

# Racial/Ethnic Differences in Cardiovascular Risk Factors Among Women Veterans

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**BACKGROUND:** Heart disease is the leading cause of death for women in the United States, accounting for 24.5 % of all deaths among women. Earlier research has demonstrated racial/ethnic differences in prevalence of cardiovascular (CVD) risk factors.

**OBJECTIVE:** To empirically examine the prevalence of CVD risk factors among a national sample of women Veterans by race/ethnicity, providing the first portrait of women Veterans' cardiovascular care needs.

**DESIGN AND PARTICIPANTS:** Cross-sectional, national population-based telephone survey of 3,611 women Veterans.

**MEASUREMENTS:** Women Veterans were queried about presence of diabetes, hypertension, obesity, tobacco use and physical activity. Four racial/ethnic categories were created: Hispanic, Non-Hispanic White (White), Non-Hispanic Black (Black), and Other. Logistic regressions were conducted for each risk factor to test for racial/ethnic differences, controlling for age (under 40 vs. 40 and over).

**KEY RESULTS:** Racial/ethnic differences in CVD risk factors persisted after adjusting for age. Black women Veterans were more likely to report a diagnosis of diabetes (OR: 2.58, 95 % CI: 1.07, 6.21) or hypertension (OR: 2.31, 95 % CI: 1.10, 4.83) and be obese (OR: 2.06, 95 % CI: 1.05, 3.91) than White women Veterans. Hispanic women Veterans were more likely than White women Veterans to report diabetes (OR: 4.20, 95 % CI: 1.15, 15.39) and daily smoking (OR: 3.38, 95 % CI: 1.01, 11.30), but less likely to report a hypertension diagnosis (OR 0.21, 95% CI: 0.07, 0.64) or to be obese (OR: 0.39, 95 % CI: 0.18, 0.81).

**CONCLUSIONS:** Among women Veterans, CVD risks vary by race/ethnicity. Black women Veterans consistently face higher CVD risk compared to White women Veterans, while results are mixed for Hispanic women Veterans.

**KEY WORDS:** cardiovascular disease; risk factors; race; ethnicity; women veterans.

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## INTRODUCTION

Heart disease is the leading cause of death for women in the United States, accounting for 24.5 % of all deaths among women.<sup>1</sup> Research has demonstrated age-adjusted differences in heart disease-related mortality by race and ethnicity. Specifically, Non-Hispanic Black (Black) women have higher heart disease-related mortality compared to Non-Hispanic White (White) women. In contrast, ethnicity appears to be protective against heart disease-related mortality: Hispanic women experience lower heart disease-related mortality compared to White women.<sup>1</sup>

These heart disease-related mortality differences reflect, at least in part, racial/ethnic differences in the prevalence of cardiovascular disease (CVD) and CVD risk factors (e.g., diabetes, hypertension, obesity, tobacco use, and physical inactivity). For example, Black women carry a greater burden of cardiovascular disease compared to White or Mexican-American women.<sup>2</sup> Blacks and Hispanics have higher prevalence rates of diabetes compared to Whites. Black women have higher rates of diagnosed hypertension, compared to Hispanic and White women. Black and Hispanic women are more likely to be obese than White women. Current tobacco use was nearly double among Black and White women, compared to Hispanic women. Racial/ethnic differences in physical inactivity rates also exist: about half of Black and Hispanic women were considered inactive, compared to one-third of White women.<sup>3</sup>

Efforts to reduce these racial/ethnic and gender disparities in CVD risk, disease and mortality will likely require both healthcare delivery and public health approaches to improved screening, assessment and treatment. Despite the Veterans Health Administration's (VA) substantial efforts to reduce CVD risk, significant gender disparities in CVD risks have persisted.<sup>4</sup> While the number of women Veterans using the VA healthcare system has doubled in the past decade,<sup>5</sup> the vast majority of women Veterans use private and other public healthcare providers, making CVD risk factors for women Veterans a salient issue not only for VA providers, but also primary care providers nationwide.

