

Racial/Ethnic and Age Differences in Women's Awareness of Heart Disease

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Abstract

Background: The purpose of this study was to examine differences in awareness of heart disease among women according to race/ethnicity by age group, adjusted for confounders.

Methods: American Heart Association (AHA) National Surveys conducted in 2006 ($n=1005$) and 2009 ($n=1142$) were pooled using common variables ($n=2147$) and reweighted to reflect the 2010 United States Census. Surveys comprised standardized, interviewer-assisted demographic and awareness questions. Associations between racial/ethnic group and heart disease awareness stratified by age were assessed by weighted chi-square statistics; logistic regression was used for multivariable adjustment.

Results: Black and Hispanic women were 66% less likely than white women to be aware that heart disease is the leading cause of death in women (odds ratio [OR] 0.34, 95% confidence interval [CI] 0.23–0.50) after multivariable adjustment for significant confounders. The percent aware among white women was 65%; awareness did not differ between black and Hispanic women (37% vs. 38%). Other significant multivariable predictors included <high school education (OR 0.37, 95% CI 0.22–0.62) and income <\$35,000/year (OR 0.56, 95% CI 0.41–0.77). Younger women (age <55 years) were less likely to be aware that heart disease is the leading cause of death in women (OR 0.66, 95% CI 0.50–0.87) and were less likely to report being very well/well informed about heart disease (OR 0.53, 95% CI 0.41–0.68) compared to older women (age ≥ 55 years). Awareness of heart attack signs, such as shortness of breath (34%), nausea (15%), and fatigue (7%), was low among all women.

Conclusions: Racial/ethnic minority status and age <55 years were significant risk factors for lower heart disease awareness among women, suggesting these groups should be targeted for educational programs. Awareness of heart attack signs was low among all subgroups of women.

Introduction

THE DEATH RATE FOR CARDIOVASCULAR DISEASES (CVD) has declined by almost 30% over the past decade, yet coronary heart disease (CHD) remains the single leading killer in women, and black women have a significantly increased risk compared to whites.¹ Trends in overall awareness about heart disease in women have paralleled reductions in mortality, but racial and ethnic differences in awareness have been difficult to assess because of small numbers in racial/ethnic subgroups in national data samples, especially according to age strata.^{2–6} Racial/ethnic disparities in awareness are important to understand because of the higher CVD death rate and increased prevalence of risk factors among certain racial/ethnic groups, such as hypertension in black women or diabetes mellitus among Hispanic women.⁷ Moreover, because prior data have shown age is an impor-

tant predictor of awareness, conclusions about racial/ethnic differences should take differences in age distribution between populations into account. To address this, we pooled data from the most recently conducted American Heart Association (AHA) National Women's Surveys to further examine differences in heart disease awareness according to race/ethnicity by age group.

Materials and Methods

Design and participants

AHA National Women's Survey data from 2006 ($n=1005$) and 2009 ($n=1142$) were pooled using common variables and definitions. Surveys were conducted by random digit dialing in English-speaking women aged ≥ 25 years by trained interviewers from a professional market research company (Harris Interactive, New York, NY).^{5,6} Pooled survey data were

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reweighted to reflect the 2010 United States Census for age, race/ethnicity, region, household income, and number of female adults in the household.

Measures

Surveys comprised standardized, interviewer-assisted questions about demographic information, including age, education level, marital status, annual household income, and racial/ethnic group. Racial/ethnic group was determined by asking participants to categorize themselves as either (1) African American, (2) Asian or Pacific Islander, (3) black, (4) Hispanic, (5) mixed racial/ethnic background, (6) Native American or Alaskan Native, (7) other race, or (8) white.

Participants were asked open-ended questions about their awareness of heart disease, including: As far as you know, what is the leading cause of death for all women? Participants were also asked closed-ended questions, including: How informed are you about heart disease in women? Would you say you are very well informed, well informed, moderately informed, or not at all informed? and Have any of your doctors ever discussed heart disease with you when discussing your health? Women were queried about the warning signs of heart attack (multiple responses allowed) and the action they would take first if they thought that they (2009) or someone they knew (2006) was having a heart attack using open-ended questions.

Statistical analysis

Frequencies and associations between racial/ethnic group and heart disease awareness overall and stratified by age category (<55 years vs. ≥55 years) were estimated using the SAS PROC SURVEYFREQ procedure (SAS statistical software, version 9.2), which provides weighted cross-tabulation tables and Rao-Scott chi-square test statistics.⁸ Participants who self-categorized as white or Hispanic were categorized in those respective categories in the analysis. Participants who self-categorized as black or African American were categorized as black in the analysis; those who self-categorized as Asian or Pacific Islander, mixed racial/ethnic background, Native American or Alaskan Native, or other race were classified as other in the analysis.

