

RESULTS FROM STUDIES SUPPORTED BY THE NATIONAL INSTITUTE OF NURSING RESEARCH

Subtle and Dangerous:
Symptoms of Heart Disease
in Women



Subtle and Dangerous: Symptoms of Heart Disease in Women

HEART DISEASE is the number one cause of death in the United States, for women as well as men. The various forms of heart disease, which include coronary artery disease (CAD), high blood pressure, atherosclerosis, heart failure and heart attacks, are responsible for over 250,000 deaths a year among women. Research-based strategies to promote heart health – emphasizing lifestyle changes to improve diet, decrease cholesterol levels, increase exercise, maintain a healthy body weight, and avoid cigarette smoking – have contributed to the steady decrease in rate of death from heart disease for men since 1980. Unfortunately, the rate for women has remained largely unchanged.¹

The National Institute of Nursing Research (NINR), one of the Institutes of the National Institutes of Health, supports research by nurse scientists that helps to improve the health and health care of individuals across the life span – from the management of patients during illness and recovery to the reduction of risks for disease and disability and the promotion of healthy lifestyles. Since its inception, NINR has placed a large focus on disease prevention, with particular attention devoted to the aspects of heart disease that relate specifically to women. Scientists funded by the NINR have investigated gender-related factors associated with heart disease risk assessment, heart attack symptoms, management, and recovery, and the effects of related cardiovascular conditions. The results of this research have shed new light on differences in how men and women experience and respond to heart and other cardiovascular diseases.

Heart Disease Risks for Women

In a review of several studies on women's health, Elizabeth Sparks, RN, and Dr. Lorraine Frazier described the risk factors of heart disease among women. Even though cardiovascular disease accounts for 43% of all female deaths, few women view it as a significant health risk. The diagnosis of CAD often occurs at a much older age in women than in men, and angina (chest pain), a frequent symptom of CAD, may receive inadequate attention from health care providers.



Prior to menopause, the female hormone estrogen seems to have a protective effect in maintaining adequate levels of "good" high-density lipoprotein (HDL) cholesterol, which serves to protect the body's overall cardiovascular health. Estrogen also works to relax the smooth muscle of arteries, helping to maintain a normal blood pressure and prevent some forms of blood vessel damage. However, the beneficial cardiovascular effects of estrogen are lost after menopause, when the rate of heart disease-related death for women steadily increases.²

One in three American women dies of heart disease, making it the #1 killer.

There are many factors that have been shown to elevate the risk of heart disease for post-menopausal women, including the "deadly quartet" of chronic conditions that includes diabetes, obesity, high blood pressure and high cholesterol.² Tobacco use also significantly increases the incidence of heart disease, which puts smokers – currently 20% of women in the United States – at additional risk.³

Cardiovascular risk is commonly assessed with the use of the Framingham Risk Estimation (FRE), a survey that can be used with asymptomatic adults to classify their risk for future heart disease. However, the FRE does not take into account a family history of premature cardiovascular disease, which can be an independent risk factor for the development of atherosclerosis – a leading cause of CAD that results from the buildup of plaque in the coronary arteries.

To help determine the role of family history in the risk of atherosclerosis for women, a research team at the Johns Hopkins Hospital, including NINR-funded researcher Dr. Diane Becker, studied 102 women who reported no current cardiac symptoms but had recently had a sibling hospitalized with premature CAD. The research team first determined the FRE scores for the women in the study. Although one-fifth of the women were current smokers, almost half were obese, and many had high blood pressure or were taking blood pressure medications, only two were considered high risk by the FRE. The women then underwent a special x-ray scan to determine the presence and extent of calcified atherosclerotic plaques within their coronary arteries. Forty of the women were found to have detectable coronary plaques, with 32 having elevated levels for their age and six showing severe and extensive coronary blockage.⁴

Each year, about 88,000 women ages 45-64, and about 372,000 women aged 65 and older, have a heart attack.



These findings show that women need to be more aware of their risks for heart disease, especially after menopause or in combination with other conditions or lifestyle factors. Also, adding an assessment of family history to the current screening procedures for women may help to identify those at risk for CAD at an early stage, when they would be able to benefit most from preventive measures such as dietary changes, weight loss, low-dose aspirin, or lipid-lowering medications.

Subtle Symptoms of Heart Attack

Most of the early research studies on the symptoms of heart attacks underrepresented women and focused primarily on older men, who generally reported feeling pain and pressure in their chest prior to an attack. Once a woman does seek treatment, health care professionals commonly misinterpret or underestimate the severity of her symptoms. This trend is also apparent when dealing with CAD, a frequent precursor to a heart attack.

