Knowing the Atypical Signs and Symptoms of Heart Attack in Women will Improve Survival

Combatting Heart Disease Through Awareness

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Summary
Statistics show that heart disease has become the leading killer of women, far surpassing breast cancer. While heart disease is not a curable condition, it can be prevented or managed with early detection. Unfortunately, most women are unaware of heart disease symptoms and early prevention includes knowing the factors that play a role in susceptibility of heart disease and the differences between gender symptoms for women vs men. A practical implementation for prevention is discussed. As awareness is key, an informative presentation to a group of women university student-athletes was given about heart disease prevention and signs and symptoms in women.

Video Link: https://youtu.be/YBeNGyMm3nY

The Issue: Unawareness of heart attack symptoms in women decreases their chance of survival
What is the number #1 killer of women in North America today? Cancer? Diabetes? Stroke? Most people are startled to find that heart disease takes the lead as the top killer of women today, far outweighing all cancers combined.

The majority of data on heart and cardiovascular diseases have been taken from research and numerous studies conducted on men. Consequently, the public learned to look for symptoms that men experienced prior to a heart attack. However, in light of research on women, it has been found that symptoms of heart disease are gender-specific. Women have various symptoms differing from men when they are experiencing a heart attack. For example, men often experience angina (chest pain), particularly if they are performing manual labor. The pain diminishes when they rest. In contrast, women often experience angina when they are resting. Many women brush off these symptoms (i.e. lightheadedness) as simply fatigue or tiredness and delay in seeking treatment.

What are the facts about women and heart disease? (AG)
Contrary to popular belief, diseases of the heart are the leading causes of death in women over the age of 65 followed by cancer, stroke and chronic lower respiratory disease (CLRD) (1). Unfortunately, women and men can have drastically different experiences with an acute myocardial infarction (AMI) or heart attack. Women who suffer from an AMI have higher mortality rates than men. Within the first year of an AMI, 38% of women die, 13% higher when compared to men. Why is there such a difference between
male and female mortality rates? One of the reasons is the lack of recognition amongst women that they’re experiencing symptoms of a heart attack and they therefore delay seeking medical attention. The treatment for an AMI should be performed within at least 12 hours of the onset of symptoms however, women and older-age individuals delay seeking treatment more often than their male and younger counterparts thus increasing the risk of mortality. The high mortality rate of women post-AMI could also result from a lack of estrogen; a naturally occurring hormone that protects the heart after menopause. Therefore, postmenopausal women are more susceptible to heart disease than their younger, premenopausal counterparts. This condition creates a “double risk” in which gender and age increase the likelihood of treatment-seeking delay for women (2).

A few alarming statistics: Heart disease is responsible for 25% of female deaths. About a majority of women are unaware that their number one killer is heart disease. Close to 6% of white women and Mexican American women have coronary heart disease (CHD); that percentage increases to about 10% for all black women. About 66% of females who die of sudden cardiac death (SCD) present without previous cardiac symptoms (3).

**Relationship between women, aging, and heart disease (AG)**
Statistics show that men have a greater risk of heart disease than women. That is, until women go through menopause. Once this happens, the heart protecting effects of estrogen decrease significantly and the risk of heart disease for women increases especially around the tender age of 55-60 years old. This explains why women experience their first MI about ten years later than the average male (4). There was a study involving 1,143,513 MI patients; 42.1% of which were women. The study revealed that women were significantly older than men when presenting at the hospital with an MI, with the mean ages were 73.9 vs 66.5 years, respectively. They examined the relationship between sex specific MI symptom presentation and hospital mortality with age and sex factored in. The research revealed that more women with MI presented without chest pain compared to men. In addition, there was a significant interaction between age and sex with chest pain at presentation. Younger women (45 years or less) presenting without chest pain had higher mortality rates than young males presenting without chest pain. Perhaps this is responsible for the in-hospital mortality rate being 4.3% higher for women compared to men. The observational study concludes that MI patients without complaints of chest pain are shown to have high mortality. This could explain why younger women, who often present without chest pain, do not fare as well as young men. Further research should be conducted to understand why there is a higher mortality rate in the female premenopausal or middle-aged group.

**Awareness (AG)**
One of the main issues with the prevalence of heart disease in women is that they are simply unaware of the signs and symptoms of heart disease. Women should be educated about the leading cause of death for their gender and age group. The American Heart Association (AHA) has been conducting surveys every three years for the past 39 years evaluating women’s awareness and knowledge about CVD. In 2012, a study revealed that black and Hispanic women were as aware of CVD as white women were in 1997, 35 years prior. In fact, awareness in all racial/ethnic and age groups were low (1). These
results correlate to the prevalence of heart disease among different racial groups. In regard to race, more whites have heart disease compared to all other races. The African American population has the highest recording of CAD and hypertension compared to other races (1).