A Bonferroni correction was applied to set statistical significance for multiple comparisons between racial/ethnic groups (white vs. black vs. Hispanic vs. other, $p < 0.0083$). Multivariable logistic regression models were fit using the SAS PROC SURVEYLOGISTIC procedure to simultaneously adjust for racial/ethnic group, age group, education level, marital status, and annual household income level.^{8,9} Tests for interaction between participant racial/ethnic group or age group and survey year were conducted by including these variables and their cross-product terms in multivariable logistic regression models.

Results

Characteristics of participants in the pooled analysis are presented in Table 1. Overall, 57% of participants were <55 years old, and one third (34%) reported income <\$35,000/year. Black and Hispanic participants were younger, were less likely to be married/with partner, and had lower household income levels compared to white participants.

TABLE 1. CHARACTERISTICS OF PARTICIPANTS IN POOLED AMERICAN HEART ASSOCIATION NATIONAL WOMEN'S SURVEYS ($n = 2147$)

| Characteristic | White ^a | Black ^b | Hispanic ^c | Other ^d |
|-------------------------|---------------------|---------------------|-----------------------|--------------------|
| | ($n = 1358$) % | ($n = 253$) % | ($n = 325$) % | ($n = 211$) % |
| Age group <55 years | 52 ^{b,c} | 65 ^a | 73 ^a | 61 ^{***} |
| Education < high school | 6 ^c | 10 | 12 ^a | 8 |
| Unmarried/no partner | 29 ^{b,c} | 59 ^{a,c,d} | 44 ^{a,b} | 40 ^{b,*} |
| Income <\$35,000/year | 30 ^{b,**} | 45 ^a | 39 [*] | 39 |
| History of heart attack | 5 ^{**} | 5 | 2 [*] | 4 |
| History of stroke | 5 | 5 | 5 | 5 |
| Diabetes mellitus | 12 ^c | 15 | 20 ^{a,d} | 8 ^{c,**} |

All values are weighted percentages.

Superscript letters a,b,c and d denote statistically significant differences ($p < 0.0083$ with Bonferroni correction) between racial/ethnic group column percentages labeled with the corresponding letter.

* $p < 0.05$ for difference compared to white women.

** $p < 0.05$ for difference compared to black women.

*** $p < 0.05$ for difference compared to Hispanic women.

When asked what they thought is the leading cause of death in women, black and Hispanic women were less likely than white women to be aware that it is heart disease in each age stratum (Table 2). Awareness that heart disease is the leading cause of death in women did not differ between black and Hispanic women (37% vs. 38%, $p = 0.86$). Racial/ethnic minority status remained a significant predictor of lower awareness that heart disease is the leading cause of death after adjustment for confounders (Table 3). Younger age, lower education level, and lower income were each significantly associated with lower awareness that heart disease is the leading cause of death in women (Table 3). Tests for interaction between survey year and racial/ethnic group (odds ratio [OR]_{RaceGroup*SurveyYear} 1.21, 95% confidence interval [CI] 0.91–1.61) and survey year and age group (OR_{AgeGroup*SurveyYear} 1.28, 95% CI 0.76–2.18) on awareness of heart disease as the leading cause of death in women were not significant. Hispanic women were less likely than white women to perceive themselves as being very well or well informed about heart disease in women, independent of age group, education level, marital status, and income level (Table 3).

Age <55 years old vs. age ≥55 years were significant predictors of lower awareness of heart disease as the leading cause of death in women and of perceiving oneself to be less informed about heart disease in women, after adjustment for race/ethnicity, education, marital status, and income level (Table 3). Multivariable analysis also showed that women <55 years of age and married women were less likely than older women (≥55 years) and women who were unmarried or had no partner to report that their doctor discussed heart disease with them (Table 3).

When queried about warning signs they associate with having a heart attack, few women cited atypical heart attack signs, such as fatigue (7%), nausea (15%), and shortness of breath (34%), compared to chest pain (60%). Racial/ethnic