The purpose of this paper is to empirically examine the prevalence of CVD risk factors among women Veterans by race and ethnicity, providing the first portrait of their cardiovascular care needs regardless of VA use. We capitalize on a unique data source—the National Survey of Women Veterans (NSWV) (2008-09).

## METHODS

### Data Sources

The NSWV, a cross-sectional national telephone survey of U.S. women Veterans, was conducted to support evidence-based VA strategic planning for programs and services. Administered in 2008-09, the NSWV enrolled a population-based, stratified random sample of women Veterans. Stratification was based on VA ambulatory care use (VA user and nonuser) and period of military service [ending date of military service prior to the Vietnam era; service in Operations Enduring and Iraqi Freedom (OEF/OIF); and all other military service periods combined] using previously described methods.<sup>6</sup> Survey respondents represented all U.S. geographic regions. This study was approved by the Institutional Review Board of the VA Greater Los Angeles Healthcare System, and the survey was also approved by the U.S. Office of Management and Budget.

### Sample

We cross-linked Veterans Health Administration, Veterans Benefits Administration, and Department of Defense databases that collectively identified more than 50 % of the 1.8 million U.S. women Veterans.<sup>6</sup> Inclusion criteria were being a women Veteran of the regular Armed Forces, or a member of the National Guard or Reserves who had been called to active duty. To recruit participants, an advance information packet was mailed to each randomly sampled veteran. Study interviewers contacted potential respondents 10–14 days after packets were mailed, and screened them for study eligibility prior to obtaining consent and conducting a computer-assisted telephone interview. Potential respondents were offered study enrollment if they were not currently serving on active military duty, not employed by the VA, and not institutionalized. The NSWV enrolled 3,611 women Veterans (86 % of those screened and eligible), and included 1,993 VA users and 1,618 VA nonusers. All analyses applied weights to account for disproportional allocation of the population by strata, so that resulting estimates are representative of the U.S. women Veteran population.

### Dependent Variables

We queried women Veterans about diagnosed medical conditions, personal health practices and the presence of

cardiovascular risks factors, to identify five dependent variables: self-reported diabetes, hypertension, obesity, tobacco use and physical activity. Diabetes and hypertension were defined by affirmative responses to the following questions: “Please tell me if a doctor or nurse has ever told you that you had any of the following health problems: diabetes; hypertension or high blood pressure.” Obesity was defined as a body mass index (BMI) greater than or equal to 30, and calculated from self-reported height and weight. Daily smoking was derived from the following question: “Do you smoke every day, some days, or not at all?” with respondents who indicated they smoke every day designated as daily smokers. For physical activity, we asked, “On average, how many days per week do you exercise at least 30 min, enough to make you breathe hard and/or sweat?” If respondents indicated they did not exercise at least 1 day per week, they were indicated as physically inactive.

### Independent Variables

We ascertained Hispanic or Latino ethnic origin, and then self-reported race to create four mutually exclusive categories: Hispanic, Non-Hispanic White (White), Non-Hispanic Black (Black), and all other. Respondents who did not indicate a race and/or ethnicity (< 3 %) were categorized as other. To be consistent with the American Heart Association recommendation that everyone know their risk factors by age 40 and reassess them every 5 years,<sup>7</sup> we categorized self-reported age as 18–39 years and 40 or older.

### Statistical Methods

To examine the association between race/ethnicity and each CVD risk factor, we performed chi-square tests to examine presence of racial/ethnic differences on the weighted sample. We then performed separate weighted logistic regressions for each CVD risk factor to compare each racial/ethnic group with White, controlling for age. We present age-adjusted differences, but do not adjust for socioeconomic status (SES), because we are examining the impact of race/ethnicity (and its associated characteristics) on CVD risk. The rationale is based on using provider-level and system-level perspectives on clinical care presentations (i.e., providers cannot adjust away the SES differences in their patient panels).