**Keywords and Definitions (AG)**
Cardiovascular disease (CVD) or heart disease is an umbrella term for a list of heart conditions a person may have. The first type of CVD, which is the most prevalent affecting 80.0 million Americans, is hypertension or high blood pressure (BP). High BP reads as a systolic (top number) of 140 mmHg or more and/or a diastolic (bottom number) of 90 mmHg or more (1). These numbers represent the force of blood traveling out of the heart and back to the heart, respectively. A high systolic number means the blood is exiting the heart at a fast rate at a high pressure due to a forceful contraction of the ventricles in the heart. The diastolic number represents the resistance the blood faces as it is returning to the heart from the body. When blood pressure remains high for extended periods of time it can cause wear and tear on the arteries and vessels in the body and the heart causing them to become weak and inefficient.

The most common forms of coronary heart disease (CHD) or coronary artery disease (CAD) in order of prevalence are chest pain (angina or AP), heart attack (MI), congestive heart failure (CHF) and stroke. Angina attacks are bouts of chest pain that can last for up to a few minutes and usually occurs during exercise or stressful situations. This chest pain is a result of oxygen and blood deficiency in the heart muscle that does not cause permanent damage to the muscle (5). In an MI however, the heart muscle is deprived of oxygen because the blood supply is reduced or halted completely. An MI is usually a result of atherosclerosis, which is the buildup of plaque in the arteries of the heart restricting the flow of blood to the heart muscle and without that supply the heart muscle can die causing a heart attack (5). CHF means the heart is working inefficiently. The main function of the heart is to supply the body with the appropriate amount of blood. In CHF, the heart muscle cannot pump enough blood to satisfy the demand of the body. In an effort to compensate for this lack of efficiency the chambers of the heart will stretch and enlarge, the heart will develop more muscle mass and pump faster, and blood vessels will constrict to keep BP high (6). Though these compensatory methods will keep the heart beating and the body supplied with oxygen eventually, the heart will experience fatigue and start to decline. A stroke is similar to a heart attack but in the brain. When brain does not receive oxygen and nutrients the cells can die causing a stroke (7).

**What happens to your body during a heart attack? (AM)**
An intricate network of blood vessels, called the coronary arteries, help carry and deliver blood to the heart with each pump. The oxygen contained in the blood is vital for the heart to continue beating. Even minute damage that prevents or blocks off the needed amount of oxygen for the heart can lead to severe repercussions in an individual’s health and may prove to be fatal.

Many factors can affect oxygenated blood from reaching the heart. One specific factor includes the buildup of plaque in the arteries. Plaque occurs when fat accumulates in the
blood vessels and causes injury to the walls. As a defense mechanism, the body then makes the blood vessel walls stickier to heal the injury, but this mechanism also allows other cellular wastes to stick to the wall. Eventually, the accumulation of this plaque leads to ischemia (starvation of oxygen) in the heart and risk of coronary thrombosis (8). Other factors which affect heart health, such as environmental, dietary and lifestyle factors, will be discussed further in the paper.

**Identifying and differentiating the symptoms between genders** (AM)

One of the telltale signs of a heart attack is *angina*, a tightness or pressure in the chest area. The condition results from the narrowing of the arteries due to the aforementioned plaque buildup in the blood vessels. Other symptoms include dizziness, shortness of breath, difficulty in breathing, pain in the left arm, and sweating.

However, symptoms of a heart attack can vary differently between genders. While both men and women experience angina, the incidents occur at different times. For example, men are most likely to feel the pressure when they are doing physical labor and feel relief when they are resting. Women experience angina when they are resting. The discomfort that women experience in their chest is often described as an ache, pressure, or burning sensation rather than a sharp pain (9). Often times, the burning sensation is mistaken for heartburn. Other symptoms women experience include pain or discomfort in the neck, jaw, throat, abdomen, back and left arm, which may not be typically associated as symptoms of a heart attack (8).

Women also have smaller arteries in comparison to men. Thus, when women experience a heart attack, it often involves their microvascular arteries, which are the smaller blood vessels connected to the main arteries (10). On the other hand, men tend to be hospitalized due to coronary artery disease (CAD). Small and subtle differences in symptoms between the genders show that men and women have different symptoms that require specific interventions and treatments (9).

