Killing Me Softly: Women & Heart Disease

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Symptoms of a heart attack can include ...

1. Dizziness, weakness, arm pain, pressure on chest
2. Heart palpitations, SOB, weakness
3. No symptoms
4. All of the above
“Heart disease is the leading killer of women in the United States and the second leading cause of death in most developed nations.”

--American Heart Association (2015)
Flawed Concept of Women’s Health?

“... The community has viewed women’s health almost with a ‘bikini’ approach, looking essentially at the breast and reproductive system, and almost ignoring the rest of the woman as part of women’s health.”

Nanette Wenger, MD
Chief of Cardiology, Grady Hospital
Professor of Medicine, Emory University
Atlanta, Georgia
Awareness is lacking!

AHA Special Report

Fifteen-Year Trends in Awareness of Heart Disease in Women
Results of a 2012 American Heart Association National Survey

WRITING COMMITTEE
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### Awareness


**Table 4. (Unaided) Awareness of Warning Signs of Heart Attack in 2012 Compared With 1997**

<table>
<thead>
<tr>
<th>Response (Unaided)</th>
<th>1997</th>
<th>2012</th>
</tr>
</thead>
<tbody>
<tr>
<td>What warning signs would you associate with having a heart attack?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest pain</td>
<td>67</td>
<td>56*</td>
</tr>
<tr>
<td>Fatigue</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Nausea</td>
<td>10</td>
<td>18*</td>
</tr>
<tr>
<td>Pain that spreads to shoulders, neck, or arm</td>
<td>NA</td>
<td>60</td>
</tr>
<tr>
<td>Shortness of breath</td>
<td>33</td>
<td>38*</td>
</tr>
<tr>
<td>Tightness of the chest</td>
<td>15</td>
<td>17</td>
</tr>
</tbody>
</table>

All values are weighted percentages for telephone results for comparability between the 1997 and 2012 surveys. 
NA indicates response not surveyed in 1997.

*Statistical significance between survey years at P<0.05.
Why Do Women Have a More Adverse CHD Prognosis?

- Is it due to **age**?
- Is it due to **comorbidity**?
- Is it due to **gender gap** in medical therapy?
- Is it due to more **advanced angiographic CAD**?
- The answers are at the end!
The Scope of the Problem

• Heart disease is the biggest killer of women
• Cardiovascular disease is BY FAR the biggest killer of women
  • Roughly 401,000 deaths/year from CVD (vs. 386,000 men)
  • 176,255 deaths/year from CAD
  • Vs 39,520 deaths from breast cancer
The Scope of the Problem

• Women are roughly 10 years older than men when they present, and have more comorbidities
• Young women also develop CAD and have a worse prognosis than men

CVD and other major causes of death: females (United States: 2014). Source: NCHS and NHLBI.
Prognosis After MI

- 38% of women die within first year
  - Compared to 25% of men

- 35% of women will have second MI within 6 years
  - Compared to 18% of men
Risk Factors

Non-modifiable
- Age
- Ethnicity
- Genetics
  (First degree male < 55, female <65)

Modifiable
- Diabetes
- Hypertension
- Smoking
- Dyslipidemia
- Obesity
- Sedentary lifestyle
- Stress
Gender

• Among women, diagnosis and death rates are steady; among men, they’re declining.

• More than 500,000 women die of cardiovascular disease (CVD) each year
  • Greater than the number of CVD deaths in men
  • Also greater than the total of the next seven causes of death in women
Age

- Men develop CVD at younger ages, but incidence and prevalence equalize for women after menopause
- Postmenopausal status is considered an independent risk factor
- Hormone therapy no longer recommended to prevent or manage CVD due to increased rates of thrombotic events, such as myocardial infarction (MI) and stroke, as well as breast cancer
- Short-term hormone therapy used to treat menopause symptoms
Ethnicity and Genetics

• **Ethnicity**
  – Race and ethnicity together affect CVD risk
  – Death rate for African-American women with CVD is almost 40% higher than that of white women

• **Genetics**
  – Inherited susceptibility patterns appear in families
Diabetes

• Poses a greater risk than any other factor
• Nurses’ Health Study: Women with diabetes had seven times more cardiovascular events than other women and about half of them died of CVD
• Women with diabetes and CVD--especially Hispanic and African-American women--die at a much higher rate than men or nondiabetic women
• Young women with diabetes lose any premenopausal protection
Hypertension

- Puts women at a much greater risk for CVD, especially if it develops before menopause
- At least half of women may have hypertension before menopause, with prevalence greatest in African-American women
Smoking
Smoking

