

Prevalence of Cardiovascular Disease Risk Factors in Blacks and Whites: The Minnesota Heart Survey

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Abstract: Two cross-sectional surveys were conducted in 1985 and 1986 to measure the prevalence of coronary heart disease (CHD) risk factors in Blacks and Whites. A home interview was followed by a survey center visit. Participation rates were 78 per cent and 90 per cent for the home interview and 65 per cent and 68 per cent for the survey center visit. Adjusted for age and education, systolic and diastolic blood pressure was 3 to 4 mmHg higher in Blacks. Hypertension was more prevalent in Blacks than Whites (44 per cent vs 28 per cent); serum total cholesterol was approximately 0.4 mmol/l

lower in Black than White men and 0.08 mmol/l lower in Black than White women. Among men, more Blacks than Whites were current cigarette smokers (44 per cent vs 30 per cent); however, White smokers smoked more cigarettes per day (26 vs 17). Similar differences were noted for women, although the prevalence and quantity of cigarette consumption was less than men. The excess prevalence of these CHD risk factors in Blacks, especially among women, may explain their elevated CHD and stroke mortality rates in the Twin Cities. (*Am J Public Health* 1988; 78:1546-1549.)

Introduction

The relation of blood pressure, serum cholesterol, and smoking to coronary heart disease (CHD) incidence and mortality rates has been reported in many epidemiologic studies both nationally and internationally.¹⁻³ CHD mortality rates are higher for Blacks than Whites at younger ages, and lower for Blacks after the age of 70.⁴⁻⁶ Whether racial differences reflect access to medical care or prevalence of CHD risk factors is unclear. Few reports compare the prevalence of the known CHD risk factors between Blacks and Whites. This paper describes the prevalence of coronary heart disease risk factors in Blacks and Whites using data from two population-based surveys in a large metropolitan area.

Methods

Study Population

Methods and early findings from the Minnesota Heart Survey, a survey of CHD risk factors and related behaviors in probability samples of Twin Cities residents aged 25 to 74 years, have been described previously.⁷ The seven-county metropolitan area was divided into 704 clusters of approximately 1,000 households each, based on 1970 and 1980 census information, from which 40 clusters and approximately 10 per cent of households within each cluster were randomly selected. One individual aged 25-74 was randomly selected per household, interviewed in the home, and then invited to attend a neighborhood clinic for more extensive interviews and physiologic tests. The first series of general population surveys was conducted in 1980-82. A second series was begun in December 1985, with two complete one-year survey cycles.

From July to November 1985, we also surveyed an area of Minneapolis with large numbers of Black residents to provide more precise estimates of their CHD risk factors. In the sampling area, which included four and one-half census tracts, every occupied housing unit was identified and all 35-

to 74-year-old Blacks were considered eligible and recruited to the survey. Other methods were identical to those in the general population survey; preliminary findings are detailed elsewhere.^{8,9}

Data on Risk Factors

In both surveys, height was measured in stocking feet to the nearest half inch. Body mass index (BMI) was computed as $wt/ht^2(kg/m^2)$. Blood pressure was measured by trained technicians using a random zero sphygmomanometer on the right arm of seated participants after a five-minute rest. The average of two measures of systolic and diastolic (5th phase) is reported. Non-fasting blood specimens were obtained using the protocol of the Lipid Research Clinics.¹⁰ The Jenkins Activity Survey¹¹ was used to assess Type A behavior (positive scores indicate more Type A tendencies and negative scores more Type B). The Minnesota Leisure Time Physical Activity (LTPA) questionnaire¹² was administered to a systematic 50 per cent sample of study participants. The systematic 50 per cent not receiving the LTPA were given a 24-hour dietary recall questionnaire. Exertional anginal pectoris,¹³ smoking, alcohol use, demographics, and medication use were assessed by questionnaire.

Analysis

Data on Whites aged 35 to 74 from the first cycle of the 1985-87 general population survey were compared to those obtained from the 1985 Black population survey. We used analysis of variance to adjust for the effects of age and education to determine the relationship and overall significance of racial differences.¹⁴

Results

Participation rates in the general population survey were 90 per cent for the home interview alone and 68 per cent for the home interview and clinic visit. Participation rates in the 1985 Black survey were 75 per cent and 65 per cent, respectively. In both surveys individuals attending clinic were more likely than non-clinic attenders to be non-smokers (47.7 per cent vs 63.2 per cent), have more education (greater than high school education, 54.0 per cent vs 48.1 per cent), be married (63.8 per cent vs 57.9 per cent) and be currently employed (71.1 per cent vs 66.3 per cent). No differences were noted in the percentages of individuals with a history of high blood pressure, hypercholesterolemia, diabetes, heart attack, or stroke or in leisure time physical activity scores between clinic attenders and non-attenders. Table 1 shows

