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Knowledge and Perceived Risk of Major Diseases in Middle-Aged and Older Women

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Women's (N = 200; 41–95 years) knowledge of mortality risks and their perceived general risk, personal risk, control, and preventability of coronary heart disease (CHD) and breast, colon, and lung cancer were examined. Middle-aged (MA) women were more accurate in their mortality knowledge for MA men than for MA women and were more accurate for MA than for older (OA) men and women. OA women, in contrast, were least accurate in their mortality knowledge for OA women compared with all other target groups; only 34% knew that CHD is the leading cause of death in OA women. Participants also overestimated a woman's risk of death from breast cancer and underestimated the risk from lung and colon cancer. Ratings of perceived risk, control, and preventability varied as a function of disease. OA women in particular appear to lack knowledge regarding women's risk of major diseases. Results have implications for women's health behaviors and medical decisions.

Key words: older women, perceived risk, disease, coronary heart disease, breast cancer, mortality knowledge

As the population of baby-boomers (born between 1946 and 1964) ages, the United States will experience major growth in its population of older adults (U.S. Bureau of the Census [USBC], 1996a). Increasing age is associated with an increase in disease and disability. Coronary heart disease (CHD) and cancer, the two leading causes of mortality in older adults, increase dramatically with age. The most common causes of cancer mortality in women, including lung, colon, breast, and genital organ cancer, also increase with age (USBC, 1996b). Because of women's increased longevity and lower death rates, older women often spend a substantial part of their later lives with chronic disease and disability (O'Brien & Vertinsky, 1991). Many chronic diseases that are associated with aging, however, are caused, in large part, by lifestyle factors. For example, CHD, the leading cause of morbidity and mortality in the United States, is strongly associated with tobacco use, dietary factors, and physical inactivity (McGinnis & Foege, 1993).

These population projections, combined with the epidemiology of chronic disease and the role of lifestyle factors in reducing and managing chronic disease, underscore the need for large-scale changes in preventive health behaviors (U.S. Department of Health & Human Services [USDHHS], 1990). Knowledge of disease risk factors has been identified as a necessary prerequisite for behavior change (e.g., Breslow, Sorkin, Frey, & Kessler, 1997; Womeodu & Bailey, 1996). A recent report from the 1992 National Health Interview Survey Cancer Control Supplement, however, found that the majority of Americans, regardless of age, race, education, and income level, lacked knowledge regarding major risk factors for common cancers and lacked knowledge regarding survival rates following early detection (Breslow et al., 1997). For example, close to two thirds of Americans did not know that age increased one's risk for breast and colon cancer, and more than one half believed that the chance of survival following the early detection of colon cancer was fair or poor. Furthermore, the belief that age was a risk factor for breast and colon cancer actually decreased with increasing age among women.

Although knowledge of CHD risk factors has increased over time (Davis, Winkleby, & Farquhar, 1995; Frank, Winkleby, Fortmann, & Farquhar, 1993; Smith, Croft, Heath, & Cokkinides, 1996), certain subgroups have made substantially less improvement in knowledge, including the less educated and ethnically diverse (Davis et al., 1995; Smith, Croft, et al., 1996). In addition, although the overall mortality rate due to cardiovascular disease in the United States has been declining over the past several decades, the decline is less for women than men and less for African American women than White women (American Heart Association, 1997). Among younger adults (i.e., 25–65 years), knowledge of CHD risk factors has been shown to be positively related to education, female gender, and amount of exercise participation (Avis, McKinlay, & Smith, 1990). Among a broader age range (i.e., 25–74 years), knowledge

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of CHD prevention has been shown to be positively related to education, female gender, and younger age (Finnegan, Viswanath, & Loken, 1988).