## RESULTS

Table 1 reports demographic and CVD risk factors among women Veterans by racial/ethnic group. We found significant racial/ethnic differences in age, education, employment, health insurance, VA use and three of five CVD risk factors (hypertension, obesity and smoking). Racial/ethnic

Table 1. Sample Description of Women Veterans by Race/Ethnicity

	All N=3,611	White n=2,575	Black n=477	Hispanic n=213	Other n=346	p-value
Race/ethnicity		77 %	11 %	5 %	7 %	
Age Group						< 0.001
18–39 years old	19 %	14 %	42 %	47 %	20 %	
40 years old or older	81 %	86 %	58 %	53 %	80 %	
Education						0.005
College Graduate	48 %	48 %	53 %	12 %	55 %	
Marital status						
Married	58 %	57 %	56 %	68 %	56 %	
Employment						0.005
Working	46 %	41 %	64 %	66 %	54 %	
Health insurance coverage						< 0.001
Medicare	32 %	36 %	14 %	4 %	26 %	
Health insurance (other)	57 %	54 %	66 %	82 %	61 %	
No insurance	11 %	10 %	20 %	14 %	13 %	
Household income						
Less than \$30,000	23 %	20 %	38 %	33 %	24 %	
\$30,001 to \$50,000	21 %	22 %	16 %	15 %	23 %	
Greater than \$50,000	56 %	58 %	46 %	52 %	53 %	
Reported VA health care use in past 12 months						
VA user	14 %	12 %	22 %	16 %	18 %	0.004
Cardiovascular risk factors						
Diabetes	10 %	8 %	15 %	21 %	15 %	
Hypertension	40 %	40 %	47 %	9 %	46 %	0.02
Obese	26 %	25 %	42 %	12 %	26 %	0.02
Smoke daily	12 %	12 %	8 %	32 %	3 %	0.005
Physically inactive	26 %	26 %	28 %	34 %	26 %	

differences in prevalence of CVD risk factors were found after adjusting for age (Table 2). Black women Veterans, in comparison to White women Veterans, were more likely to report a diabetes (OR: 2.58, 95 % CI: 1.07, 6.21) or hypertension diagnosis (OR: 2.31, 95 % CI: 1.10, 4.83). In terms of lifestyle behaviors, Black women Veterans were more likely to be obese compared to White women Veterans (OR: 2.06, 95 % CI: 1.05, 3.91). Hispanic women Veterans, compared to White women Veterans, were more likely to report a diabetes diagnosis (OR: 4.20, 95 % CI: 1.15, 15.39) and daily smoking (OR: 3.38, 95 % CI: 1.01, 11.30), but they were less likely to report a hypertension diagnosis (OR: 0.21, 95 % CI: 0.07, 0.64) or to be obese (OR: 0.38, 95 % CI: 0.18, 0.81). Age (greater than 40 years) was positively associated with report of hypertension (OR: 6.51, 95 % CI: 3.08, 13.78) or diabetes diagnosis (OR: 3.71, 95 % CI: 1.12, 12.19). There were no racial/ethnic differences in reports of physical inactivity.

## DISCUSSION

There are significant age-adjusted racial/ethnic differences in the prevalence of four of five CVD risk factors among women Veterans. Black women Veterans had higher prevalence of three of five risk factors (diabetes, hypertension and obesity) compared to White women Veterans. The results for Hispanic women Veterans were mixed. Hispanic women Veterans had higher prevalence for two of five risk factors (diabetes and smoking), but lower prevalence for two other risk factors (hypertension and obesity) compared to White women Veterans. Prior research at one VA medical center found that 67 % of women Veterans were categorized as having an increased risk (e.g., moderate or high risk) of CVD based on a modified Framingham cardiovascular risk score.<sup>8</sup> The current study adds to the evidence base about women Veterans' CVD risk by being the first study to document racial/ethnic disparities in prevalence of CVD

Table 2. Logistic Regression Predicting Cardiovascular Risk Factors among Women Veterans (n=3,611)