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TABLE 1—Sociodemographic Characteristics of Men and Women Ages 35–74 Years by Race Adjusted for Age: The Minnesota Heart Survey

Variables	Men		Women	
	White (N=893)	Black (N=547)	White (N=976)	Black (N=706)
Age (years)	49.1	50.1	49.9	50.8
% Married	78.0	63.4	62.9	43.2
% Currently employed	81.3	71.4	64.8	63.5
Educational Status				
% ≤ high school	34.9	54.2	46.9	56.8
% some college	30.3	28.5	30.3	29.1
% ≥ college degree	34.9	17.3	22.8	14.1
Income Status†				
% < \$15,000	6.7	25.5	17.0	40.2
% \$15,000–\$30,000	21.0	34.8	29.5	32.2
% > \$30,000	70.6	38.3	49.9	25.0
% Unavailable	1.7	1.3	3.6	2.6

†For income status N = 763–WM; 457–BM; 811–WW; 590–BW.

the sociodemographic characteristics of men and women by race adjusted for age.

The age-adjusted prevalence of diabetes, angina, history of heart attack or stroke, and average body mass index was higher in Black than White women (Table 2). No racial difference in these conditions was noted for men. In general, scores for physical activity and Type A behavior were higher in Whites than Blacks. Alcohol consumption was higher in Black than White men with no differences noted for women.

For all age groups, systolic and diastolic blood pressures were higher in Blacks than Whites by 3 or 4 mmHg (Table 3). These differences remained after stratification by antihypertensive medication status. The prevalence of hypertension, defined as systolic blood pressure greater than or equal to 140 mmHg and/or diastolic blood pressure greater than or equal to 90 mmHg and/or currently taking antihypertensive medication, was higher in Blacks than Whites for all age-sex categories (Table 4).

Figure 1 shows that a greater percentage of Black than White men were aware of their hypertension, treated and controlled. More Black than White men had treated but uncontrolled hypertension, except 65- to 74-year-olds. The percentage of men aware of their hypertension yet untreated and uncontrolled was similar in Blacks and Whites and decreased consistently with age. Overall, the percentage of

TABLE 3—Average Blood Pressure (mm/Hg) for Men and Women by Race and Age: The Minnesota Heart Survey

Age (years)	Men		Women	
	White	Black	White	Black
<i>Systolic</i>				
35–44	122.6	125.1	113.1	116.2
45–54	125.6	129.2	119.5	124.1
55–64	129.5	133.0	127.9	132.4
65–74	135.1	137.1	133.7	134.9
Total†	126.7	129.0	120.9	124.3
Mean difference† (95% CI)	2.3(0.5,4.3)		3.4(1.6,5.2)	
<i>Diastolic</i>				
35–44	76.7	79.8	71.5	75.5
45–54	79.2	83.5	74.3	78.9
55–64	76.9	79.7	75.4	79.3
65–74	74.9	81.6	72.3	75.5
Total†	78.7	82.4	74.1	78.2
Mean difference† (95% CI)	3.7(2.3,5.1)		4.1(2.9,5.3)	

†Age and Education-adjusted.

TABLE 4—Prevalence of Hypertension† among Men and Women by Age and Race: The Minnesota Heart Survey

Age (years)	Men		Women	
	White	Black	White	Black
<i>Systolic</i>				
35–44	19.3	30.4	7.8	21.9
45–54	28.4	39.6	21.9	42.9
55–64	42.7	57.0	40.0	68.6
65–74	47.0	70.3	57.8	68.7
Total*	30.7	43.7	24.8	44.1
Mean difference* (95% CI)	12.9(7.5,18.3)		18.6(14.1,23.1)	

†Hypertension defined as systolic blood pressure ≥ 140 and/or diastolic blood pressure ≥ 90 mm/Hg and/or currently taking antihypertensive medication.

*Age and Education-adjusted.

men unaware of their hypertension was markedly higher among Whites than Blacks (38 per cent vs 27 per cent: mean difference = 10.5 per cent, 95 per cent CI = 1.7, 19.3).

