



Perceived Cardiac Risk among Older, High-Risk Black and White Women

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ABSTRACT

Disparities in coronary heart disease (CHD) outcomes in the American healthcare system continue today, especially among older women, those with low socio-economic status, residents of rural areas, and minorities. Purposes of this cross-sectional, descriptive study were to determine: 1) the risk perceptions of older “high-risk” Black and White women, 2) the relationship of risk perceptions to personal CHD risk factors, and 3) racial differences in risk perceptions. Equal numbers of older, high-risk, Black and White women (N=96) underestimated risks for CHD with a perceived risk score of 53.94 (0-100mm scale), although beliefs were racially similar. Negligible correlation $r = 0.11$ existed between risk perceptions and the number of risk factors the women possessed. We conclude that older, high-risk women have inaccurate and unrealistic perceptions of personal CHD risk and that they may benefit from tailored health promotion interventions that alter risk.

Keywords: Gerontology, Coronary Disease, Minority groups

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Older individuals, especially women, experience a disproportionate share of poor outcomes with coronary heart disease (CHD). Over 83% of CHD deaths in the United States occur with myocardial infarction (MI) and in individuals 65 and older.¹ More women than men die each year and they have more than double the amount of disability after experiencing an MI.¹ Disparities in CHD outcomes between African American/Black and White adults also pervade the American health care system, especially in subpopulations of women such as the elderly,

those with low incomes and educations, and residents of rural areas.² For example, Black women are reported to have up to a 59% higher CHD death rate than White women^{3,4} and less often receive cardiac care as recommended by treatment guidelines.⁴ For many older women who possess several of these disparate characteristics concurrently, it is not surprising that more death and disability occurs among older women when compared to other populations groups.

The Agency for Healthcare Research and Quality defines health *disparity* as inequality of health care or differences among populations. According to the Institute of Medicine's report on sex-based differences in health, gender disparities are not fully understood, but research indicates that both biological and behavioral factors contribute.⁵ Differences in the anatomy and physiology of the cardiovascular system, such as differences in coronary artery size, endothelial cell function, lipid deposition, and platelet activity account for some of the disparities in CHD outcomes.⁵ However, researchers suggest that there are also behavioral contributions to disparities for women with CHD.² For instance, Black women have more CHD risk factors related to lifestyle than White women, such as higher rates of physical inactivity, hypertension, obesity, and diabetes.¹ More women than men in America do not realize that CHD is their number one killer and they have a poor understanding of personal risk factors and how they relate to the development of CHD and MI.⁶⁻⁸ Gender⁹ may play a central role in risk perceptions, as many women continue to believe CHD is a "man's disease".

In 2006, the National Heart, Lung, and Blood Institute reported that American women displayed a "personal disconnect", or a failure to make the connection between CHD risk factors and personal risk for heart attack.¹⁰ This is unfortunate because perceived personal risk is reported to be a powerful predictor of preventive health behaviors.¹¹⁻¹⁴ According to the Health Belief Model, if an individual believes their risk for a condition is high, they are more likely to change their health behaviors to reduce their risk.¹¹ The Health Belief Model stipulates that the probability for adopting health-promoting behavior increases if one appreciates one's risk and if one perceives that the benefits to health action exceeds the disadvantages through an informal cost/benefit analysis (see Figure 1). Consequently, perceptions of personal risk to CHD and MI may be important indicators for appropriate heart-health behavior and lifestyle. Because perceiving risk involves social, cultural, cognitive, motivational^{15,16} and emotional factors,¹⁷ it is a multifaceted and complex process.

Yet, we know very little about CHD risk perceptions of populations such as older Black and White women—those women most likely to have a CHD event. We hypothesized that personal risk perceptions may be different between older Black and White women, thus contributing to disparities in women's heart disease outcomes. Therefore, this study examined: 1) the risk perceptions of older "high-risk" Black and White women, 2) the relationship of risk perceptions to personal CHD risk factors, and 3) racial differences in risk perceptions.