Knowledge and beliefs regarding CHD risk among women in general and older women in particular have received little empirical study. Furthermore, research on perceived vulnerability and knowledge of risk factors has tended to be disease specific. Few studies have compared what women in general know about different diseases (e.g., cancers vs. CHD), how knowledge and perceived risk vary according to age for different diseases, and how these factors relate to preventive health behaviors and screening. For example, although the study by Breslow et al. (1997) compared knowledge of risk factors for several different types of cancer, comparisons were not made between cancer and CHD. In a similar vein, perceived vulnerability and concern regarding breast cancer has been well-studied, but comparisons have generally not been made between different types of cancer and other diseases. An exception is a recent study by Legato, Padus, and Slaughter (1997). They found that 44% of women in a community sample believed that it was somewhat or very unlikely that they would have a heart attack in their lifetime, 58% believed that they were as likely or more likely to die of breast cancer than heart disease, and 51% of women aged 60 years and older believed that a woman's risk of having a heart attack sometime in her life is lower than her male peers. Furthermore, more than half of the women in their sample reported that their physicians had never talked to them about heart disease. In addition, Pilote and Hlatky (1995) found that twice as many Stanford University women alumni (median age = 50 years) reported being worried about breast cancer as compared with heart disease.

The major goal of this study was to add to the literature on women's health and aging by examining middle-aged and older women's knowledge and perceived risk of CHD and cancers (breast, lung, and colon cancer). Specifically, women's knowledge of mortality rates across age and gender target groups was examined. In addition, women's perceptions regarding the general risk of a woman developing disease, the personal risk of developing disease, the ability to prevent disease, the ability to control disease, and knowledge regarding disease were examined for CHD and for breast, lung, and colon cancer. A second purpose of this study was to examine how beliefs and perceptions varied according to such factors as age, race, education, and chronic disease risk factors.

Method

Participants and Procedures

A convenience sample of 200 women aged 41 to 95 years who resided in the San Francisco Bay area completed the survey. Women were recruited through local senior centers (n = 45), senior organizations (n = 31), senior health fairs (n = 42), women's health fairs (n = 26), informational talks for seniors and women (ns = 14 and 37, respectively), and employment settings (n = 5). Attempts were made to reach a diverse sample by recruiting, for example, at a health fair in a less educated, ethnically diverse population. Women aged 40 years and older were invited to complete a survey focused on beliefs and attitudes regarding health and disease. Women did not put their name anywhere on the survey and no identifiers were used so that the survey was completely anonymous. Due to this anonymity, women who returned surveys with missing data could not be recontacted. Overall, 96% of items were completed, and missing data for specific variables are reflected in the degrees of freedom presented in the Results section. Surveys were completed between April 1997 and March 1998.

A total of 132 surveys were completed in person and an additional 131 were provided along with postage-paid envelopes to return at a later date. Of those surveys to be returned by mail, 68 (52%) were actually returned. The precise overall study response rate is unknown because some sources of recruitment were participant-initiated (e.g., health fairs), thus preventing a tally of the number of women approached who refused. It is likely, however, that the overall response rate was lower than the 52% mail response rate.

Measures

Demographics. Women reported their age (in years), marital status (married, divorced, living with partner, single, or widowed), education (in years), and race (White, Asian American, Native American, Hispanic, African American, or other). Because of the small sample sizes within non-White racial groups, race was dichotomized in all primary analyses (1 = White, 0 = races other than White).

Medical and health variables. CHD risk factors included whether the woman reported a history of high blood pressure, high cholesterol, or diabetes (1 = presence of each condition, 0 = absence); current smoking status (1 = smokers, 0 = nonsmokers); overweight based on self-reported height and weight (1 = computed body mass index $\geq$ 27.3, 0 = body mass index <27.3; Kuczmarski, Flegal, Campbell, & Johnson, 1994); and the absence of participation in at least moderate intensity physical activity (0 = $\geq$3 times per week over the past 3 months, 1 = <3 times per week). Moderate intensity exercise was defined to women as exercises or activities that "substantially increased your heart rate, for example, brisk walking, dancing, swimming, jogging, etc." A CHD risk factor composite was made up of the sum of these six risk factors (possible range: 0–6). Women were also asked whether either one of their biological parents had a heart attack before the age of 65 (1 = known history, 0 = no history or unknown history). Breast cancer risk factors included whether the participant reported a history of breast abnormalities (i.e., lump, biopsy, etc.) and whether they had any blood relatives that developed breast cancer (including mother, aunts, grandmothers, or sisters). The presence of these risk factors was coded 1 and the absence was coded 0. Smoking status served as the major measured risk factor for lung cancer (1 = smokers, 0 = nonsmokers). Colon cancer risk factors were physical inactivity and a history of breast, ovarian, or endometrial cancer. Additional health variables that were measured included a reported history of one or more heart attacks, angina, lung cancer, colon cancer, heart disease, stroke, respiratory disease, and other cancers. Women also rated their current health on an 11-point Likert scale, from 0 (*poor*) to 5 (*average*) to 10 (*excellent*).