In a series of preliminary studies, Dr. Jean McSweeney and her research team interviewed women who had recently suffered a heart attack about the symptoms they experienced both prior to and around the time they sought treatment. From these interviews, Dr. McSweeney developed the McSweeney Acute and Prodromal Myocardial Infarction Symptoms Survey (MAPMISS), a questionnaire to help women identify and describe their heart attack (also called myocardial infarction) symptoms.⁵

The research team later administered the MAPMISS questionnaire to over 500 female cardiac patients who had suffered a heart attack within the last 4-6 months. Virtually all the women recalled having early (prodromal) symptoms within the weeks prior to their attack. The most frequent symptoms were unusual fatigue and sleep disturbance. Other symptoms included shortness of breath, indigestion and anxiety. Less than a third of the women in the survey reported any early warning signs involving chest pain or discomfort. Acute symptoms experienced during the attack included shortness of breath, weakness, fatigue, cold sweats and dizziness. In contrast to most men, fewer than half of these women reported some degree of pressure, pain or tightness of the chest during the critical time of attack onset.⁶

In a separate study, Dr. Anne Rosenfeld interviewed 52 women who had been hospitalized after a recent heart attack about their experiences prior to seeking treatment. Common symptoms found in this group of women were pain of the jaw, arm, back, or chest, shortness of breath, fatigue, nausea, and sweating. However, most reported that they delayed seeking treatment for anywhere from 15 minutes to 2 weeks after their symptoms began.⁷

Further analysis of the interviews revealed two main groups of decision trajectories: *knowing* and *managing*. Women in the *knowing* group understood that their symptoms were serious and knew they would need help, even if they did not recognize that they were experiencing



a heart attack. Some of these women sought treatment immediately, but others waited for a convenient time to go to the hospital, or delayed seeking treatment until a family member or co-worker insisted on calling for help. Many women in the *managing* group believed they were suffering from indigestion and tried to manage their pain with common analgesics, antacids, and other stomach remedies, or simply ignored their symptoms until the pain intensified and they were forced to seek treatment.⁸

During mid-life, a woman's risk for heart disease starts to rise dramatically. In part, this is because a woman's body stops producing estrogen.

A research team led by Dr. René Martin interviewed both men and women recovering from heart attacks to determine gender differences in early and acute symptoms. When initially seeking treatment, over half of the study participants understood that their symptoms and pain indicated a possible heart attack. Women were more likely than men to attribute their symptoms to gastrointestinal distress, stress, or anxiety, and to be surprised to receive a heart-related diagnosis. Those who recognized the cardiac nature of their symptoms sought treatment earlier than those who associated their symptoms with some other cause. While most of the participants reported that they had discussed their symptoms with a spouse or other support person, women were less likely than men to have their symptoms recognized as cardiac in nature, or to be advised to seek medical attention.⁹

These research results have helped to establish that both the early and the acute symptoms women experience related to a heart attack vary significantly from the classic chest pressure or pain described for men. The symptoms for women are more subtle and difficult to recognize, often appearing more like stomach problems or indigestion. Failure to recognize the meaning and severity of these symptoms could lead a woman suffering a heart attack to attribute her symptoms to other causes and delay seeking treatment.

Women in Recovery and Rehabilitation after a Heart Attack

The first year following a heart attack, women tend to have a higher rate of disability and death, and show poorer psychological adaptation, than men. In another study led by Dr. Martin, patients recovering from a heart attack were interviewed shortly after they were discharged from the hospital regarding their beliefs as to the causes of their illness. There were no differences noted between men and women in their medical histories prior to their hospitalization. Over one-third of those interviewed attributed their heart attacks to stress; other widely believed causes were diet, smoking, heredity and lack of exercise. Men tended to identify more causes than women, and were more likely to include poor diet, smoking or lack of exercise. These same patients were contacted for a three-month follow-up, at which time fewer than 20% of all participants reported efforts to lower their stress levels and women were less likely than men to report changes in diet or exercise.¹⁰

Dr. Sally Rankin recently led a study that followed 30 female heart attack survivors for a year following their attacks, in order to understand the factors that affect recovery and improve quality of life. Study participants completed questionnaires regarding quality of life at preset intervals – the first prior to leaving the hospital, then at one month, six months, and one year after hospital discharge. The quality of life scores, which included overall health, psychosocial and family functioning, mood, and social support, all improved by the end of the year. The greatest improvement, however, occurred in the area labeled “satisfaction with family life,” an area often viewed differently by women and men. Social support and mood were the best predictors of overall quality of life at one year for women; cardiac capacity, which indicates the ability to tolerate activity, was not found to have a significant impact.¹¹