Compared to men, women were more aware of their hypertension (Figure 2) and it was better treated and con-

TABLE 2—Medical Conditions and Behavior Patterns by Race and Sex Adjusted for Age: The Minnesota Heart Survey

Variables	Men			Women		
	Black	White	95% CI of Difference	Black	White	95% CI of Difference
History of diabetes (%)	7.3	4.8	(-0.002,4.6)	12.0	4.2	(5.4,10.4)
History of angina (%)	2.7	3.2	(-0.01,0.02)	6.8	3.5	(1.2,5.4)
Prior hospitalization for heart attack or stroke (%)	6.0	5.2	(-0.02,0.03)	5.1	2.4	(0.9,4.5)
Body mass index (Kg/m ²)	27.3	27.3	(-0.5,0.5)	29.0	26.2	(2.2,3.4)
LTPA*	2.1	2.3	(0.1,0.3)	1.9	2.1	(0.06,0.20)
JAS**						
Working	-4.8	-2.3	(1.3,3.6)	-5.1	-5.0	(-0.9,1.3)
Non-working	-9.2	-8.3	(-1.9,3.7)	-7.0	-8.4	(0.3,3.1)
Alcohol consumption (oz/wk)	7.3	4.6	(1.7,3.7)	1.9	1.9	(-0.4,0.5)

*Log transformed Leisure Time Physical Activity Score.¹²

**Jenkins Activity Survey Score.¹¹

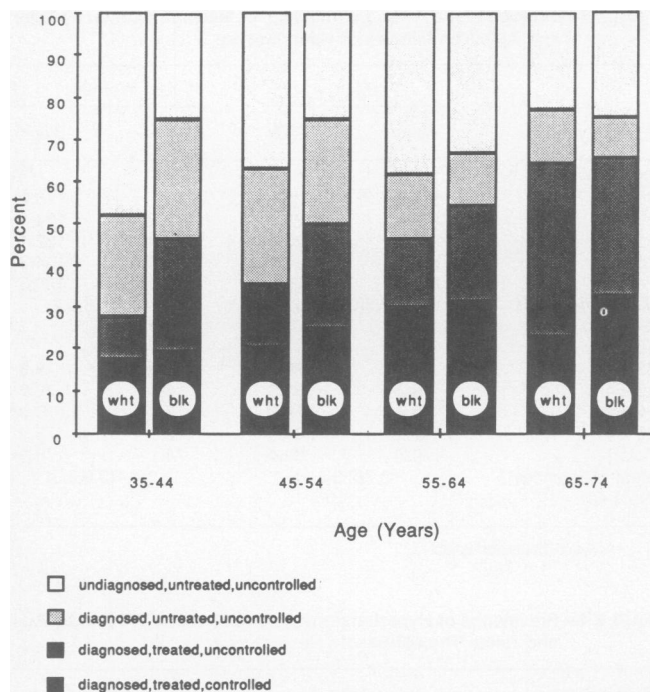


FIGURE 1—Awareness, Treatment and Control Status among Hypertensive Men by Race and Age: The Minnesota Heart Survey

trolled in all ages. The fraction of women diagnosed, treated and uncontrolled averaged approximately 25 per cent in both Blacks and Whites. More White than Black women were unaware of their hypertension (24 per cent vs 15 per cent: mean difference = 8.9 per cent, 95 per cent CI = 1.7, 16.1).

In general, Black men had lower serum total cholesterol and higher serum HDL cholesterol levels than White men

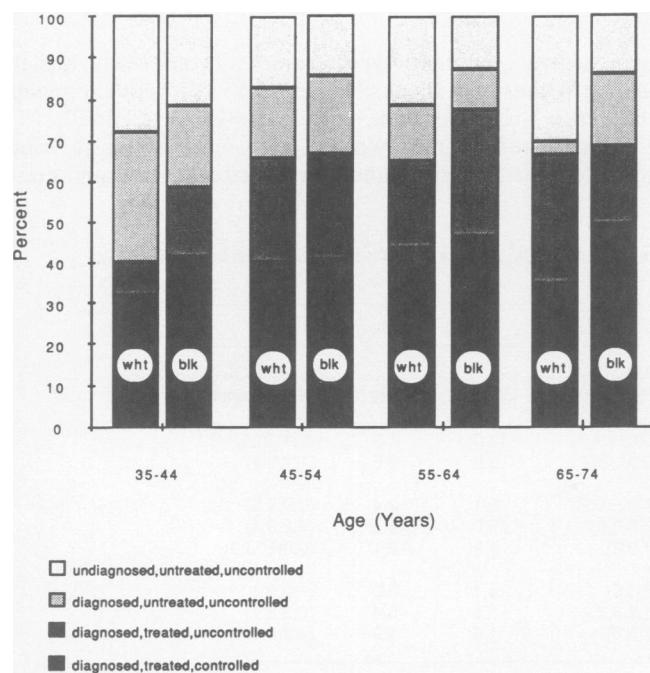


FIGURE 2—Awareness, Treatment and Control Status among Women by Race and Age: The Minnesota Heart Survey