Mortality knowledge. Participants were asked what they believed was the leading cause of death in the following age and gender target groups: men aged 45–64 years, women aged 45–64 years, men aged 65 years and older, and women aged 65 years and older. They were forced to choose cancer, heart disease, stroke, or accidents for each age and gender target group. Participants were

also asked to choose which form of cancer they believed was the leading cause of cancer deaths for women in the following target groups: 45–54 years, 55–64 years, 65–74 years, 75–84 years, and 85 years and older. They were forced to choose lung, colon, breast, cervical, or ovarian cancer. For all analyses, cervical and ovarian cancer were combined to represent genital organ cancers to be consistent with nationally reported data (USBC, 1996b).

Perceived general risk. Participants' perceived risk of a woman developing a disease was measured by the question, "What do you think the chances are of a *woman* getting the following diseases sometime in her life?" for breast cancer, heart disease, lung cancer, and colon cancer. Responses were measured on a 5-point Likert scale from 1 (*very low*) to 5 (*very high*). This item was adapted from McCaul, Schroeder, and Reid's (1996) work on breast cancer.

Perceived personal risk. Participants were asked, "What do you think the chances are of *you* getting the following diseases sometime in your life?" for each of the four diseases mentioned earlier. Responses were measured on a 5-point Likert scale from 1 (*very low*) to 5 (*very high*). Participants were also asked, "How worried are you about getting the following diseases?" for the same four diseases. Responses were measured on a 5-point Likert scale from 1 (*not at all*) to 5 (*extremely*). These questions were adapted from McCaul, Schroeder, and Reid's (1996) work on breast cancer. Because the correlation (Pearson) between these two items was high (*r*s = .65 to .76), a composite measure based on the summed average of the two items for each disease was computed.

Perceived control. Perceived control was measured with one item from Champion's (1987) work for each of the four diseases listed. For example, "If I get heart disease, I can do a lot to control what happens." Responses were measured on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Perceived preventability. Participants rated how preventable they believed each of the four diseases were. For example, "Heart disease is largely preventable." Responses were measured on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Knowledge. Participants were asked to indicate their agreement with the following statements: "A man over age 65 is much more likely to die from heart disease than a woman over age 65," "As I get older, my chances of getting breast cancer increase," "Having a mother or sister with breast cancer does NOT increase my risk of developing the disease," "More women die of breast cancer each year than they do of lung cancer," and "Someone who quits smoking after many years cannot lower his or her risk of lung cancer." Responses were measured on a 5-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

Statistical Analyses

For overall mortality knowledge, repeated measures analysis of variance (ANOVA) was conducted to test whether accuracy of responses (% correct) differed according to target age (45–64 years vs. ≥65 years), target gender (men vs. women), and participant age (<65 years vs. ≥65 years). For cancer knowledge, a repeated measures ANOVA was conducted to test whether the accuracy of responses (% correct) differed according to target age (45–54, 55–64, 65–74, 75–84, and ≥85 years) and participant age (<65 years vs. ≥65 years). Paired *t* tests were conducted following statistically significant ANOVAs to evaluate pairwise differences.

Repeated measures ANOVAs were also conducted to compare whether participants' ratings in the domains of perceived general risk, personal risk, control, and preventability varied according to disease (heart disease, breast cancer, lung cancer, and colon cancer) and participant age (<65 years vs. ≥65 years). Paired *t* tests were conducted following statistically significant ANOVAs to evaluate pairwise differences across diseases.

To determine whether ratings on the domains of perceived general risk, personal risk, control, and preventability for the four diseases differed according to age, race, education, and additional risk factors, a series of simultaneous multiple regression analyses were conducted. The independent variables in each analysis were age (in years), race (dichotomized as White vs. other races), education (in years), and additional disease-specific risk factors (described in the *Medical and health variables* section). The dependent variables were ratings of perceived general risk, personal risk, control, and preventability for each of the four diseases. Women who reported a history of heart disease (heart disease, angina, or a history of heart attack; $n = 28$), breast cancer ($n = 18$), lung cancer ($n = 2$), or colon cancer ($n = 2$) were excluded from their respective analyses.