After a heart attack or coronary artery bypass graft (CABG) surgery to address CAD, a cardiac rehabilitation program consisting of regular exercise can significantly





reduce mortality during recovery. Dr. Shirley Moore followed both recent female heart attack survivors and those who had undergone a CABG, to measure the frequency, quantity, persistence and intensity with which they followed their rehabilitation programs. She found that almost a quarter of the participants did not exercise at all, and only about half were still exercising at 3 months. Those who reported having fewer associated health conditions exercised with greater frequency and intensity. Those with more social support tended to have a higher rate of persistency, while a belief in the positive health benefits of exercise increased the amount of exercise undertaken by the participant.¹²

Taken together, these results indicate that women and men cardiac patients tend to differ in how they attribute the causes of their illness, which may influence their motivation to change their behavior and reduce the risks of reoccurrence after surviving a heart attack. Understanding the different dimensions of motivation, quality of life, activity levels, and exercise compliance could help clinicians improve rehabilitation programs for women after a cardiac event.

Women with Chronic Angina

Chronic angina is a long-term condition that often results from CAD, and two-thirds of the estimated 6 million Americans who suffer from this condition are women. In a survey of elderly CAD patients, Dr. Laura Kimble explored how chronic angina limits activity and diminishes quality of life. The research found that men and women experienced different forms of pain due to chronic angina. A significant percentage of both men and women described their pain as aching, heavy, exhausting or sharp; however, men reported a greater number of recent angina episodes, while women reported a greater intensity of pain which caused more limitation of activity. Also, a large proportion of women characterized their pain as hot/burning and tender, which was not seen in men. Although small, these variations could affect how health care personnel interpret the effects of chronic angina, possibly leading to different treatments for men and women.^{13, 14}

Women and Peripheral Artery Disease (PAD)

Dr. Roberta Oka examined peripheral artery disease, a form of atherosclerosis which impairs circulation to the legs, for gender-related differences. PAD often causes intermittent claudication (leg pain associated with exertion) which limits activity and significantly decreases the quality of life for its sufferers. Severe cases of PAD could lead to leg ulcers and gangrene. Dr. Oka and her research team assessed lower leg circulation and measured the walking distance, activity tolerance, and quality of life in a group of elderly men and women suffering from mild to moderate PAD.

By taking action, older women and especially those who already have heart disease can reduce their risk of developing heart-related problems.

Over three-quarters of those polled reported engaging in regular exercise and fewer than 10% were smokers. However, many reported common related medical conditions including high blood pressure, high cholesterol, diabetes, chronic angina, and CAD. As part of the study, the participants underwent a graded exercise treadmill test. The walking distance before the onset of claudication was not significantly different between men and women, although the men achieved a greater total distance. In a quality of life questionnaire, the women reported worse physical functioning, more body pain and a poorer mood state.¹⁵ Even though PAD is more common in men, the results of this study indicated that women with PAD might suffer a greater decrease in their activity tolerance and quality of life.

Conclusion

Research supported by the NINR has contributed to the growing body of evidence indicating that women's risks for, symptoms of, and responses to heart and cardiovascular disease vary widely from those of men. Women's symptoms tend to be more subtle and less predictable, leading to potentially detrimental outcomes. Women often underestimate the danger of cardiovascular disease, and may fail to take preventive measures, heed warning signs, or seek treatment for symptoms. Even after a heart attack or cardiac surgery, their compliance with rehabilitation efforts may be insufficient.

About 6 million American women have coronary heart disease.

Understanding the complexity of a woman's symptoms of heart and cardiovascular disease could greatly assist nurses and other health care professionals in designing interventions both to promote cardiac health awareness and to decrease treatment delay – key components in survival and recovery. Nursing care also needs to focus more on teaching heart-protective lifestyle habits, cardiac symptom recognition and response, and cardiac recovery and rehabilitation, in order to improve the future of women at risk for or suffering from heart disease.



Glossary of Abbreviations

Atherosclerosis a build-up of plaque in the arteries that can block blood flow, also called hardening of the arteries