Coronary Heart Disease Risk

A collaborative team of medical researchers and clinicians from expert panels and health organizations developed the *Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women*.¹⁸ The *Guidelines* recommend calculating the probability of a woman having a coronary event (acute coronary syndrome or revascularization) within the next 10 years by using the Framingham risk score method. The Framingham method requires physiologic measures and self-report measures entered into a formula for calculation.¹⁹ The physiologic measures include an average of two fasting blood lipoprotein analyses including low-density lipoprotein (LDL) and high-density lipoprotein (HDL), and an average of two measures of systolic blood pressure. The self-reported measures include age, smoking status, diabetes mellitus, and currently taking a medication for hypertension. Those with diagnosed diabetes mellitus, cardiovascular disease, symptomatic carotid artery disease, end-stage renal disease or peripheral vascular disease are automatically designated high-risk and are not scored further. High risk confers an absolute risk of a greater than 20% chance of having a coronary event in the next ten years. Women with multiple risk factors are typically considered high-risk because major CHD risk factors are additive in predictive power.¹⁸⁻²⁰

Coronary heart disease is amenable to prevention. Modifying unhealthy levels of risk factors is the major intervention recommended by the *Guidelines* for the prevention of CHD¹⁸ and is an effective strategy for reducing primary and secondary CHD events in all population groups.²¹ The risk factors amenable to change are cigarette smoking, hypertension, diabetes mellitus, hyperlipidemia, physical inactivity, obesity, and metabolic syndrome.¹ Risk rises as the number of modifiable risk factors increase, especially when combined with the nonmodifiable risk factors of older-age, Black or Hispanic race, and/or family history of CHD. Consequently, understanding older women's risk perceptions for CHD is the first step in developing health promotion interventions that may alter women's risk.

Method

This study was a cross-sectional and descriptive analysis of perceptions of risk for MI or "heart attack" among older, Black and White southern women. This study was part of an intervention study evaluating the effectiveness of a tailored intervention to increase older women's knowledge of heart disease risks and symptoms.^{22,23} The investigator obtained Institutional Review Board approval prior to initiating the study.

Participants and Setting

The investigator purposefully recruited 96 older women (age > 60 years) from seven churches in central Arkansas. Volunteers were recruited at church facilities

using several methods recommended by Pastors or key personnel from the churches: posting notices in church meeting rooms, visiting senior groups inviting women to participate, advertising in weekly church bulletins, and staffing information tables after church services. Volunteer participants were first screened for English language, African American/Black or White race, if living in a community setting (vs. nursing home), with self-reported medical histories of hypertension and/or diabetes mellitus. The investigator chose these criteria to include only women whom experts consider at high risk for CHD due to the presence of multiple major risk factors. We excluded women with self-reported histories of a previous cardiac event (heart attack, heart surgery, or angioplasty/stent placement) because we expected they would be aware of their high-risk status.

Measures

The investigator used two self-report instruments for this study: a demographic data/risk factor questionnaire, and a perceived CHD risk assessment tool. The demographic data questionnaire identified age, race, educational level, household income, and current medical conditions (arthritis, cancer, lung, kidney, or heart disease). The risk factor subsection asked women if they had “been told by a doctor” that they had hypertension, diabetes mellitus, or high cholesterol. Other lifestyle risk factor information was queried to complete the risk factor information: current tobacco use, physical activity (“I exercise at least 3 times a week”), height and weight, diet (“I follow a heart-healthy diet”), age, and family history of CHD. Women were given instructions to complete the questionnaires by the Principal Investigator or Research Assistant who were available for questions or assistance with the questionnaires.

The demographic/risk factor questionnaire was used to determine a *Risk Indication score* for each participant by scoring 1 or 0 for each CHD risk factor reported present or not present and summing the total. We used the Risk Indication score as a proxy measure for Framingham Risk scoring since we did not draw and analyze blood chemistries at the church settings. Other researchers have also used this method to reflect actual CHD risk.²⁴ The Risk Indication score was based on a self-reported personal history of hypertension (1 yes, 0 no), diabetes, high cholesterol, current tobacco use, and family history of CHD. Current physical inactivity, body mass index indicating obesity (BMI >30), lack of a heart healthy diet, family income less than \$30,000 annually, age greater than 65 years, education level less than high school graduate, and not having a cholesterol level check in the last 5 years were also scored as 1 for present and 0 for not present. We summed the risk factors to create the Risk Indication score in order to estimate CHD risk. The maximum score for a participant who possessed all the risk factors included was 12.