Results

Sample Characteristics

Demographic and health characteristics of the study participants are shown in Table 1. Participants who completed the surveys in person were compared with those who returned their surveys by mail across all demographic and health variables shown in Table 1. Significant differences between groups were found only for age, marital status, and history of a heart attack. Women who returned surveys by mail were significantly older, $t(191) = -3.39$, $p < .001$, were less likely to be married, $\chi^2(1, N = 200) = 7.73$, $p < .01$, and were more likely to have had a heart attack, $\chi^2(1, N = 198) = 9.51$, $p < .01$, than women who completed surveys in person.

Mortality Knowledge

Overall, 76% of women correctly indicated that CHD is the leading cause of death for men aged 45–64 years, 67% correctly chose cancer for women aged 45–64 years, 59% correctly chose heart disease for men aged 65 years and older, and 45% correctly chose heart disease for women aged 65 years and older.

Participants were more accurate for younger target groups (45–64 years) than for older target groups (≥65 years), $F(1, 168) = 20.48$, $p < .001$, and were more accurate for target men than for target women, $F(1, 168) = 19.07$, $p < .001$. Participant age was not significant, nor were any of the two-way interactions. The three-way interaction of Participant Age × Target Age × Target Gender, however, was significant, $F(1, 168) = 15.31$, $p < .001$.

The nature of the three-way interaction is shown in Figure 1. Among women under the age of 65 years, accuracy rates were higher for younger target men than younger target women, $t(77) = 2.48$, $p < .02$, for younger than older target men, $t(76) = 3.39$, $p < .001$, and for younger than older women, $t(77) = 2.17$, $p < .04$. Among women aged 65 years and older, on the other hand, accuracy rates were significantly lower for older target women as compared with younger target men, $t(93) = 6.37$, older target men, $t(93) = 5.09$, and younger target women, $t(93) = 5.37$ (all $ps < .001$). Furthermore, when accuracy rates were compared across the younger and older participants, they differed only in accu-

Table 1
Demographic and Health Characteristics of the Entire Sample

Characteristic	%	*M*	*SD*	Range
Age (years)		66.25	12.11	41–95
≤44	3.1			
45–54	16.6			
55–64	22.3			
65–74	29.5			
75–84	22.3			
≥85	6.2			
Education (years)		14.91	2.56	8–20
Race				
White (non-Hispanic)	86.0			
Asian	2.0			
Native American	1.0			
Hispanic	4.5			
African American	5.0			
Other race	1.5			
Marital status				
Married	46.0			
Divorced	15.5			
Living with partner	2.5			
Single (never married)	7.0			
Widowed	29.0			
Self-reported health		7.10	2.02	0–10
Body mass index (kg/m^2)		25.84	5.01	17–46
Overweight	30.7			
Smokers	5.6			
Self-reported physical activity participation in past 3 months				
Never	12.2			
≤1 time/week	19.4			
>1 and <3 times/week	23.5			
≥3 times/week	44.9			
Reported history of medical conditions				
High cholesterol	34.3			
Hypertension	30.3			
Diabetes	7.6			
Angina	9.6			
Heart disease[a]	6.1			
Heart attack	7.1			
Stroke	3.0			
Breast abnormality or biopsy	17.2			
Breast cancer	9.1			
Colon cancer	1.0			
Lung cancer	1.0			
Respiratory disease	7.1			
Known family history of breast cancer	28.4			
Known history of parental heart attack prior to age 65	18.3			

Note. $N = 200$.
[a]Although only 6.1% of participants reported a history of heart disease, 14.0% of participants actually reported a history of either heart disease or angina or one or more heart attacks.

racy for older target women: Younger participants were significantly more likely than older participants to know that the leading cause of death among older women is heart disease, $t(178) = 3.75, p < .001$.

