proportion of women 65 years and older were unable to identify any stroke warning sign. Our study also revealed that a higher percentage of women aged 25 to 44 years felt they were not informed at all about either heart disease or stroke compared with other women.

The perception that breast cancer is the greatest health problem for women aged 25 to 64 years in this survey and others<sup>4,5,9</sup> indicates a heightened awareness of this disease. This may reflect the fact that for women aged 40 to 59 years, the probability of developing invasive breast cancer (1 in 25) increases almost 10-fold from the probability of developing this disease prior to age 40 (1 in 231).<sup>3</sup> Alternatively, this awareness of breast cancer may be related to the uniquely female aspect of the disease and to the plethora of information on breast cancer that is targeted to women. Except for the youngest cohort of women (25-34 years), more respondents correctly identified heart disease, rather than breast cancer, as the leading cause of death. This bodes well for current educational efforts. The disparity between what women perceive as the greatest health problem and what

they perceive as the leading cause of death may indicate that heart disease is seen as a less debilitating disease than breast cancer, both psychologically and physically.

We found small differences between the ethnic groups regarding knowledge about risk factors for heart disease or knowledge about heart disease as the leading cause of death. Although women in minority groups were included in the survey by Legato et al,<sup>9</sup> results were only presented according to age groups. Identification of a disparity in information about heart disease risk factors between ethnic groups can be useful to develop key messages and strategies for targeted groups.<sup>13,14</sup> For example, the National Heart, Lung, and Blood Institute's (Bethesda, Md) Latino Community Cardiovascular Disease Prevention and Outreach Initiative, "Salud Para Su Corazon," is a heart disease and education campaign targeting the Latino community and was based on data from ethnic-specific focus groups.<sup>14</sup>

The media sources most commonly cited as sources of heart disease information by the respondents in our study are similar to those identified in the study by Pancioli et al.<sup>12</sup> In our study, magazines were identified by the highest percentage of respondents (43%), followed by television (24%) and health care professionals (18%). The percentage of respondents who identified the latter 2 sources in our study were similar to those reported previously.<sup>12</sup>

More than 70% of participants in our study reported that physicians had not discussed heart disease with their patients when discussing health, yet more than 75% of the women stated that they felt comfortable talking with their physicians about preventive health options. In a previous survey, 47% of women aged 45 to 59 years and 44% of women 60 years of age and older also reported this lack of discussion with physicians about CHD risk.<sup>9</sup> When stratified by age, we found that more than 60% of women 45 years or older responded that they had not discussed heart disease with their physicians. Our results are consistent with a recent analysis of the National Ambulatory Medical Care Survey by the Centers for Disease Control and Prevention.<sup>15</sup> This survey of almost 30 000 routine visits to physicians indicated that only a minor proportion of women were counseled about physical activity, diet, and weight reduction lifestyle modifications that reduce CHD risk factors. Although the use of recall to address this issue has been questioned,<sup>16</sup> the fact that women perceive this lack of communication with

their physicians regarding CHD risk may be a missed opportunity to emphasize prevention and should be investigated further.

There are limitations of the survey that was used in the current study. Because only households with telephones were included, it is likely that we did not survey women in the lowest socioeconomic group. It is also possible that households with more than 1 telephone would be biased for inclusion. Open-ended questions allowed women to interpret risk in the context of their own age and/or ethnic group. This is supported by differences in the responses observed. It is important to note that the perceived greatest health problem does not necessarily have to be consistent with the leading cause of death, which may be appropriately influenced by age. However, the clearly established lack of awareness of the leading cause of death in women in the United States was startling.

Our data indicate the need for heart disease and stroke education programs for all women, including programs targeted for older adults ( $\geq 65$  years) and younger adults (25-34 years). For this latter group, it is important to emphasize that adopting healthy lifestyle behaviors now can influence their risk for developing long-term disease. Recent data linking fatty streaks to atherosclerotic disease suggest that awareness of CVD risk at a young age may have an effect on the rate of disease development in the subsequent 20 to 40 years.<sup>17</sup> Our findings support the continued use of education programs and materials that are also targeted to specific ethnic groups to close the gap between women's perceptions of heart disease risk and reality. It is also clear that physicians need to do a better job of providing health information to their female patients.

To address the issues raised in this survey, the American Heart Association initiated the National Women's Heart Disease and Stroke Campaign for the promotion of cardiovascular disease prevention and self-empowerment of women. The campaign consists of multiple components, including a national media campaign, educational materials and conferences, programs that address behavior change, and ongoing grassroots initiatives. The campaign was designed to increase public awareness and knowledge about heart disease and stroke. It was also designed to enable women to lower their risk for developing these diseases through improved lifestyle and better prevention practices.

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## REFERENCES

1. American Heart Association. *1999 Heart and Stroke Statistical Update*. Dallas, Tex: American Heart Association; 1998.
2. Mosca L, Manson JE, Sutherland SE, Langer RD, Manolio T, Barrett-Connor E. Cardiovascular disease in women: a statement for health-care professionals from the American Heart Association. *Circulation*. 1997;96:2468-2482.
3. American Cancer Society. *Cancer Facts and Figures: 1999*. Atlanta, Ga: American Cancer Society; 1998.
4. Assessing the odds [editorial]. *Lancet*. 1998;350:1563.
5. Pilote L, Hlatky M. Attitudes of women toward hormone therapy and prevention of heart disease. *Am Heart J*. 1995;129:1237-1238.
6. Griffiths F. Women's health concerns: is the promotion of hormone replacement therapy for prevention important to women? *Fam Pract*. 1995;12:54-59.
7. Cameron JD, Jennings JL, Kay S. A self-administered questionnaire for detection of unrecognized coronary heart disease. *Aust N Z J Public Health*. 1997;21:545-547.
8. McDonagh TA, Morrison CE, Lawrence A, et al. Symptomatic and asymptomatic left-ventricular systolic function in an urban population. *Lancet*. 1997;350:829-833.
9. Legato MJ, Padus E, Slaughter E. Women's perceptions of their general health, with special reference to their risk of coronary artery disease: results of a national telephone survey. *J Womens Health*. 1997;6:189-198.
10. Lloyd-Jones DM, Larsen MG, Beiser A, Levy D. Lifetime risk of developing coronary heart disease. *Lancet*. 1999;353:89-92.
11. Lloyd-Jones DM, Martin DO, Larson MG, Levy D. Accuracy of death certificates for coding coronary heart disease as the cause of death. *Ann Intern Med*. 1998;129:1020-1026.
12. Pancioli AM, Broderick J, Kothari R, et al. Public perception of stroke warning signs and knowledge of potential risk factors. *JAMA*. 1998;279:1288-1292.
13. Carter-Edwards L, Bynoe MJ, Svetkey LP. Knowledge of diet and blood pressure among African Americans: use of focus groups for questionnaire development. *Ethn Dis*. 1998;8:184-197.
14. Moreno C, Alvarado M, Balcazar H, et al. Heart disease education and prevention program targeting immigrant Latinos: using focus group responses to develop effective interventions. *J Community Health*. 1997;22:435-450.
15. Centers for Disease Control and Prevention. Missed opportunities in preventive counseling for cardiovascular disease—United States, 1995. *MMWR Morb Mortal Wkly Rep*. 1998;47:91-95.
16. Bush TL. Women's perception of risk of coronary artery disease [letter]. *J Womens Health*. 1997;6:477.
17. Strong JP, Malcom GT, McMahan CA, et al. Prevalence and extent of atherosclerosis in adolescents and young adults: implications for prevention from the Pathobiological Determinants of Atherosclerosis in Youth Study. *JAMA*. 1999;281:727-735.