Risk perception was determined by asking women to score their response to the question: “*Compared to other women my age, I believe my risk of having a heart*

attack in the next 5 years is.” Multiple investigators have measured perceived risk using this question, with scoring on a Likert scale, or formatted for yes/no dichotomized scoring,^{6,25,26} but these investigators did not recruit older samples. In this study, we elected to use visual analogue scaling (VAS) for the response format because Castle and Engberg²⁷ concluded that elders preferred this format to all others tested. Participants marked a 100 mm horizontal line VAS corresponding to the degree of perceived risk they believe they possessed: 0= no perceived risk; 100= high risk. The investigator scored the instrument by measuring the distance in millimeters from the zero mark to the point where the participant’s mark intersected the VAS line. Because the risk perception instrument lacked reliability and validity data with older participants, we pilot tested the measure with 22 older, Black and White women (mean age 74.5). The women did not have difficulty understanding or marking the measure and we obtained a test/retest correlation of $r^2 = 0.82$ after a 2-week interval, indicating a good test-retest reliability.²²

Data Analysis

The investigator entered data from the risk perception and demographic questionnaires into the SPSS version 14.0 software program (Chicago, IL). Next, we reviewed the data for completeness and validity by running frequencies for outliers and incorrectly entered data. The investigator described the sample by using descriptive statistics. The investigator conducted Chi-square and *t*-test measures for independent groups, as appropriate, for racial differences in age groups, educational levels, BMI, income levels, comorbidities and the Risk Indication score per race. After screening the data to ensure that statistical assumptions were met, we performed group means of personal perceived risk and compared racial groups using independent *t*-tests. We conducted Spearman’s rho correlations and analysis of variance to determine if Risk Indication scores were correlated with perceived risk and if differences in perceived risk existed because of having multiple CHD risk factors and comorbidities. An alpha level of 0.05 was used for testing two-tailed significance.

Results

Sample Characteristics

The sample was composed of 96 women, with 50% Black and 50% White. Ages ranged from 60-86 years with no significant differences between the races ($p=0.11$); the mean age range was 71-74 years. Hypertension (97.4%), hyperlipidemia (46%), family history of CHD (41.8%) and diabetes mellitus (34.2%) were the most prevalent risk factors in this sample, other than age. Key sample characteristics by race are described in Table 1. Black women were more often current smokers, had higher BMIs, were less likely to follow a heart smart or low fat diet and had lower incomes and educational levels ($p<.05$). No significant racial differences were observed with presence of diabetes,

hypertension, hyperlipidemia, physical activity, personal or family history of heart disease, cancer, arthritis, or lung disease ($p>.05$).

Risk Perception Scores for Myocardial Infarction

Descriptive statistics revealed that the 96 women in this study had a mean perceived risk score of 53.94 (+ 27.64) measured on the VAS scale from 0-100 mm. The perceived risk scores varied greatly from 2 to 97. Forty-one percent (41.4%) thought their risk to be below the 50 mm mark on the VAS or below the median; 34% thought they were at some risk (51-79mm), and 25% believed their risk to be in high-risk range (80-100mm). Racial differences in perceptions of personal risk for MI were not statistically significant: the Black women had a mean perceived risk score of 50.3 mm, compared to the White women's mean of 57.6 ($t = -1.29$; $p = 0.20$). Cohen's d effect size was 0.22, indicating only a small effect related to race²⁸ (see Table 2).

Risk Perceptions Related to Risk Indication Scores

The range of Risk Indication scores (summed number of CHD risk factors) varied from 2 to 10 among the group with an overall mean of 5.44 (Refer to Table 2). The Black women had higher mean Risk Indication scores than the White women (6.08 vs. 4.79; $t=4.37$; $p<.001$). Spearman's correlation analysis revealed an $r=0.11$ ($p =0.29$), indicating that there was a negligible correlation between the women's Risk Indication score and their perceived risk for MI or heart attack. Further, to determine if differences existed in groups of women with few risk factors compared to multiple risk factors, the 96 scores were then collapsed into three groups using naturally occurring breaks in the data. Analysis of variance was conducted with Risk Indicator scores of 3 or less ($n=10$), 4-7 ($n=75$), and > 8 ($n=10$), to determine whether differences in perceived risk were related to personal presence of risk factors (or Risk Indication Score). Results indicated there was no significant differences in the three group's perceptions of their risks, ($F [2, 93] =.049$, $p =.952$).