Participant's knowledge of cancer mortality in women, according to the five target age groups (45–54, 55–64, 65–74, 75–84, and 85+ years), is shown in Figure 2. Sixty-four percent of participants correctly indicated that breast cancer is the leading cause of cancer death for target women aged 45–54 years. Despite the fact that breast cancer is not the leading cause of cancer death for women at other ages, this disease was chosen by 58% of participants for target women aged 55–64 years, 44% for target women aged 65–74 years, 38% for target women aged 75–84 years, and 37% for target women aged 85 years and older. In fact, 85% of women did not know that lung cancer is the leading cause of cancer death for women aged 55–64 years, 82% did not know that lung cancer is the leading cause of cancer death for women aged 65–74 years, 68% did not know that colon cancer is the leading cause of cancer death for women aged 75–84, and 64% did not know that colon cancer is the leading cause of cancer death for women aged 85 years and older.

Accuracy rates differed significantly across target age, $F(4, 628) = 34.97, p < .001$. Significant differences between all pairs were found ($ps < .001$), with two exceptions: 55–64 years versus 65–74 years and 75–84 years versus ≥85 years. Accuracy rates did not differ according to participant age nor according to Participant Age × Target Age.

Perceived General Risk, Personal Risk, Control, and Preventability of Diseases

Neither participant age nor the interaction of Participant Age × Disease were significant for any of the domains; therefore, only the within-subjects effects of disease are reported.

Results from the four ANOVAs are shown in Table 2. For the domain of perceived general risk, participants rated the lifetime risk of a woman developing heart disease to be significantly higher than breast cancer. Participants also rated the lifetime risk of a woman developing heart disease and breast cancer to be significantly higher than both lung cancer and colon cancer. For the domain of perceived personal risk, participants rated their personal lifetime risk of developing heart disease to be significantly higher than breast cancer, lung cancer, and colon cancer. In addition, women rated their lifetime risk of developing breast cancer and colon cancer to be significantly higher than lung cancer. For the domain of perceived control, participants reported that they would be significantly more able to control the course of heart disease than breast cancer, lung cancer, or colon cancer. Participants also reported that they would be significantly more able to control the course of breast cancer and colon cancer than lung cancer. For the domain of perceived preventability, participants rated heart disease and lung cancer as significantly more preventable than breast cancer and colon cancer. Furthermore, colon cancer was rated as significantly more preventable than breast cancer. Finally, although not shown in Table 2, women rated their personal risk of developing each disease to be significantly lower than a woman's risk in general ($ps < .001$).

Multivariate Predictors of Ratings of General Risk, Personal Risk, Control, and Preventability of Diseases

Significant overall models (at $p < .01$) were only seen in the domain of ratings of perceived personal risk; models for the other domains (perceived general risk, control, and

