Do you know them when you see them? Women's prodromal and acute symptoms of MI.

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Abstract:

This study described women's prodromal and acute symptoms associated with myocardial infarction (MI) based on interviews with 76 women who had experienced an MI in the previous year. Sixty-eight women experienced prodromal symptoms including unusual fatigue (70%), shortness of breath (53%), and pain in the shoulder blade/upper back (47%). All women experienced acute symptoms including chest pain/discomfort (90%), unusual fatigue (59%), shortness of breath (59%), and shoulder blade/upper back discomfort (42%). Although women in this study reported numerous prodromal symptoms, none had received a new diagnosis of coronary heart disease (CHD) prior to MI. Practitioners must develop an awareness of and a more comprehensive approach to treating women at risk for CHD. Further research to elucidate prodromal and acute symptom clusters is needed to assist practitioners in early diagnosis of CHD in women.

Keywords: myocardial infarction | angina | coronary heart disease | fatigue | women's health | nursing | cardiovascular nursing

Article:

I know that if I'd had symptoms men have, my heart trouble would have been diagnosed months sooner and this heart damage could maybe have been prevented. I had no idea it was heart trouble. My symptoms didn't match, you know, like what I'd heard.—50-year-old woman

Cardiovascular disease, the primary cause of death in American women, kills approximately twice as many women each year as all types of cancer 1 and is the leading cause of disability in American women over 40 years of age.2,3 Yet, as recently as 1999, only 7% of women participating in a national survey identified heart disease as women's greatest health risk.4 Further, 64% of women who experienced sudden cardiac death had no previously recognized cardiac symptoms.1 Because women do not regard heart disease as a major health threat, is it possible that women are experiencing early warning symptoms that neither they nor their health care providers are recognizing as prodromes to a cardiac event? The majority of women in recent qualitative studies 5,6 identified a wide variety of prodromal symptoms, those that appeared intermittently before and changed in frequency or intensity after their myocardial infarction (MI). Unfortunately, the women and their health professionals typically ignored these prodromal symptoms because they differed from classic cardiovascular symptoms.

Even when women experience acute MI symptoms, research 7-10 shows that they delay seeking treatment longer than men do, possibly because women's presentation and perception of chest pain may differ from men's well-publicized symptoms.11,12 Generally, people may fail to seek treatment in a timely manner when their symptoms differ from the expected symptoms.8,9,13,14 When women do seek treatment, they frequently describe symptoms associated with ischemia differently than men do,1 which increases the likelihood that their symptoms will be misdiagnosed. This difficulty in accurately diagnosing women with MI precipitated the Consensus Working Group on Cardiovascular Disease at the National Institutes of Health 1 to recommend that research address women's qualitative descriptions of angina to assist women and health care providers in recognizing prodromal and acute symptoms of coronary heart disease (CHD) and MI in a timely manner. Qualitative symptom descriptors and their relationship to other variables such as age, race, and comorbidities are essential in developing a complete clinical picture of women's presentation of CHD and MI symptomatology. Therefore, this study described the full range of women's prodromal and acute symptoms associated with their MI and explored the relationship of age, race, and comorbidities to symptom presentation. Data from this study will assist in developing an accurate clinical picture of CHD and MI in women.

LITERATURE REVIEW

Prodromal symptoms

Angina has long been recognized as an early warning symptom of a cardiac event. In the 1970s and 1980s, researchers began to explore other symptoms, such as fatigue, changes in chest or epigastric pain, and shortness of breath, as prodromes to MI.15,16 Unfortunately, most of these early studies excluded women since it was believed that CHD was not a major health threat to women and that women's symptoms would match men's symptoms of CHD.17,18 However, as recently as 1992, few studies had investigated other prodromal symptoms, especially in women. Bahr,19 addressing an audience at a national heart conference, proposed that CHD remains the leading cause of death in the United States because health care professionals fail to recognize and treat prodromal symptoms.

More recently, a limited number of researchers have begun investigating prodromal symptoms of MI.5,20-23 For instance, Hofgren et al 20 studied prodromal symptoms in men (n = 647) and women (n = 267) hospitalized for suspected MI. In this study, 57% of the sample reported prodromal chest pain, and 61% reported other prodromes to MI such as tiredness and arm pain. Although women reported significantly more prodromal symptoms than men did ($p < .05$), women's symptoms were not differentiated from men's, making it impossible to determine if women experienced or described different prodromal symptoms than men did. McSweeney 5 conducted qualitative interviews with women (n = 20) after MI. Although her study focused on acute symptoms of MI, women identified prodromal symptoms such as discomfort between the shoulder blades, onset of migraine headaches, and episodes of temporary blindness. The women most frequently reported unusual fatigue (55%) as a prodrome to their MI. Interestingly, this fatigue consistently began 2 to 4 weeks prior to their MI and persisted until infarction.

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Timing of interviews to assess prodromal symptoms may influence recognition of these symptoms. For example, women in a recent study 6 indicated they needed months after their MI to identify accurately all of their prodromal symptoms. This passage of time allowed them to determine that symptoms disappeared or changed in intensity or frequency after the MI and then identify them as prodromes to the MI. However, other researchers 22,23 who have investigated women's prodromal symptoms of MI have typically queried the women within 2 to 5 days after

their MI. Consequently, they may have missed important prodromal symptoms. Therefore, we know little about women's specific prodromal symptoms of MI.