Discussion

This study provides new information about older Black and White women, a subset of the population that has traditionally been "invisible" in research concerning cardiac disease.² The study investigated perceptions of heart attack risk among older, Black and White women and compared these values to definitions of risk using the *Prevention Guidelines*.¹⁸ A key finding is that the older, high-risk women in this study estimated their risk to be "average", at 53.94 (0-100mm). Thus, they believed their risk was no greater than that of any other women, showing a clear heart attack risk *underestimation*. This phenomenon is termed "optimistic bias" and is similar to that found in other studies samples of mostly White and younger individuals.^{6,14,25} One study that focused exclusively on urban Black women (N=128) found those with multiple risk factors also

perceived their risk to be low; however, these women were much younger with a mean age of 56.²⁴

Perceptions of personal risk for MI did not significantly differ between Black and White older women (50.3 vs. 57.6 mm, respectively) but there was a small racial effect, with lower risk perceptions among the Black women when Cohen's *d* was calculated. Similarly, Mosca and colleagues (2006) did not find significant racial/ethnic differences in whether women perceived themselves to be at risk for CHD. They reported that 33% of nonwhites (*n*=210 Blacks, *n*=171 Hispanics) and 29% of Whites did not perceive themselves at risk. However, the mean age of women in their national randomized telephone survey was much younger at 51.3 years. Since age is considered the most powerful risk factor for CHD,¹ it is rather troubling that this current study's sample of older *and high-risk* women were more likely to underestimate their risk than the younger (most likely lower risk) women in Mosca's sample. Additionally, because Black women have up to a 59% higher CHD death rate than White women,³ it is a major concern that older Black women in this study did not perceive their CHD risk to be greater than Whites. Baker et al.²⁹ reported that inadequate health literacy among older adults (*N*=3344) was associated with higher rates of cardiovascular death (controlling for demographics, socioeconomic status and baseline health) and that African American study participants (*n*=384) more often had inadequate health literacy when compared to White participants (*n*=2464; hazard ratios of 2.03 vs. 1.60). DeSalvo and colleagues²⁴ reported that Black, younger women also underestimated their CHD risk; and that perceived stress and low income predicted low perceptions of risk, but they did not measure health literacy. The AHA reports that women in the southeastern states of America are ranked highest in age-adjusted death rates for CHD; we suggest that inaccurate and low perceived risk for CHD as well as inadequate health literacy may contribute to this disparity.

We correlated our proxy measure for actual MI risk (Risk Indication score) for women to their perceived risk and found a negligible correlation. In essence, it appears that women "guessed" about their risk for heart disease. We further evaluated this negligible correlation with an ANOVA to determine if differences in perceived risk were related to the numbers of risk factors that groups of participants had (risk indication score), but we found no differences between groups. Thus, there were no differences in the risk perceptions of women who had 3 risk factors and those who had up to 12, similar to findings from others.²⁴ It was also surprising to find that scores did not fall into any discernable pattern of association and demonstrated a wide range. These results indicate a consistent lack of knowledge or understanding about the relationship of major CHD risk factors to the development of CHD or MI among this sample of older women. Other research has come to similar conclusions with younger samples of women and men.^{6,8,15,24,30-33}

Applying these findings to the HBM's conceptual framework, the women in this study did not perceive themselves at high-risk for CHD, consequently they are not likely to change their health behaviors to reduce their risk without other interventions.¹¹ Despite having multiple risk factors for CHD and MI, women in this study did not perceive themselves at CHD high-risk. Other researchers have found that individuals with more risk factors perceive themselves at higher CHD risk,^{26,34,35} but others have reported inconsistent associations between actual and perceived risks.^{7,25,31,36-39} The current study is consistent with Mosca et al.'s (2006) recent national randomized study indicating that knowledge of CHD risk and risk factors is poorest among older and minority women. They concluded—and we concur, that there is a continuing discrepancy between perceived risk and actual CHD risk and women are confused about how to prevent heart disease.

Study Limitations

This was a descriptive, cross-sectional, non-probability sample using self-reported information, which is prone to bias. Additionally, all participants were recruited using faith-based methods, contributing to selection bias since non-churchgoers did not participate. Other factors may influence CHD risk perceptions (health literacy, knowledge, self-efficacy) but were not measured in this study. Further, the risk definitions used in the study were not actual biophysical measures of CHD risk and some women in the study may have fallen in the *at-risk* instead of the *high-risk* category.¹⁸ However, the mean Risk Indication score for this sample of women was 5.44 (range 2-10), which corresponds to a high-risk designation.