• Nurses’ Health Study: Even a few cigarettes a day correlated with a greater risk of CVD or fatal MI
• About one-quarter of all women smoke; prevalence greatest among postmenopausal women
• Younger women who smoke probably cancel out any premenopausal protection
• Women who take oral contraceptives and smoke are more likely to have an MI or stroke than those who take the pill but don’t smoke
• Associated with 50% of all coronary events in women
Dyslipidemia and Obesity

• Dyslipidemia
  – Doubles a woman’s risk of CVD compared to women with normal lipid profiles
  – Low levels of HDL have been shown to be a much stronger predictor of CVD mortality in women than men

• Obesity
  – Central obesity poses a greater risk than increased body mass index (BMI)
  – Healthy waist circumference
    • Women: less than 35 inches
    • Men: less than 40 inches
  – Desired BMI (men and women): 18.5 to 24.9 kg/m²
Sedentary Lifestyle

• Can contribute to obesity, dyslipidemia, hypertension, and hyperglycemia
• Exercise can reduce cardiovascular risk by increasing high-density lipoprotein (HDL) and decreasing BP, blood glucose, and low-density lipoprotein (LDL)
• Exercise can cut a woman’s CVD risk by half and may significantly decrease the risk of a second MI in a postmenopausal woman
• 30 minutes of moderate-intensity physical activity on most days is ideal; 60 minutes for women who need to lose weight or sustain weight loss
Stress

• Puts a woman at greater risk for CVD and poorer outcomes
• Depression also may increase risk or deter her from seeking medical help
• Consider screening women with CAD for depression and refer for treatment as needed
Determining CVD Risk:

• One or more major risk factors (cigarette smoking, poor diet, physical inactivity, hypertension, dyslipidemia, metabolic syndrome, obesity, family history of premature CVD (<55 in a male relative and <65 in a female relative))

• Evidence of subclinical vascular disease

• Poor exercise capacity on treadmill test and/or abnormal heart rate recovery after stopping exercise
When heart trouble is sensed, who waits at least two hours before help is called?

1. Men
2. Women
3. Both
Symptoms in Women with MI

- Study of 515 women with MI
  - Chest pain absent in 43%
  - Most common symptom:
    - Dyspnea in 58%
    - Weakness in 55%
    - Fatigue in 43%
  - Prodrome:
    - Fatigue in 71%
    - Sleep disturbance (48%), dyspnea (42%)

Symptoms in Women with MI

• Over 1,000,000 men and women in NRMI registry, 1994-2006 (481,581 women)
  – 42% of women presented without CP (vs. 31% of men)
  – Higher in-hospital mortality in women (14.6%) than in men (10.3%)
  – Younger women without chest pain were at the highest risk

Canto JG et al. JAMA 2012;307:813
Symptoms in women with MI

• These women who presented without CP were sicker and fared worse:
  – More had DM
  – Later presentation
  – More Killip III/IV
  – More NSTEMI
  – Less timely therapies
  – Less antiplatelet meds, heparin, BB

Canto JG et al. JAMA 2012;307:813
Signs and Symptoms in Men

• Classic substernal pain characterized by heavy, crushing, or squeezing feeling
• Commonly occurs with physical exertion or emotion
Signs and Symptoms in Women

• Number one symptom is **SOB!**

• Other symptoms include: fatigue, GI symptoms, changes in sleep patterns

• May also have:
  – Heaviness, squeezing, or pain in left chest, abdomen, midback, or shoulder
  – Arm pain
  – Palpitations or pain that’s sharp or fleeting

An older woman or one with diabetes may not experience any pain during an MI.
Symptoms in women with MI

• Sudden cardiac death
  – Higher rates in men
  – However, a significantly higher percentage of women who have SCD had no prior symptoms! (63% vs. 44%)

Canto JG et al. JAMA 2012;307:813
Other Risk factors

- Pregnancy-related
  - Pre-eclampsia, eclampsia
  - Gestational diabetes
  - Stillbirth
  - Miscarriages, esp. multiple

- Hx of cancer treatments (XRT)

- Depression and stress

- Hx of trauma or abuse
Which risk factors are more predictive in women?

- Low HDL is more predictive than high LDL
- Lp (a) can be more predictive in younger women
- TG can be more predictive in older women, especially if >400 mg/dL
“Significantly, electrocardiogram findings are different for men and women. A woman experiencing an MI is far less likely than a man to have concurrent ST-segment elevation. If she describes atypical pain and has an EKG that doesn’t show any ST-segment changes, she may be misdiagnosed and not get follow-up testing.”
Diagnostic Testing

- Acute symptoms should be triaged and treated in the emergency department
- If patient isn’t having acute symptoms but may be at risk for CVD, conduct a risk assessment using the Framingham tool
- If at risk or high risk:
  - Exercise or pharmacologic stress test
    - False-positives more common in women
  - Exercise echocardiography ("stress echo")
    - More reliable in women, especially when wall motion or valve function in question
Cardiac Catheterization

- For anyone with a positive or inconclusive stress test or stress echocardiogram
- Most reliable diagnostic tool in women
- Invasive procedure with risk of bleeding, infection, and stroke
TIMI Myocardial Perfusion Grades

- **TMPG 3**: Normal ground glass appearance of blush. Dye mildly persistent at end of washout.
- **TMPG 2**: Dye strongly persistent at end of washout. Gone by next injection.
- **TMPG 1**: Stain present. Blush persists on next injection.
- **TMPG 0**: No or minimal blush.