**How come women don’t think they’re having a heart attack?** (AM)

Every year, roughly 15,000 women under the age of 55 are hospitalized for heart disease. Younger women are twice as likely to die upon hospitalization for heart attack than men in the same age range (11). Statistics like these would lead one to think that heart disease is a well-known risk for women, but only 53% of the population is aware of the dangers (5). Most studies indicate that women are less likely to seek medical assistance due to one main reason: their unawareness of the symptoms women experience when having a heart attack.

Unawareness of symptoms manifests itself in different forms. Some women carry a misconception of a heart attack. Most people perceive heart attack symptoms as the “Hollywood heart attack” in which an individual experiencing one will clutch his/her hands to the chest and collapse to the ground (12). However, seldom do heart attacks occur in this way for women. It was reported that only half of all women who are hospitalized recall having angina prior (13). In numerous cases, women experience silent heart attacks, in which they either cannot detect any symptoms at all or do not associate these symptoms with a heart attack. Because they are unaware, they do not call 911 or
seek medical assistance until it is too late (11). Furthermore, many women who exercise regularly believe they are risk-free due to their lifestyle and may fail to take into account other factors such as family health history.

**Why are men’s symptoms more recognized? (AM)**

To further perpetrate the issue, women are not seeking medical assistance because they are looking for the wrong symptoms. For decades, research on heart disease was published and focused on men and subsequently the general understanding of heart disease and its symptoms were tested on men. Historically, it was believed that heart disease was a “man’s disease” but statistics are now showing otherwise—with heart disease as the #1 killer of women in America today (11).

**Understanding the Risk Factors (AM)**

Cardiovascular heart disease (CHD) is potentially a preventable disease. The best way to combat CHD is through early prevention and intervention. Changes in lifestyle are often what keeps the risks at bay and/or can prevent a second cardiac arrest from occurring. Several factors to note include family history, dietary changes, and socioeconomic status.

**Genetics, Race, and Ethnicity - What makes you predisposed to CHD (AG)**

During a new-patient orientation, a doctor may ask a series of general questions. One of them being, do you have any history of or does anyone in your family have a history of X, Y or Z? This question is important because it provides an indicator of potential issues that could arise down the road. The genetics of a mother and father can contribute to the genetic health of their offspring.

A study conducted by Donald M et al. set out to determine whether or not parents who have a history or experienced an episode of CVD transfer that trait to their offspring. The study measures the cardiovascular events of offspring whose parent(s) has had an occurrence of CVD. A total of 1128 men and 1174 women were involved in the investigation (14). The follow-up showed that about 15% of the men and about 7% of the women had incident cardiovascular events. Of the 243 people who experienced a cardiovascular event, 31.3% resulted from MI or coronary insufficiency 29.2% due to chest pain (angina pectoris) 16.0% had a stroke 15.6% were intermittent claudication and 7.8% resulted in death; 5.7% coronary and 2.1% were other (14). Statistical analyses revealed that if a parent has a history of a CVD occurrence, it could predict events in offspring especially in middle-aged men and women. In addition, if a parent had premature CVD, their male offspring’s risk of CVD doubled and female offspring’s risk increased 70% (nonsignificant) over 8 years (14). These findings are significant because it highlights the importance of parental information.

The knowledge of family history may help clinicians provide appropriate preventative care and treatment for patients at borderline risk based on a few simple risk factors. Patients with intermediate or borderline risk can utilize their knowledge of family history of CVD to individualize treatment. Overall, if a parent had a premature onset of CVD, his/her offspring should consider that a personal risk factor for cardiovascular events (14).
Risk factors that are considered to be out of human control are referred to as non-modifiable risk factors. Along with family history, race and ethnicity are considered to be one of those non-modifiable risk factors for heart disease. In fact, minority groups compared to their white counterparts have higher rates of CVD, morbidity, and mortality (15). Black women, South Asians, and Hispanic women in particular have some notable statistics when it comes to heart disease. For example, black women over the age of 64 have a higher incidence of MI than white men. Hypertension and diabetes is also more prevalent in black women compared to non-Hispanic white women (15). South Asian women are another ethnic group susceptible to cardiovascular problems. Heart disease rates for South Asian women are overall very high but the mortality rate of CAD in this group is much higher than that of white women and in fact, represent one of the highest mortality rates overall. Angiographic studies show that South Asian women have severe cardiac issues, including three-vessel disease, despite the majority of them being premenopausal at the time of diagnosis (15). This is a significant statistic because usually, the majority of heart disease cases in women begin after menopause. Therefore, for this ethnic group to have a majority of diagnosed women at a pre menopausal age is unusual and concerning. Another minority group showing high risk of heart disease are the women of Puerto Rican background. 31.7% of Puerto Rican women are obese, just over a majority of them currently smoke, 41% or victim to hypercholesterolemia and they have three or more risk factors in comparison to Cuban, Dominican, Mexican, Central American, and South American counterparts (15). The accumulation of these risk factors is detrimental to the body and especially the heart. The devastating part about these statistics is that two out of the three listed risk factors, smoking and obesity, can be modified and controlled. Another issue among minority groups is knowledge and low levels of awareness, which could be a result of a lack of education, socioeconomic status, location and/or other factors.