Clinical Implications

Understanding beliefs about perceived risk among older women is an important first step in the development of healthcare interventions to prevent disparities in death and disability from heart disease. The results of this descriptive study of older, high-risk Black and White women, are consistent with the AHA and the National Heart, Lung, and Blood Institute's conclusions that "personal disconnect" is common among women who mistakenly believe that they are not personally at risk for CHD. Although evidence-based, scientific methods are available with which to measure women's CHD risk, only a small percentage of women know their risks or have their risks measured.⁴⁰ This is very important since prevention or modification of CHD risk factors, early detection, and early treatment of CHD are the only way to reduce disparities in morbidity and mortality among older women. These patients if left unaided will most probably not take the necessary steps to protect their hearts through preventive measures because of lack of understanding of CHD risk factors and their relationship to the development of CHD and MI. In order to facilitate positive behavior and lifestyle changes, nurses can increase older women's accuracy of CHD risk perceptions

by developing and tailoring educational health interventions that are sensitive to their health literacy, culture, and beliefs.

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Figure 1

The Perceived Risk Variable Associated with Health Behavior Change (adapted from the Health Belief Model 9)

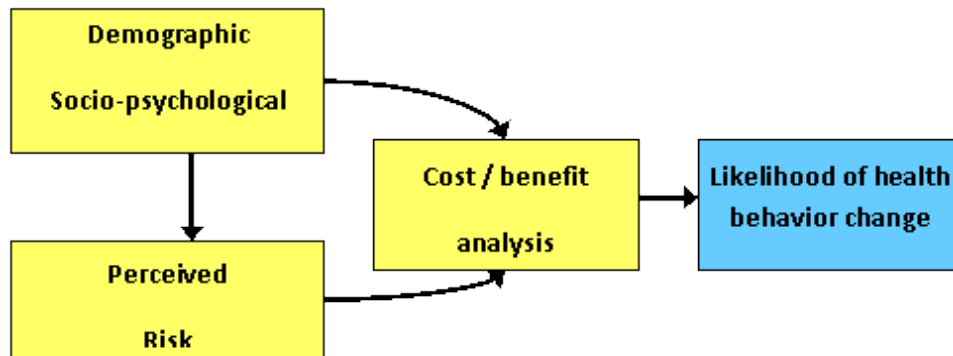


Table 1

Key Sample Characteristics and Racial Comparisons

Variable N(%)	Study Sample N=96	Black Women n=48 (50)	White Women n=48 (50)	P value
Education Level*				0.03
< High School Graduate	18 (18.8)	14 (14.6)	4 (4.2)	
High School Graduate	24 (25)	13 (13.5)	11 (11.5)	
Some College	30 (31.3)	13 (13.5)	17 (17.7)	

College Graduate	24 (25)	8 (8.3)	16 (16.7)	
Income (annual family)*				<.001
<\$29,999	56 (58.3)	37 (38.5)	19 (19.8)	
>\$30,000	31 (32.3)	9 (9.4)	22 (22.9)	
Refused	9 (9.4)	2 (2.1)	7 (7.3)	
Current Tobacco Use*	4 (4.2)	4 (4.2)	0	0.04
Diabetes	32 (33.3)	20 (21)	12 (12.5)	0.08
Heart Smart Diet*	37 (38.5)	10 (10.4)	27 (28.1)	<.001
Non-Exercisers*	43 (44.8)	26 (27.1)	17 (17.7)	0.06
BMI * M(SD)	29.5 (6.9)	32.2 (7.4)	26.7 (5.1)	< .001

*Significant racial difference ($p < 0.05$); M= Mean; SD= Standard Deviation;

Table 2

Racial Comparisons of Personal CHD Risk Perception and Risk Indication Scores

Variable Mean(SD)	Study Sample N=96	Black Women n=48 (50)	White Women n=48 (50)	P value
Personal Risk Perception Scores (0-100 mm Scale)	53.9 (27.6)	50.3 (27.8)	57.6 (27.3)	0.82
Risk Indication Score*	5.44(1.58)	6.08(1.6)	4.79 (1.2)	<.001

*Significant racial difference ($p < 0.05$); SD= Standard Deviation; mm= millimeter