% Mortality:
- TMPG 3: 2.0% (n = 203)
- TMPG 2: 4.4% (n = 46)
- TMPG 1: 5.1% (n = 79)
- TMPG 0: 6.2% (n = 434)

(P = 0.05)*

Invasive Procedures

- PCI
- CABG

A woman’s blood vessels may be small and difficult to cannulate or visualize during the above procedures, therefore her risk of complications is greater. Also, women are more likely than men to experience bleeding at the surgical site or hemorrhagic stroke, and their in-hospital mortality rate is significantly higher.
Women Receive Less Interventions to Prevent and Treat Heart Disease

- Less cholesterol screening
- Less lipid-lowering therapies
- Less use of heparin, beta-blockers and aspirin during myocardial infarction
- Fewer referrals to cardiac rehabilitation
Western Lifestyle
Lifestyle Modifications

- Low-fat, low-cholesterol diet; avoid saturated fats (butter, cheese, fatty meats)
  - Limit daily saturated fat intake to <10% of calories
  - Limit cholesterol intake to <300 mg
  - Limit intake of trans fatty acids
- Omega-3 fatty acids
  - Protect against CVD
  - Found in oily fish such as tuna and salmon
  - Eat several times a week
USDA Food Pyramid (2025 proposal)

Sponsored by the Association of American Corporations for Freedom of Choice in Food (AAC-FCF)

- Fruit and Vegetable-Based Snacks
  - 1-2 Servings

- Pasta / Rice / Wonderbread
  - 2-3 Servings

- Yogurt / Cheese / Ice Cream / Milkshakes
  - 3-5 Servings

- Coca-Cola / PowerAid / Sodas / Energy Drinks
  - 2-3 Servings

- Snickers / Snack Crackers / Granola Bars / Candy
  - 2-4 Servings

- Meats and Fast Food
  - 6-11 Servings
Lifestyle Modifications

• Eat more fresh fruits, vegetables, whole grains, and other high-fiber foods
  – Recommended daily fiber intake: 20 to 30 grams
• Limit salt intake to 2,400 mg/day
• Limit alcohol consumption to one drink per day
• Do at least 30 minutes of moderate aerobic activity daily
• Maintain BMI <25 kg/m² and waist <35 inches (women)
• If diabetic or pre-diabetic, keep blood glucose in normal range and hemoglobin A1C level <7%
• Stop smoking and avoid secondhand smoke
• Reduce stress
Managing CVD with Drugs

• Antiplatelet agents
  – Prevent thrombotic events

• Statins
  – Normalize lipid levels
  – Reduce rates of nonfatal MI and stroke
  – Decrease need for percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG)

• Beta blockers
  – Reduce the risk of MI, reinfarction, and sudden cardiac death
Managing CVD with Drugs

• **ACE inhibitors**
  – Reduce morbidity and mortality in patients who've had an MI and those with hypertension, left ventricular dysfunction, or diabetes

• **Short-acting sublingual or aerosol nitrates**
  – Reduce acute angina symptoms

• **Long-acting nitrates**
  – Prevent angina and improve exercise tolerance
Rehabilitation

• Women have higher hospital readmission rates for unstable angina, reinfarction, heart failure, ventricular tachycardia, and ventricular fibrillation.

• Follow-up care to focus on signs and symptoms, energy level, blood cholesterol levels, medication use, and ability to cope

• Formal rehab after MI, PCI, or CABG includes early ambulation, behavioral modifications, psychosocial support, and vocational and sexual counseling
And the Answer is......

- Differences in physiological vascular function. The coronary endothelial and microvascular reactivity are the believed key players.

WISE Study
Websites on Sex-Based Differences in Health and Disease

• Society for Women’s Health Research:
  – Overview of sex-based differences
  – Links to additional sources of information
    – http://www.womenshealthresearch.org/hs/links.htm
    – http://www.womenshealthresearch.org/hs/healthfacts.htm
• Centre for Research in Women’s Health
  – http://www.crwh.org/
• National Center for Gender Physiology at the University of Missouri
  – http://www.genderphysiology.org
• Partnership for Gender-Specific Medicine
  – http://cpmcnet.columbia.edu/dept/partnership/
Questions?