TABLE 5—Serum Total and HDL Cholesterol Values (mg/dl)* for Men and Women by Age and Race: The Minnesota Heart Survey

Age (years)	Total Cholesterol (TC)		HDL Cholesterol		HDL/TC Ratio	
	Black	White	Black	White	Black	White
Men						
35-44	186.7	203.0	48.2	40.0	0.26	0.20
45-54	196.2	209.7	47.8	42.2	0.25	0.21
55-64	191.7	212.1	49.1	40.0	0.26	0.20
65-74	207.6	201.5	50.6	42.4	0.25	0.22
Total†	193.2	206.8	48.6	40.9	0.26	0.21
Mean Difference† (95% CI)	13.6(9.0,18.2)		7.7(6.1,9.3)		0.05(0.04,0.06)	
Women						
35-44	184.2	185.8	55.8	54.8	0.31	0.30
45-54	201.2	203.5	54.7	54.8	0.28	0.28
55-64	218.0	226.0	58.3	53.2	0.27	0.24
65-74	222.7	235.6	55.8	50.9	0.25	0.23
Total†	201.4	206.0	56.3	53.8	0.29	0.27
Mean Difference† (95% CI)	4.6(2.5,6.7)		2.5(0.9,4.1)		0.02(0.003,0.02)	

†Age and Education-adjusted.

*1 mg/dl = 0.02586 mmol/l.

(Table 5). Black women had slightly lower serum total cholesterol values than Whites among individuals aged 35 to 54 and the differences increased with age. Black women had slightly higher values of serum HDL cholesterol than White women in the younger age groups and this difference increased with age. The ratio of HDL to total serum cholesterol remained relatively stable with age in men but gradually declined in women.

The age- and education-adjusted prevalence of cigarette smoking was higher in Black than White men (43.9 per cent vs 29.5 per cent) and women (27.9 per cent vs 17.9 per cent).^{*} Black and White men were equally likely ever to have smoked, but many more of the White men had quit. More Black than White women were current cigarette smokers especially among those aged 35 to 44. Black women were more likely never to have smoked than White women, but fewer Black women had quit.

Discussion

The effect of non-response on the CHD profiles in this study is unknown; however, previous reports indicate that survey non-participants more often are unmarried, unemployed, smokers, and have alcohol problems than participants.^{7,15} Our findings on clinic participation are consistent with these observations. Overall response rates were similar in the Black and general population surveys, 65 per cent and 68 per cent, respectively.

With the exception of serum total and HDL cholesterol levels and Jenkins Activity Survey scores,¹¹ Blacks had a relative excess of the known CHD risk factors. The results regarding blood pressure, blood lipids, and cigarette consumption differences between Blacks and Whites agree closely with those reported elsewhere.¹⁶⁻¹⁹ If, as our data suggest, these blood pressure differences between Blacks and Whites are not attributable to lower hypertension awareness and treatment patterns among Blacks, one possible explanation is that Blacks have more severe hypertension with earlier

*Data available on request to author

onset and poorer control when treated. Differences between Blacks and Whites in hypertension awareness and control in this survey are consistent with the National Health and Nutrition Examination Survey (NHANES) data²⁰; but the percentages of individuals aware, treated and controlled are much higher than those reported in NHANES for both men and women, Black and White, suggesting that Minnesota may have more effective hypertension control programs than the US as a whole.

Average serum cholesterol levels among US adults have declined significantly in the last 20 years for Whites but not for Blacks.²¹ The average serum cholesterol level in Blacks is lower than in Whites in Minnesota and nationwide, yet Blacks in this study had higher serum HDL cholesterol values than Whites. Reasons for this are unclear and are not likely explained by differences in alcohol and cigarette consumption, obesity, or physical activity. A genetic component, as suggested by Gartside, *et al*,²³ might be an hypothesis needing further exploration.

The excess of CHD risk factors among Twin Cities Blacks, especially women, may partially explain their elevated cardiovascular mortality rates.⁸ Despite significant declines during the last decade for all sex- and race-specific groups, heart disease mortality rates are higher in Blacks than Whites (10 per cent excess in men, 60 per cent excess in women). In addition, stroke mortality rates are higher in Blacks than Whites (23 per cent excess in men, 79 per cent excess in women). Public health interventions must focus on reducing these risk factors if further improvements in Black CHD mortality rates are to be seen.

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