Women become more susceptible to heart disease after menopause, which is usually around the age of 65. For those women who experience MI before the age of 65, they might have to look a little deeper than lifestyle, diet, and age. Genetics can have a major influence on heart health and unfortunately, a seemingly healthy individual can be predisposed to having a faulty heart. Therefore, a young woman may be experiencing an MI for completely different reasons than an older woman. A study showed that premenopausal or middle-aged women who experience MI could be placed in a different category than older women who experience MI. Thus, younger women may have anatomical differences such as the size of their coronary arteries compared to older women or men. These differences can be caused by inflammation, coronary spasm, or the varied ways in which plaque could erode or rupture (4). Atherosclerosis, the inelasticity of heart vessels, can develop at an early age and create more risk factors for coronary heart disease (4).

Diet – what are the main foods women should and should not consume? (AM)
After Susan Chlebek, a stay-at-home mother, survived an unexpected heart attack, she was unsure she would be around to raise her children. The statistics of a post-heart attack survival did not seem to be in her favor, but after consulting with her cardiologist, she
learned that those statistics only applied to those who did not implement lifestyle changes. Through the encouragement of her cardiologist, she began watching her diet, “What you eat has a huge impact on your heart. I switched to mostly fish, chicken, fruits, and vegetables. No fast food, ever. No pop” (16).

Stories such as Chlebek’s abrupt encounter with a heart attack are not uncommon among women and highlights the importance of how changes in diet can help prevent another heart attack. Diets that are typically high in sodium, sugar, processed and saturated fats should be avoided. An excess intake of sodium can cause the heart and arteries to contract more which leads to the kidneys retaining excess sodium. When the blood vessels in kidneys and adrenal glands contract more, the abdominal fat makes large arteries stiffer and the sympathetic more active. To make matters worse, genetic factors regulate how much sodium is excreted from the kidneys so caution should be taken if an individual comes from a family that has a history of heart disease (17). Although sodium intake is still necessary for our bodies, it is recommended to take less than 1,500 mg daily (18).

Certain nutrients can be favorable in protecting the heart and warding off disease. For example, potassium is an important nutrient that prevents disease by lowering blood pressure. In addition, potassium makes the blood vessels “less stiff” and causes expansion as the heart pumps blood through them (16). This nutrient can be found in a variety of fruits such as bananas, cantaloupe, citrus fruits, and kiwi and almost all dark green leafy vegetables. Other health experts also recommend other good sources such as milk, yogurt as well as fish, nuts, and soy foods (16).

Another important nutrient to consider is magnesium as it can ward off disease and lower blood sugar. Women should aim for 320 mg a day and the magnesium can be ingested through foods such as beans, pumpkin seed kernels, assortment of nuts, coffee, and chocolate (16).

Revisiting Chlebek’s story, we see that a change in what individuals eat can affect their diagnosis. A study conducted in 2013 found that women who suffered from heart failure had a lower mortality rate if they had previously adhered to a DASH (Dietary Approaches to Stop Hypertension) diet than those who did not. In trials with controlled diets, the DASH dietary pattern decreased blood pressure and overall, higher DASH scores were associated with lower incidents in coronary heart disease as well as heart failure (19). DASH diets are typically composed of fruits, vegetables, and low-fat dairy.

Looking at geographical distribution and socioeconomic factors (AM)
Could other factors such as diet, socioeconomic status, etc., predispose individuals living in different locations of the U.S. cause them to be more susceptible to heart disease? An epidemiological study conducted by the Center for Disease Control a few years ago showed that residents in southeastern U.S., such as Texas, South Carolina, Florida, were at the highest risk for cardiovascular diseases. Similarly, rates of obesity and poverty mimicked the geographic distribution of cardiovascular disease death (20). Although there is no explanation given by the CDC report as to why prevalence is higher in the
southeastern states, there is a possibility that different dietary habits in the southeastern states cause a shift in the disparity seen in the figure below.