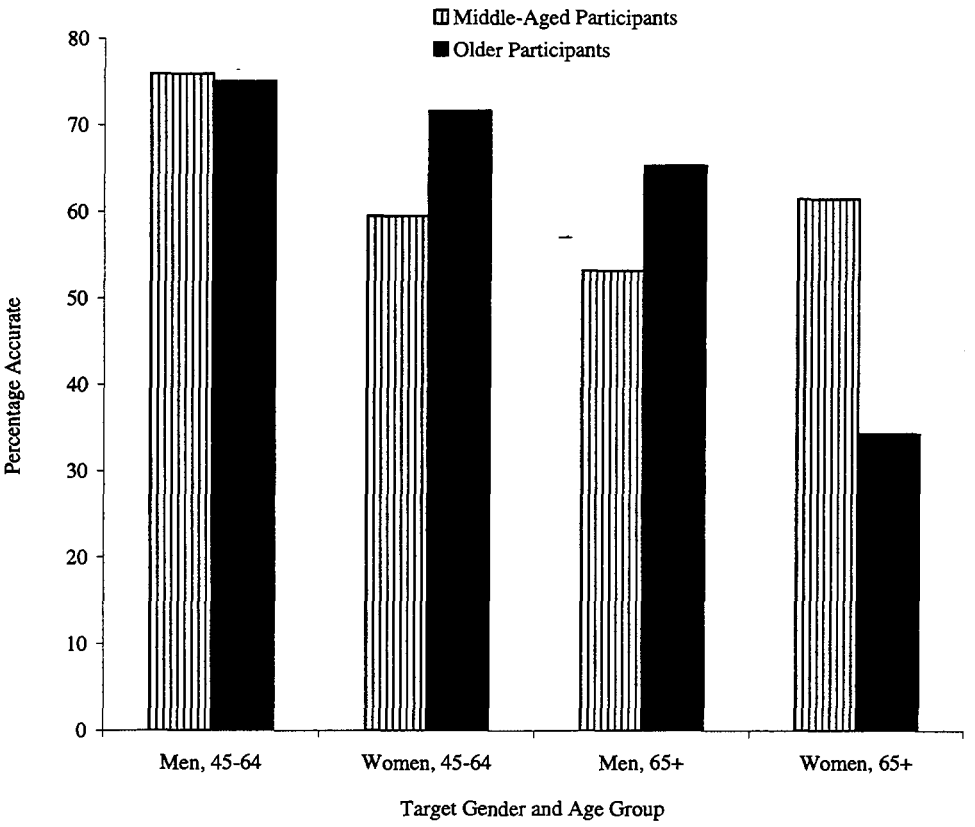

Figure 1. Mortality knowledge accuracy rates for four target groups, by participant age group.

preventability) were not statistically significant and explained less than 9% of the variance for each disease. As a result, only the analyses for perceived personal risk are described. Although all possible two-way interactions were tested for each of the models, none made a unique contribution to the explained variance (at $p < .01$) beyond the main effects model and therefore were not included.

For perceived risk of breast cancer: model, $F(5, 161) = 7.76, p < .0001, R^2 = .19$, a family history of breast cancer ($\beta = .27, t = 3.71, p < .001$) and younger age ($\beta = -.30, t = -4.04, p < .001$) were each associated with greater perceived risk of breast cancer. For perceived risk of heart disease: model, $F(5, 145) = 6.06, p < .0001, R^2 = .17$, a greater score on the cardiovascular disease risk composite ($\beta = .32, t = 3.99, p < .001$), and a known family history of parental heart attack before age 65 ($\beta = .20, t = 2.67, p < .01$) were both associated with greater perceived risk of heart disease. For perceived risk of lung cancer: model, $F(4, 178) = 8.71, p < .0001, R^2 = .16$, smokers rated their risk of lung cancer to be greater than that for nonsmokers ($\beta = .40, t = 5.83, p < .0001$). Finally, for perceived risk of colon cancer, the overall model was not significant, $F(6, 173) = 1.01, p > .05$.

Knowledge

Participants were most accurate in their knowledge that a family history of breast cancer increases one's personal risk of developing the disease and in their belief that quitting smoking even after many years lowers one's risk of lung cancer. Participants were least accurate in their belief that women over age 65 are about as likely as men over age 65 to die from heart disease and in their belief that more women die of lung cancer than breast cancer. The inaccurate belief that a family history of breast cancer does *not* increase one's risk of developing the disease increased with increasing age of the participant ($r = .21, p < .01$). In addition, the inaccurate belief that a man over age 65 is much more likely to die from heart disease than a woman over age 65 also increased with increasing age of the participant ($r = .23, p < .01$). Finally, two items were related to years of education: Those with more education were less likely to believe that more women die from breast cancer than lung cancer and were less likely to believe that a family history of breast cancer does *not* increase one's risk of developing the disease ($rs = -.16$ and $-.14, ps < .05$).

Discussion

This study examined middle-aged and older women's knowledge of the leading cause of death in middle-aged and older men and women; knowledge of the leading cause of cancer death in women of different ages; perceptions of the general risk and personal risk of developing four major diseases (CHD, breast cancer, lung cancer, and colon