TABLE 2. WOMEN'S AWARENESS OF HEART DISEASE BY RACE/ETHNICITY STRATIFIED BY AGE GROUP

| | White ^a (n = 1358) | | | Black ^b (n = 253) | | | Hispanic ^c (n = 325) | | | Other ^d (n = 211) | | |
|---|----------------------------------|----------------------------|---------|---------------------------------|----------------------------|---------|------------------------------------|---------------------------|---------|---------------------------------|---------------------------|---------|
| | Age < 55 years (n = 586) % | Age ≥ 55 years (n = 764) % | p value | Age < 55 years (n = 141) % | Age ≥ 55 years (n = 112) % | p value | Age < 55 years (n = 231) % | Age ≥ 55 years (n = 93) % | p value | Age < 55 years (n = 130) % | Age ≥ 55 years (n = 80) % | p value |
| Aware heart disease/heart attack is LCOD in women | 64 ^{b,c,d} | 66 ^{b,c,d} | 0.51 | 35 ^a | 42 ^a | 0.35 | 38 ^a | 39 ^a | 0.89 | 28 ^a | 47 ^a | 0.01 |
| Very well or well informed about heart disease in women | 41 ^{***} | 58 | <0.0001 | 42 ^{***} | 55 | 0.11 | 29 ^{***} | 55 | 0.001 | 34 | 48 | 0.11 |
| Doctor discussed heart disease | 40 | 61 ^{***} | <0.0001 | 43 | 74 ^{c,d,*} | <0.0001 | 38 | 45 ^{b,*} | 0.39 | 41 | 48 ^b | 0.46 |
| What signs do you associate with having a heart attack? | | | | | | | | | | | | |
| Chest pain | 62 | 62 ^c | 0.63 | 59 | 55 | 0.63 | 57 | 43 ^a | 0.07 | 59 | 64 ^{**} | 0.97 |
| Fatigue | 7 | 8 ^{**} | 0.90 | 5 | 5 [*] | 0.66 | 5 | 5 | 0.96 | 8 | 18 ^{*****} | 0.16 |
| Nausea | 17 | 18 | 0.55 | 11 | 8 | 0.64 | 11 | 12 | 0.60 | 14 | 15 | 0.58 |
| Pain that spreads to shoulders/neck/arms | 63 ^{b,c,d} | 62 ^{***} | 0.17 | 44 ^a | 52 | 0.61 | 48 ^a | 48 [*] | 0.69 | 35 ^{a,***} | 50 | 0.16 |
| Shortness of breath | 37 | 32 | 0.006 | 31 | 37 | 0.54 | 29 | 30 | 0.88 | 40 | 32 | 0.09 |
| Tightness of chest | 18 ^{**} | 17 ^c | 0.25 | 9 [*] | 10 | 0.70 | 14 | 6 ^a | 0.16 | 12 | 13 | 0.94 |
| What is the first thing you would do if you thought you/ someone you knew was having signs of a heart attack? | | | | | | | | | | | | |
| Call 911 | 70 ^{***} | 59 | <0.0001 | 64 ^{***} | 70 | 0.31 | 79 ^{***} | 61 | <0.0001 | 66 ^{***} | 54 | 0.19 |

n = 10 participants missing age data omitted from this analysis.

p values denote differences between age groups within each race/ethnic stratum.

Superscript letters a,b,c and d denote statistically significant differences (p < 0.0083 with Bonferroni correction) between race/ethnic group column percentages labeled with the corresponding letter.

*p < 0.05 for difference compared to white women within the same age group.

**p < 0.05 for difference compared to black women within the same age group.

***p < 0.05 for difference compared to Hispanic women within the same age group.

LCOD, leading cause of death.

TABLE 3. MULTIVARIATE ANALYSIS OF WOMEN'S AWARENESS OF HEART DISEASE

| | <i>Aware heart disease is LCOD in women OR (95%CI)</i> | <i>Very well or well informed about heart disease in women OR (95%CI)</i> | <i>Doctor discussed heart disease OR (95%CI)</i> | <i>Would call 911 first OR (95%CI)</i> |
|-------------------------|--|---|--|--|
| Racial/ethnic group | | | | |
| Black | 0.34 (0.23–0.50) | 0.95 (0.65–1.39) | 1.31 (0.90–1.92) | 0.95 (0.64–1.41) |
| Hispanic | 0.34 (0.23–0.50) | 0.66 (0.45–0.96) | 0.74 (0.51–1.08) | 1.44 (0.97–2.15) |
| Other minority | 0.35 (0.22–0.54) | 0.76 (0.48–1.20) | 0.71 (0.44–1.15) | 0.84 (0.53–1.32) |
| Age < 55 years | 0.66 (0.50–0.87) | 0.53 (0.41–0.68) | 0.43 (0.33–0.56) | 1.38 (1.06–1.80) |
| Education < high school | 0.37 (0.22–0.62) | 1.11 (0.67–1.82) | 0.89 (0.53–1.50) | 1.11 (0.67–1.83) |
| Unmarried/no partner | 1.13 (0.84–1.53) | 1.25 (0.94–1.65) | 1.36 (1.02–1.82) | 1.26 (0.94–1.69) |
| Income < \$35,000/year | 0.56 (0.41–0.77) | 0.81 (0.60–1.08) | 0.90 (0.66–1.21) | 0.71 (0.53–0.96) |

Reference groups: white race/ethnic group, age ≥ 55 years, education \geq high school, married/living with partner, and income \geq \$35,000/year.