CABG Coronary artery bypass graft

CAD Coronary artery disease

FRE Framingham risk estimation

HBP High blood pressure

HDL High-density lipoprotein, a beneficial form of cholesterol

MAPMISS The McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey

Myocardial infarction Another name for heart attack

NINR National Institute of Nursing Research

PAD Peripheral artery disease

References

1. American Heart Association, 2004. Retrieved January 25, 2006, from <http://www.americanheart.org/presenter.jhtml?identifier=3000941>
2. Sparks EA, Frazier LQ. Heritable cardiovascular disease in women. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*. 2002; 31: 217-228.
3. Tobacco Information and Prevention Source (TIPS). 2004. Adult Cigarette Smoking in the United States: Current Estimates. National Center for Chronic Disease Prevention and Health Promotion. Retrieved January 25, 2006, from: http://www.cdc.gov/tobacco/factsheets/AdultCigaretteSmoking_FactSheet.htm
4. Michos ED, Vasamreddy CR, Becker DM, Yanek LR, Moy TF, Fishman EK, Becker LC, Blumenthal RS. Women with a low Framingham risk score and a family history of premature coronary heart disease have a high prevalence of sub-clinical coronary atherosclerosis. *American Heart Journal*. 2005; 150(6): 1276-1281.
5. McSweeney JC, O'Sullivan P, Cody M, Crane PB. Development of the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey. *Journal of Cardiovascular Nursing*. 2004; 19: 58-67.
6. McSweeney JC, Cody M, O'Sullivan P, Elbersson K, Moser DK, Garvin BJ. Women's early warning symptoms of acute myocardial infarction. *Circulation*. 2003; 108: 2619-2623.
7. Rosenfeld AG. Treatment-seeking delay among women with acute myocardial infarction: decision trajectories and their predictors. *Nursing Research*. 2004; 53: 225-236.
8. Rosenfeld AG, Lindauer A, Darney BG. Understanding treatment-seeking delay in women with acute myocardial infarction: descriptions of decision-making patterns. *American Journal of Critical Care*. 2005; 14 (4): 285-293.
9. Martin R, Lemos K, Rothrock N, Bellman SB, Russell D, Tripp-Reimer T, Lounsbury P, and Gordon E. Gender disparities in common sense models of illness among myocardial infarction victims. *Health Psychology*. 2004; 23 (4): 345-353.
10. Martin R, Johnsen EL, Bunde J, Bellman SB, Rothrock NE, Weinrib A, Lemos K. Gender differences in patients' attributions for myocardial infarction: implications for adaptive health behaviors. *International Journal of Behavioral Medicine*. 2005; 12 (1): 39-45.
11. Rankin SH, Fukuoka Y. Predictors of quality of life in women 1 year after myocardial infarction. *Progress in Cardiovascular Nursing*. 2003; 18: 6-12, 62.
12. Moore SM, Dolansky MA, Ruland CM, Pashkow FJ, Blackburn GG. Predictors of women's exercise maintenance after cardiac rehabilitation. *Journal of Cardiopulmonary Rehabilitation*. 2003; 23: 40-49.
13. Kimble LP, Dunbar SB, Weintraub WS, McGuire DB, Fazio S, De AK, Strickland O. The Seattle Angina Questionnaire: reliability and validity in women with chronic stable angina. *Heart Disease*. 2002; 4: 206-211.
14. Kimble LP, McGuire DB, Dunbar SB, Fazio S, De A, Weintraub WS, Strickland OS. Gender differences in pain characteristics of chronic stable angina and perceived physical limitation in patients with coronary artery disease. *Pain*. 2003; 101: 45-53.
15. Oka RK, Szuba A, Giacomini JC, Cooke JP. Gender difference in perception of PAD: a pilot study. *Vascular Medicine*. 2003; 8: 89-94.

Factors That Increase Women's Heart Disease Risk

Those beyond your control:

Family history of early heart disease

Being 55 or older

Those you can take action against:

Smoking – about 21.2 million women smoke.

High blood pressure – 33 percent of women have hypertension, the condition's medical name; uncontrolled high blood pressure can lead to heart failure, which affects about 2.5 million women.

High blood cholesterol – about 56.5 million women have high total cholesterol.

Overweight/obesity – 62 percent of women are overweight, including about 33 percent who are obese.

Physical inactivity – more women than men are physically inactive, with 41 percent of women engaging in no leisure-time physical activity and more than 60 percent of women do not meet the recommended amount of at least 30 minutes a day of moderately intense physical activity, such as brisk walking.

Diabetes – nearly 7 million women have been diagnosed with diabetes and another 3 million are undiagnosed.

These research findings from the NINR show that women experience a wide range of symptoms that may indicate a heart attack, and often delay seeking treatment for a variety of reasons. If you are a woman and you begin to feel fatigue, shortness of breath, anxiety, weakness, dizziness, or a cold sweat, even in the absence of chest pain or pressure, you may be having a heart attack. You should contact your health care provider or call 911 immediately.

The NINR is part of the National Institutes of Health (NIH), the biomedical research arm of the federal government. NIH is an agency of the U.S. Department of Health and Human Services. To learn more about the NINR and nursing research, please visit the NINR website:
<http://ninr.nih.gov/ninr/>

Other sources of information about women and heart disease:

National Heart, Lung, and Blood Institute
www.hearttruth.gov, 301-592-8573, TTY:
240-629-3255

Office on Women's Health, DHHS
National Women's Health Information Center
www.WomensHealth.gov, 1-800-994-WOMAN,
TDD: 1-888-220-5446

American Heart Association
www.americanheart.org, 1-888-MY HEART

WomenHeart: the National Coalition for Women with Heart Disease
www.womenheart.org, 202-728-7199



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