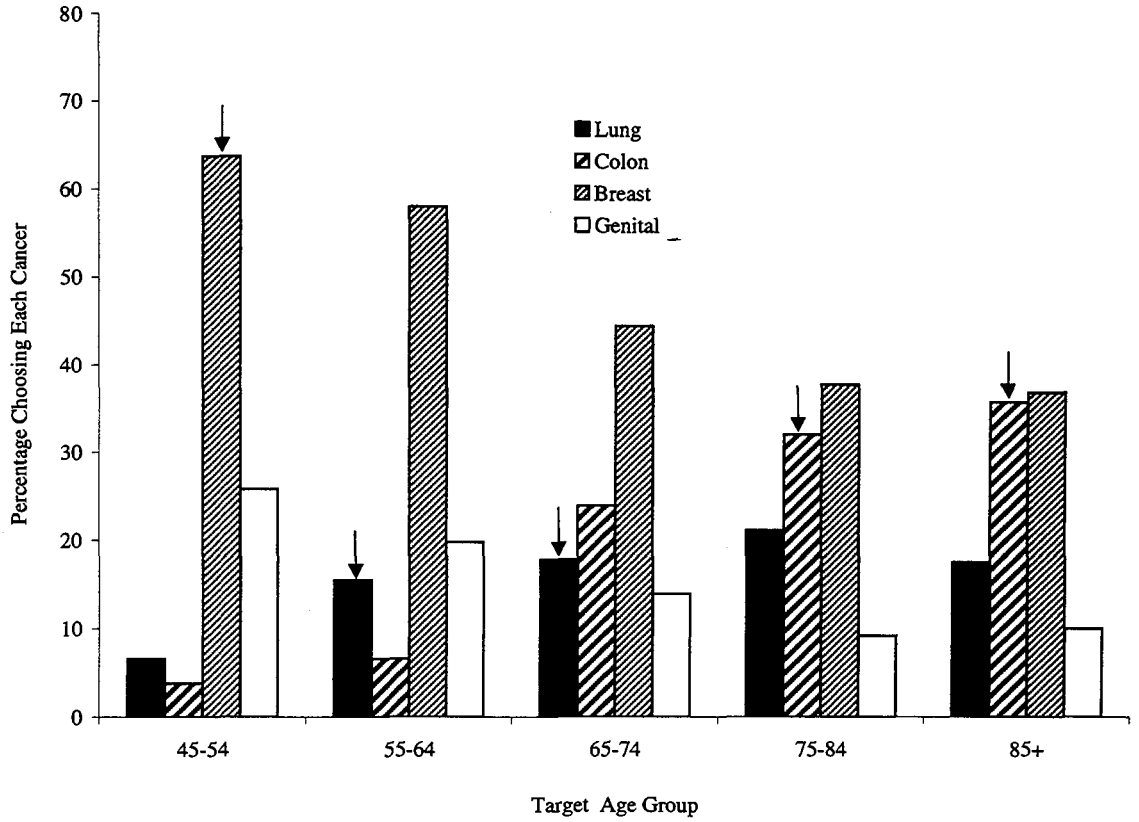

Figure 2. The percentage of women who believed that the leading cause of cancer mortality is lung, colon, breast, or genital organ cancer for each of five target age groups. Arrows indicate the actual leading cause of cancer mortality in women for each of the five age groups, as reported by the U.S. Bureau of the Census (1996b).

cancer); and perceptions of the ability to prevent as well as control these diseases. This study also examined whether knowledge and perceptions varied according to age, education, race, and the presence of disease risk factors.

We found that middle-aged and older women lacked knowledge regarding the causes of mortality in women as compared with men. Only 34% of older women knew that CHD is the leading cause of death among women aged 65 years and older. Women also lacked knowledge regarding the leading cause of cancer mortality in women of different ages. Women of all ages overestimated the lethality of breast cancer as compared with lung and colon cancers. This tendency to overestimate one's risk of breast cancer is consistent with findings from other age groups (e.g., Alexander, Ross, Sumner, Nease, & Littenberg, 1996; Black, Nease, & Tosteson, 1995; Smith, Gadd, et al., 1996). Moreover, despite the increased risk of breast cancer, colon cancer, and heart disease with increasing age (USBC, 1996b), older women did not believe they were at greater risk of these diseases; in fact, consistent with other reports,

Table 2
Study Means for Ratings of Perceived General Risk, Personal Risk, Control, and Preventability of Breast Cancer, Heart Disease, Lung Cancer, and Colon Cancer

	Breast cancer		Heart disease		Lung cancer		Colon cancer			
Domain	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*df*	*F*
General risk	3.41	0.91_a	3.61	0.87_b	2.72	0.85_c	2.64	0.82_c	3, 555	87.58*
Personal risk	2.38	1.11_a	2.94	1.20_b	1.84	0.94_c	2.32	0.98_a	3, 537	50.87*
Control	3.38	1.31_a	4.03	1.08_b	2.91	1.27_c	3.09	$1.07_{a,c}$	3, 552	46.97*
Preventability	2.31	1.26_a	3.70	1.04_b	3.63	1.24_b	3.13	1.06_c	3, 549	72.87*

Note. Means in the same row that do not share subscripts differ at $p < .01$ (paired t tests). Possible range for each domain is 1–5.
*$p < .001$.

older women believed they were at less risk of breast cancer than middle-aged women (e.g., Breslow et al., 1997; Harris et al., 1991). Although women were more accurate in their perceived relative personal risk, relative general risk, and relative preventability of four major diseases, they may have underestimated their ability to control the course of breast and colon cancer. As found in the unrealistic optimism literature (e.g., Weinstein, 1987, 1989), women consistently reported their risk of developing diseases to be lower than their peers. Finally, women underestimated their absolute personal risk of developing heart disease.