CI, confidence interval; OR, odds ratio.

minority women were less likely to cite heart attack signs compared to white women, including pain that spreads to the shoulders, neck, and arms and fatigue (Table 2). No significant differences in knowledge of heart attack signs were observed by age group, except older white women were less likely than younger white women to identify shortness of breath as a sign (Table 2).

When asked for the first thing they would do if they thought they or someone else was having a heart attack, older women were less likely than their younger counterparts to state that they would call 911. Race group was not a significant predictor of citing one would call 911 first; women with lower annual household incomes had lower odds of stating they would call 911 first compared to women with higher annual household incomes (Table 3).

Discussion

This pooled analysis of data from two AHA National Surveys documented lower awareness of heart disease as the leading cause of death in black and Hispanic women vs. white women even after adjustment for significant confounders. The racial/ethnic disparity in awareness was observed for both younger and older age groups. Women < age 55 years were less likely to be aware that heart disease is the leading cause of death in women and were less likely to report being very well or well informed about heart disease in women or to state that their doctor discussed heart disease with them than were women aged ≥ 55 years. Overall knowledge of heart attack signs was low among all women.

Despite increases in awareness of heart disease in women over the past decade, AHA National Survey research data have suggested that awareness that heart disease is the leading cause of death in women did not increase significantly between 2006 and 2009 (57% and 54%, respectively).⁶ Similarly, data from the 2009 National Heart, Lung and Blood Institute (NHLBI) Heart Truth campaign showed that approximately 6 of 10 women surveyed mention heart disease as their leading cause of death.¹⁰ Data from our pooled analysis show that disparity in awareness of heart disease as the leading cause of death in women persists in racial/ethnic minority women vs. white women, independent of such confounding factors as education level and income level. Our study also showed that Hispanic women perceived them-

selves to be least informed about heart disease. This is consistent with data from a 2007 study commissioned by the Society for Women's Health Research in a random sampling of U.S. women that showed Hispanic women had lower general cardiac knowledge compared to white women.¹¹ This finding is also consistent with research conducted in 2008 in a racially/ethnically diverse sample of college students that showed that Hispanic women aged 18–34 years were less aware than white students the same age that heart disease is the leading cause of death in women.¹² These results suggest that efforts to increase heart disease awareness in racial/ethnic minority women may be key to ending the plateau of heart disease risk awareness that has been noted in recent survey cycles.

Our results also showed that younger women were less aware that heart disease is the leading cause of death in women and were less likely to state that they were very well or well informed about heart disease compared to older women. The data also indicated that younger age was associated with lower odds of one's doctor talking about heart disease, independent of racial/ethnic group. Although this may be attributable to lower heart attack risk in younger women, it suggests that another key to reducing the morbidity and mortality from heart disease, a disease that develops over years and decades, may be to increase education targeted to younger women.

Awareness of atypical heart attack signs, such as fatigue, nausea, and shortness of breath, was low among all women surveyed. This may be an important finding in light of recent evidence that younger women admitted to the hospital with a heart attack were more likely to have atypical symptoms and had greater in-hospital mortality compared to men of the same age.¹³ Furthermore, recent statistics show that the CHD mortality rate among women aged 35–44 years has been increasing on average by 1.3% annually.^{14,15} This underscores the need to educate women about heart attack risk and signs and, in particular, to raise awareness of the spectrum of signs of a heart attack among younger women. In our study, younger women were more likely than older women to report that they would call 911 first if they thought that they or someone they knew was experiencing signs of a heart attack, suggesting that an increase in awareness of heart attack signs could promote earlier intervention.

Ongoing national public awareness campaigns, including AHA's Go Red For Women, NHLBI's Heart Truth, and the

U.S. Department of Health and Human Services Office on Women's Health's Make the Call. Don't Miss a Beat, are aimed at increasing awareness about heart disease and heart attack signs in all women, as well as to extend messages to racial/ethnic minorities.^{16–18} The impact of these programs and others on national levels of women's heart disease awareness and knowledge of heart attack signs, especially among the less informed subgroups described in this article, will be an important outcome to measure in future research.

This study was conducted in a pooled sample of cross-sectional data collected from English-speaking telephone survey respondents; therefore, results may not generalizable to all women, including non-English speakers or women who live in a household without a telephone. Significant findings may be due to chance; however, statistical adjustment for multiple comparisons makes this less likely.

Conclusions

Awareness that heart disease is the leading cause of death in women was lower in racial/ethnic minority women compared to whites and in younger women compared to older women. These data suggest that heart disease education targeted to racial/ethnic minority and younger women to increase awareness is needed. Increased knowledge about the spectrum of signs of a heart attack should be emphasized to women.

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