	Diabetes OR (95 % CI)	Hypertension OR (95 % CI)	Obese OR (95 % CI)	Smoke Daily OR (95 % CI)	Physically Inactive OR (95 % CI)
Race/Ethnicity					
Black	2.58 (1.07, 6.21)*	2.31 (1.10, 4.83)*	2.06 (1.05, 3.91)*	0.61 (0.32, 1.18)	1.18 (0.57, 2.43)
Hispanic	4.20 (1.15, 15.39)*	0.21 (0.07, 0.64)**	0.38 (0.18, 0.81)*	3.38 (1.01, 11.30)*	1.59 (0.57, 4.46)
Other race	2.09 (0.82, 5.32)	1.44 (0.68, 3.05)	1.04 (0.47, 2.30)	0.24 (0.12, 0.49)***	0.86 (0.78, 1.97)
White	Reference	Reference	Reference	Reference	Reference
Age (years)					
Age 18–39	Reference	Reference	Reference	Reference	Reference
Age 40 and older	3.71 (1.12, 12.19)*	6.51 (3.08, 13.78)***	0.80 (0.46, 1.42)	1.20 (0.48, 3.02)	1.25 (0.69, 2.27)

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

risk factors in a national sample of women Veterans not limited to VA users.

While earlier studies have found racial/ethnic differences in reports of physical inactivity,<sup>2</sup> we did not find such differences among women Veterans. The proportion of women Veterans reporting no physical activity was somewhat surprising, given the physical fitness levels required during military service. To mitigate CVD risk among women Veterans, further study may be needed to identify the determinants of *sustained* physical activity among women Veterans *after* separating from the military, and also to examine potential barriers to weight management.

The substantial proportion of women Veterans with CVD risk factors will require focused effort to promote optimal health among White and minority women Veterans. Prior research has demonstrated the value of gender-specific approaches to risk factor reduction among women Veterans. For example, women Veterans have higher smoking rates compared to male Veterans,<sup>9</sup> and previous studies have shown that women Veterans prefer women-only smoking cessation groups, which may mitigate gender disparities.<sup>10</sup> Further study should also assess why these risk differences occur, e.g., why Hispanic women Veterans have higher smoking rates compared to White and Black women Veterans. It is also important to determine whether culturally tailored approaches to risk factor reduction would benefit Black and Hispanic women Veterans. Recent research has demonstrated, for example, the potential value of enhanced health literacy among minority male Veterans, but neither gender differences nor gender-sensitive adaptations have been studied. While the VA healthcare system has reduced many access barriers,<sup>11</sup> and achieved substantial and widespread improvement in quality of care,<sup>12,13</sup> persistent gender and racial/ethnic disparities present VA with a challenge and opportunity for quality improvement.<sup>14,15</sup> Focused efforts to tackle these disparities in the VA have resulted in early successes in reducing gender disparities in some areas, but not CVD risk.<sup>16</sup> To ensure that all veterans benefit from VA care equally, more research is needed on gender-sensitive and culturally appropriate approaches to risk reduction, supplementing current VA-wide interventions. Outside the VA, where the vast majority of 1.8 million women Veterans in the U.S. still obtain their care, these racial/ethnic differences also have salience for community providers.

While the National Survey of Women Veterans offers a unique source of data to better understand the healthcare needs of the population of women Veterans, we lack data on high blood cholesterol (hyperlipidemia), which would have provided a more comprehensive profile of cardiovascular risk. The prevalence of risk factors are also based on self-report. While we used previously validated survey measures, future work would benefit from augmentation with chart review.

The number of women Veterans seeking care in VA is dramatically increasing.<sup>5</sup> The recently deployed [e.g., Operations Enduring and Iraqi Freedom (OEF/OIF)] cohort of women Veterans is much more racially and ethnically diverse than earlier cohorts of women Veterans.<sup>17</sup> Given the evidence of racial/ethnic differences in prevalence of CVD risk factors, these findings have important policy and planning implications for disparities reduction. Tailored interventions focused on reducing mutable CVD risk factors (e.g., smoking, obesity) to minority women Veterans (e.g., Black and Hispanic women Veterans) are needed. While the VA has performance measures for smoking and diabetic hypertension and glycemic control, there are no measures prompting action on weight management and physical activity promotion. In addition, racial/ethnic-specific performance measurements linked to consequent quality improvement are needed.

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**Conflict of Interest:** None of the coauthors have any conflicts of interest related to this manuscript.

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