Although evidence examining the link between knowledge and behavior change has produced mixed findings, there is increasing evidence that feeling at greater risk for a disease may relate to an increase in preventive health behaviors. For example, research in mammogram utilization has shown that women who feel more vulnerable to breast cancer and women who are worried about breast cancer are more likely to have regular mammograms than are women with lower perceived vulnerability and worry (see review by McCaul, Branstetter, Schroeder, & Glasgow, 1996).

Our results that older women underestimated the lethality of CHD and did not perceive themselves to be at greater risk for diseases compared with middle-aged women may be related, in part, to lower rates of screening and preventive health behaviors; for example, (a) rates of obtaining mammograms decrease with increasing age (e.g., Bastani, Marcus, & Hollatz-Brown, 1991; Burns et al., 1996; Fullerton, Kritz-Silverstein, Sadler, & Barrett-Connor, 1996; King et al., 1993); (b) a large percentage of older Americans are unfamiliar with colon cancer screening techniques (USDHHS, 1997a); and (c) rates of physical activity, a health behavior shown to decrease one's risk for CHD and colon cancer, decline with age, particularly for women (USDHHS, 1996). Accurate knowledge and perceived risk of CHD might impact whether women undergo regular cholesterol and blood pressure screening and whether women engage in health behaviors such as increasing leisure-time physical activity, improving diet, and engaging in regular stress management techniques. In a similar way, greater knowledge of colon cancer risk could increase the likelihood of undergoing regular screenings for colorectal cancer, a practice that many Americans do not undertake or understand (USDHHS, 1997a). Accurate knowledge and perceived risk of disease are probably necessary but not sufficient prerequisites for behavior change, making the need for multiple-stage behavior change interventions increasingly important.

In addition to understanding one's risk of disease, understanding the importance of early detection is critical (USDHHS, 1997a, 1997b). Women in our study underestimated the potential to control the course of breast and colon cancer. Although speculative, it is also possible that experiencing greater personal risk of developing a disease might impact more immediate health care decisions. For example, women who experience symptoms of a myocardial infarction are less likely than their male counterparts to seek emergency treatment and are more likely than men to die within a year of their myocardial infarction (American Heart Association, 1997; Legato et al., 1997). It is possible that if older women were more aware of their risk of CHD and were more knowledgeable about symptoms of a myocardial infarction and angina, they might seek treatment sooner. This potential relationship merits further study.

Our ability to generalize the results of this study is limited by the overrepresentation of well-educated, healthy (i.e., low rates of smoking and relatively high rates of physical activity participation), and White participants. Because of our small sample sizes within different ethnic groups, we combined non-White groups together, even though these different ethnic groups have very different chronic disease risk profiles. Examining ethnic differences in risk perceptions would be an important line of study. In addition, our sample was geographically homogenous (i.e., the San Francisco Bay area) and we had a relatively low response rate (i.e., 52% for surveys returned by mail, and probably lower overall). The fact that we found significant biases in a fairly well-educated sample, however, suggests that knowledge in the larger, more diverse population may be particularly poor and in need of intervention. We were not able to ascertain, however, whether a less educated, less healthy, and more diverse sample would have the same sorts of biases, thus limiting our ability to generalize these findings. Finally, we were not able to measure all risk factors for each disease. We chose not to measure dietary habits because of the difficulty in assessing diet in a relatively brief survey; however, this exclusion is limiting, given that diet is related to heart disease, breast cancer, and colon cancer.

These limitations notwithstanding, our results have potential practical implications for health behaviors and health care in older aged women. Women are faced with difficult and often confusing health care decisions to make in later life, and the results of our study suggest that many women may lack important knowledge necessary for making well-informed choices.

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