Acute symptoms

Researchers investigating acute MI episodes began to consistently include women in their studies in the early 1990s. The majority of this early research focused on either comparing women's and men's symptoms,24,25 investigating differences in treatment and outcomes,26-28 or comparing delays in seeking treatment.9,14 Table 1 presents a synopsis of recent studies that have investigated women's acute symptoms of MI. Findings of these studies indicated that chest pain was a predominate symptom of acute MI in women. While McSweeney 5 also noted that women reported chest pain with MI, it often occurred as a late symptom and followed other symptoms such as shortness of breath and shoulder blade or upper back discomfort. Numerous researchers have identified additional major acute MI symptoms such as dypsnea,9,29 arm pain,22,30 cold sweat,5 weakness,22 and fatigue,22,31 in women. Although some symptoms (eg, chest pain and dyspnea) are frequently reported symptoms in the majority of studies reported in Table 1, other symptoms (eg, back pain and fatigue) are inconsistent but prominent symptoms in several studies.5,22

Five issues may contribute to the lack of consistent findings on women's acute symptoms of MI. First, the selection of tools used to assess acute MI symptoms may not capture all of the symptoms women actually experienced. Many of the researchers 25,31,32 who described acute symptoms of MI in women typically used closed-ended structured tools or questions. In addition, other studies 9,24,33 addressing acute MI symptomatology used retrospective chart reviews or tools developed from studies of acute MI conducted primarily with men. When closed tools or structured interview questions were used, women were forced to choose between descriptors that most closely approximated but perhaps inaccurately described their symptoms. More important, women were unable to add symptoms they may have experienced, resulting in possible incomplete descriptions of their symptoms.

Second, it is difficult to differentiate women's acute symptoms of MI from symptoms of ischemia because numerous studies combined the symptoms experienced by persons who progressed to MI and those who were diagnosed with ischemia.29,31,33 Third, inconsistencies occurred in defining the acute symptoms themselves, such as pain location. For example, does arm pain encompass the shoulder area and hand or just the arm? Fourth, the time frame for the appearance of symptoms is not well described. For instance, some of the studies reviewed in Table 1 not only asked about acute symptoms but also about symptoms that led up to their MI,5,22 making it difficult to determine if these symptoms were actually prodromal rather than acute symptoms. Fifth, some studies 24,33 only included women's symptoms that occurred during hospitalization from retrospective chart audits. Therefore, the chart information may have excluded early acute symptoms that the women experienced before entering the hospital.

These issues made it difficult to differentiate between prodromal and acute symptoms. As a result, little specific information is known about the full range, description, and definition of women's acute or prodromal MI symptoms. This study attempted to further describe women's clinical picture of prodromal and acute symptoms of MI.

RESEARCH QUESTIONS

The two research questions for this pilot study were: (1) What are women's most frequently reported prodromal and acute symptoms of MI? and (2) Are prodromal symptoms, comorbid conditions, age, or race predictive of acute symptoms? For this study, prodromal symptoms are defined as those symptoms that appeared intermittently before the MI and changed in frequency or intensity after the MI. Acute symptoms are those symptoms that persisted or intensified, leading to a diagnosis of MI.

METHODOLOGY

To obtain the sample, the investigators identified women according to hospital discharge ICD-9 (International Classification of Diseases, 9th edition) codes at three hospitals in Arkansas and one in Florida. Hospital recruiters contacted women who had experienced an MI within the last

12 months to explain the study and referred interested women to the research team who conducted the interviews. The first 40 consenting women participated in qualitative interviews (phase 1), and an additional 36 women participated in telephone interviews (phase 2) with a structured survey instrument developed during phase 1. All women (n = 76) also completed demographic and risk factor information.

An experienced researcher conducted qualitative interviews with 40 women in their homes. The tape-recorded interviews took from 1.5 to 2.5 hours. All first interviews began with a broad opening question and followed with probe questions, as needed, to obtain specific information on prodromal and acute symptoms that the women believed were associated with their MI (see Table 2). The researcher conducted follow-up interviews that lasted 15 to 30 minutes by telephone to elicit further information, clarify content from the initial interview, and validate emerging symptom clusters. The researcher used content analysis to identify and categorize prodromal and acute symptoms. Additional data from this portion of the study are reported elsewhere.6 Using the prodromal and acute symptoms identified by the 40 women participating in the qualitative interviews, the researchers developed a structured survey instrument.

The investigators quantified the qualitative symptom data for each woman by entering the symptom data onto the structured survey instrument. In phase 2 of the study, the researchers interviewed an additional 36 women by telephone using this structured survey. Because these women may have experienced different symptoms than the initial group in phase 1, the researchers added open-ended questions to allow women to report their full range of prodromal and acute symptoms. All data then were entered into a database and analyzed using Statistical Package for Social Sciences (SPSS).