![Heart Disease Death Rates, 2008-2010](image)

Due to the limited research conducted on the geographical distribution, there can be no conclusive results on the correlation between the prevalence of heart disease and geographical location. More research done on this topic should provide more insight into the prevalence of heart disease.

Other factors to also consider include the socioeconomic status of certain women. The same study conducted by CDC found that women of a lower socioeconomic status and education level are at an increased risk for CVD. Particularly, women who had little to no education also had limited access to healthcare (20). In addition, individuals who came from underrepresented or minority group were usually less aware of heart disease symptoms.

**The most common types of CVD that affect a woman’s heart** (AG)

We know that women are more susceptible to heart disease after menopause, we know all of the risk factors and we know what to look out for but what exactly is the specific form of CVD that affects women the most? Research shows that ischemic heart disease as a result of coronary atherosclerosis is in fact the number one culprit of cardiovascular death in all women (15). Research has expanded the spectrum of coronary atherosclerosis in women and found that both obstructive coronary artery disease (CAD) and coronary endothelium dysfunction leads to ischemic heart disease (IHD) (15). IHD is a costly illness for more women compared to men due to frequent angina and doctor/hospital visits, higher MI mortality, and higher rates of heart failure hospitalization. Women have
a greater risk of left ventricular hypertrophy and symptomatic heart failure as well. These conditions can be attributed to the effects of menopause. Estrogen levels influence vascular maintenance and after menopause those estrogen levels decrease. These reduced amounts of estrogen could explain the high rates of hypertension in women post-menopause, which would also explain the left ventricular hypertrophy as the two conditions often correlate (15). Therefore, women should be aware of and on the lookout for symptoms that could lead to CAD or left ventricular hypertrophy.

What should you do if you experience these symptoms? Talking about aspirin (AM)

We’ve all heard it before: “take two aspirin and call in the morning.” We’ll take it one step further and say take the aspirin and call 911 immediately if you’re feeling symptoms of a heart attack. But to understand the importance of aspirin, one must know the preventative effects this drug has on the body.

In the case of an emergency, taking aspirin can buy an individual some time before serious damage is done to the heart during cardiac arrest. Chewing a 325-mg tablet is the most effective way when experiencing a heart attack. Coated aspirin should be avoided as absorption may take longer (21).

Aspirin is able to reduce the risk of a heart attack by preventing blood clots from forming from ruptured plaques. Plaques are a result of buildup of fat and cellular wastes along the interior lining of a blood vessel. When these plaques rupture from the wall lining, millions of platelets stick to the injury, forming a blood clot, which prevents blood flow to the heart. Aspirin has a platelet-thinning agent and prevents platelets from clumping together (22).

Even a little amount of aspirin could prevent a heart attack from occurring, but it should also be noted, however, that individuals should immediately call 911 after taking aspirin. Aspirin will not ameliorate a heart attack and can only buy an individual so much time.

Other preventative action: Getting a physical exam (AM)

As discussed throughout this paper, heart disease can be a preventable disease through early intervention. An aspect that can facilitate in prevention is getting an annual physical exam. Scheduling a routine checkout with a physician can help identify any possible symptoms of heart disease early on and allows for the physician to either begin a treatment plan or refer the patient to a cardiologist, depending on the severity of the patient’s condition. As postmenopausal women are at a greater risk heart disease due to the cessation in estrogen production (23), postmenopausal women should consider getting regular checkups to assess overall health and possible indicators of heart disease.

Community Action: Prevention through education (AM)

We delivered a brief, informative and semi-interactive presentation to the Rutgers Women’s Club Basketball Team about women and heart disease. The audience consisted of a young group of women ages 18 to 22 years old. Although their chance of having signs and symptoms of heart disease is low, it is an appropriate population to discuss how to prevent heart disease.
During the presentation, we addressed many key facts and statistics that these young women were not aware of, including survival and mortality rates, risk factors, gender specific symptoms of a heart attack, effects of certain lifestyle choices, and the genetic impact on heart health. As a practical takeaway, we also emphasized what to do in the case of an emergency—chewing a 325-mg aspirin and calling 911 immediately.

The presentation proved to be educational and effective to the student-athletes and the feedback given indicated that the women had a better idea of what to expect if they or a family member ever experienced a heart attack in the future. Many of the women also asked questions and had comments during and after the presentation regarding methods of preventing heart disease as well as defining different key terms used (e.g., tachycardia, myocardial infarction).

References


