

Research on Cardiovascular Disease in Women

Agency for Healthcare Research and Quality



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AHRQ is the lead Federal agency charged with supporting research designed to improve the quality of health care, reduce its cost, address patient safety and medical errors, and broaden access to essential services. AHRQ sponsors and conducts research that provides evidence-based information on health care outcomes; quality; and cost, use, and access. The information helps health care decisionmakers—patients and clinicians, health system leaders, and policymakers—make more informed decisions and improve the quality of health care services.



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Introduction

Cardiovascular disease (CVD) is the number one killer of women in the United States. Long thought of as primarily affecting men, we now know that CVD—including heart disease, hypertension, and stroke—also affects a substantial number of women. Experts estimate that one in two women will die of heart disease or stroke, compared with one in 25 women who will die of breast cancer.

Current statistics reveal significant differences between men and women in survival following a heart attack. For example, 42 percent of women who have heart attacks die within 1 year compared with 24 percent of men. The reasons for this are not well understood. The explanation accepted by many is that women tend to get heart disease about 10 years later in life compared with men, and they are more likely to have coexisting, chronic conditions. However, research also has shown that women may not be diagnosed or treated as aggressively as men, and their symptoms may be very different from those of men who are having a heart attack. In addition, new studies indicate that men and women react to drugs prescribed for heart disease and other

cardiovascular conditions quite differently, and drugs that may help men can have serious adverse effects in women.

Differences between white and black women in heart disease mortality are substantial. Deaths due to heart disease are about two-thirds higher among black women than among white women. However, heart disease mortality is lower among Hispanic, American Indian, and Asian/Pacific Islander women compared with white women.

AHRQ-Sponsored Research

The Agency for Healthcare Research and Quality (AHRQ) supports a vigorous women's health research program, including research focused on CVD in women. AHRQ-supported projects are addressing women's access to quality health care services, accurate diagnoses, appropriate referrals for procedures, and optimal use of proven therapies.

Following are examples of current AHRQ research projects focused on CVD and women, as well as findings from recently published studies.



Research in Progress

- *Researchers are using historical data to compare the clinical characteristics and treatment of men and women who suffer a heart attack.*

These researchers are examining medical record data to compare the duration of coronary heart disease, symptoms, diagnostic evaluations and referrals, and the assessment and treatment of modifiable risk factors for coronary heart disease for the 10-year period prior to a first heart attack in men and women. Barbara P. Yawn, Principal Investigator (AHRQ grant HS10239).

Recent Findings

- *Lack of studies on women limits usefulness of research on coronary heart disease.*

Although coronary heart disease (CHD) causes more than 250,000 deaths in women each year, much of the research in the last 20 years on the diagnosis and treatment of CHD has either excluded women entirely or included only limited numbers of women. As a result, many of the tests and therapies used to treat women for CHD are based on studies conducted predominantly in men, according to two evidence reviews on CHD conducted by AHRQ's Evidence-based Practice Center (EPC) at the University of California, San Francisco/Stanford. The reviews examined the usefulness of beta-blockers, aspirin, and ACE inhibitors in reducing risk among women with known heart disease; the use of exercise EKG and exercise thallium testing for CHD in women; the efficacy of nitrates to reduce risk for CHD events in women with known heart disease; the role of high cholesterol, diabetes, and high homocystine levels as risk factors for CHD in women; and the extent to

which smoking cessation after heart attack, along with treatment of high blood pressure and high cholesterol, can lower risk for CHD events in women. Key findings of the study indicated that no evidence addressed differences in the accuracy of diagnostic tests, strength of risk factors, effects of treatment, or prognostic value of markers for ischemia in women of different races or ethnicity. Beta-blockers, aspirin, and angiotensin converting enzyme (ACE) inhibitors were found to reduce risk for CHD events in women with known heart disease. Use of nitrates was not associated with reduction in the risk for CHD events in women with known disease. Glycoprotein IIb/IIIa inhibitor drugs given to women undergoing coronary angioplasty resulted in a reduced risk of CHD events and the need for revascularization, but use of this treatment in women suffering from acute coronary syndromes may increase mortality. Copies of the two reports, *Results of a Systematic Review of Research on Diagnosis and Treatment of Coronary Heart Disease in Women*, Evidence Report/Technology Assessment No. 80 (AHRQ Publication No. 03-E035* full report; 03-E034** summary) and *Diagnosis and Treatment of Coronary Heart Disease in Women: Systematic Reviews of Evidence on Selected Topics*, Evidence Report/Technology Assessment No. 81 (AHRQ Publication No. 03-E037 full report; 03-E036 summary) are available from AHRQ (contract 290-97-0013).*

- *Women with symptomatic heart failure benefit when treated with ACE inhibitors and have reduced mortality when treated with beta-blockers.*

Researchers at AHRQ's Southern California EPC examined evidence on pharmacologic management of heart failure and found that treatment with ACE inhibitors was beneficial in women, but it did not reduce mortality

in women with asymptomatic left ventricular systolic dysfunction. They also found that both women and men with symptomatic heart failure have reduced mortality when treated with beta-blockers. Copies of Evidence Report/Technology Assessment No. 82, *Pharmacologic Management of Heart Failure and Left Ventricular Systolic Dysfunction: Effect in Female, Black, and Diabetic Patients, and Cost-Effectiveness* (AHRQ Publication No. 03-E044 summary; 03-E045 full report) are available from AHRQ (contract 290-97-0001).*

- *Insurance status does not explain the disparity in heart attack survival.*

An analysis of data on 327,040 men and women enrolled in a national registry of patients revealed that women were less likely to receive aspirin, beta-blockers, intravenous heparin, or nitrate therapies within the first 24 hours of hospital admission. They also were less likely to undergo coronary angiography, angioplasty, or bypass surgery, but they were more likely to die in the hospital. Insurance status did not explain the differences between men and women in heart attack treatments and outcomes. Canto, Rogers, Chandra, et al., *Arch Intern Med* 162:587-593, 2002 (AHRQ grant HS08843).

- *Women have a higher prevalence of white-coat hypertension than men.*

Researchers at the Johns Hopkins Evidence-based Practice Center examined the available evidence on the utility of blood pressure (BP) monitoring outside of the clinic setting. Although they found some support for the use of ambulatory BP monitoring, in general, the evidence was insufficient to compare clinic BP monitoring with BP monitoring elsewhere. Evidence on BP monitoring among population subgroups was rarely stratified by race or sex. The only notable subgroup finding was a higher prevalence of

white-coat hypertension in women. However, the evidence was insufficient to determine whether the risks associated with white-coat hypertension are sufficiently low to consider withholding drug therapy in this large subgroup of hypertensive patients. Copies of Evidence Report/Technology Assessment No. 63, *Utility of Blood Pressure Monitoring Outside of the Clinic Setting* (AHRQ Publication No. 03-E003 summary; 03-E004 full report) are available from AHRQ (contract 290-97-0006).*

- *Researchers find an association between heart attack outcomes and a woman's age.*

In an editorial accompanying study findings on male and female mortality rates after heart attack, this researcher notes that the interaction of age and sex remains a significant predictor of heart attack-related death, even after adjustment for demographic factors, clinical characteristics, and inpatient cardiac care. The study reported an 11 percent 2-year mortality rate for women before age 60 (vs. 7 percent for men) and a lower mortality rate for women after age 79 (46 vs. 51 percent for men). The author notes that nonbiological factors may play a role, including behavioral, psychological, and social factors such as smoking, adherence to medication regimens, depression, social isolation, low income, and emotional stress. Ayanian, *Ann Intern Med* 134(3):239-241, 2001 (AHRQ grant HS09718).

- *Women and minorities may have atypical symptoms when suffering a heart attack or angina.*

Emergency room doctors miss diagnosing about 2 percent of patients with heart attacks or unstable angina because they do not have chest pain or other symptoms typically associated with a heart attack. When these patients are mistakenly sent home from



the ER, they are twice as likely to die from their heart problems as similar patients who are admitted to the hospital. The patients in this study who were misdiagnosed tended to be women under the age of 55 or minorities who reported shortness of breath as their chief symptom, instead of chest pain, and/or to have apparently normal electrocardiograms. Pope, Aufderheide, Ruthazer, et al., *New Engl J Med* 342(16):1163-1170, 2000 (AHRQ grant HS07360).

- *Black women are not as likely as others to receive life-saving therapies for heart attacks.*

Most of the 1 million U.S. patients who suffer a heart attack each year are candidates for reperfusion therapy, either thrombolytic (clot-busting) drugs or primary angioplasty. In a study of nearly 27,000 Medicare beneficiaries who met the strict criteria for reperfusion therapy between February 1994 and July 1995, only 44 percent of eligible black women received the treatment, compared with 59 percent of white men, 50 percent of black men, and 56 percent of white women. Canto, Allison, Kiefe, et al., *New Engl J Med* 342(15):1094-1100, 2000 (AHRQ grants HS08843 and HS09446).

- *Men and women differ in their reports of angina and symptoms of heart disease.*

Coronary artery disease risk is higher in certain women with angina, according to researchers who examined correlates of angina in men and women aged 35 to 55. This is particularly true for women who have a poor cardiovascular risk

profile and symptoms such as shortness of breath. Nicholson, White, Macfarlane, et al., *J Clin Epidemiol* 52(4):337-346, 1999 (AHRQ grant HS06516).

- *Risk of stroke due to large-vessel atherosclerosis is lower in women than in men.*

In this study of 454 Rochester, MN, residents who had a first ischemic stroke between 1985 and 1989, the risk of stroke due to atherosclerosis with narrowing of the blood vessel was four times greater in men than in women (47 vs. 12 per 100,000 population). This could help to explain why U.S. rates of carotid endarterectomy (surgical opening of a blocked carotid artery) are 30 to 60 percent higher in men than in women. Petty, Brown, Whisnant, et al., *Stroke* 30:2513-2516, 1999 (Stroke Prevention PORT, contract 290-91-0028).

- *Black women are less likely than men or other women to be referred for cardiac catheterization.*

In this study, blacks and women, particularly black women, had statistically significant lower odds for being referred for cardiac catheterization than whites and men. The study involved 720 primary care doctors and eight patient actors (two each black men, black women, white men, and white women) who used the same scripts to report the same symptoms, wore identical gowns, used similar hand gestures, and had the same insurance and professions. Schulman, Berlin, Harless, et al., *N Engl J Med* 340:618-626, 1999 (AHRQ grant HS07315).

More Information

For more information on AHRQ initiatives related to women's health, please contact:

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