RESULTS

Sample

Table 3 presents demographic characteristics of the women. Of the 76 women who completed the interviews, the majority were Caucasian (84%), married (57%), possessed a high school education or less (57%), and had a household income of less than $30,000 per year (66%). The mean age was 62 (standard deviation [SD] = 13), with a range from 27 to 96 years old. Most had

a family history of MI (76%), hypertension (62%), or stroke (54%). The majority also had a personal history of hypertension (59%), hysterectomy (53%), or had smoked at least 100 cigarettes in their life (67%). Most (59%) reported that they exercised regularly before their MI. However, their mean body mass index was 28 (SD = 7.6), and approximately half were considered obese (body mass index of 30 or above). Prior to MI, 9% had a previous diagnosis of CHD, 38% reported knowing that they had high cholesterol levels, and 24% had preexisting diabetes. Despite strong family and personal histories of cardiovascular risk factors, only 33% reported taking aspirin on a regular basis prior to their MI.

Prodromal and acute symptoms

Of the 76 women in the sample, 68 reported experiencing prodromal symptoms. The range was 1 to 14 with an average of five prodromal symptoms per woman. The majority (60%) of the women experienced four or more prodromal symptoms. The most frequent prodromal symptoms (see Table 4) were very tired/unusual fatigue (70%), shortness of breath (53%), pain in the shoulder blade/upper back (47%), and indigestion (43%).

All the women reported experiencing acute symptoms. The number of acute symptoms ranged from 1 to 19 with an average of eight acute symptoms per woman. The two most frequent acute symptoms were very tired/unusual fatigue (59%) and shortness of breath (59%). In addition, 54% of the women described the location of their pain or discomfort as centered high in the chest, 45% reported shoulder blade/upper back pain, and 42% noted left arm or shoulder pain. Other generalized symptoms were weakness (47%), nausea (44%), hot sensation (43%), and dizziness (42%) as listed in Table 4.

To answer the second research question, the investigators explored whether prodromal symptoms, age, race, comorbid diabetes, hypertension, or obesity predicted acute symptoms. Bivariate and logistic regression models found no significant relationships indicating that these variables did not significantly predict acute symptom presentation.

DISCUSSION

The results of this study provide a unique picture of the full range of women's prodromal and acute symptoms associated with MI. A discussion of prodromal and acute symptoms follows.

Prodromal symptoms

Women in this study frequently experienced prodromal symptoms. In fact, 68 of the 76 women experienced up to 14 (mean = 5) different prodromal symptoms. As a whole, the women in this study did not recognize the importance of their prodromal symptoms. Despite the prevalence of prodromal symptoms and a strong family history of heart disease (76%), none of the women had been newly diagnosed with CHD prior to their MI. Further, women in phase 1 who reported seeking medical assistance for their prodromal symptoms of fatigue or shortness of breath related they were frequently treated with antidepressants or anti-anxiety medications for these symptoms. Although a few studies 5,20-23 also have reported the prevalence of prodromal symptoms in women, more research is needed to develop a thorough list of prodromal symptoms and possible constellations of prodromal symptoms associated with comorbidities or other variables. This information could be used in developing an algorithm to assist practitioners and physicians in diagnosing CHD in women earlier, providing appropriate treatment, and perhaps preventing progression to MI. Two prodromal symptoms that require more discussion are tiredness/fatigue and pain or discomfort. A discussion of these follows.

Tiredness and fatigue

The most frequently reported prodromal symptom was tiredness and fatigue. The literature supports this finding in both older studies 15,16 conducted predominantly on men and current studies 5,20,22 that include women. Despite this growing evidence of fatigue as a prodromal symptom of MI, there are no definitive measures to discriminate the fatigue that is a precursor to MI from other types of fatigue. Specific questions or measurements must be developed to assess the degree of fatigue, especially that associated with activities of daily living. For instance, several authors 5,11 reported that women experienced overwhelming fatigue while performing activities of daily living such as making a bed. Women in phase 1 reported experiencing a similar type of severe unusual fatigue.6 This type of fatigue differed from the fatigue reported by someone who tires after walking two blocks. However, when health care professionals ask patients about their fatigue, they rarely investigate the degree of fatigue in sufficient detail to provide useful diagnostic information. To further compound this issue, women often attribute

their prodromal fatigue to aging or stress and perceive it as unimportant.5,6 Therefore, they frequently do not report it to their provider. This issue merits additional research. If studies continue to identify fatigue as a frequent prodromal symptom of MI, educational materials must be revised so that both women and health care professionals recognize its significance.

Pain or discomfort

Although other researchers 5,20 identify chest pain as the most frequent prodromal symptom, in this study women identified shoulder blade and back pain (47%) as the most frequent location of their pain or discomfort. This finding may be attributed to the open-ended format used to assess location of pain or sensations prodromally that allowed women to differentiate the location of chest pain. Because women most frequently identified two locations of chest discomfort, generalized throughout the chest and centered high in the chest, the frequency for each site was less than the frequency of shoulder blade/back pain. However, when both chest pain sites are added together, the frequency of chest pain is 54%, making it the most frequent prodromal symptom. Further research with formats that allow women to describe their symptoms fully would assist clinicians in identifying symptoms and determining when they are clinically significant.

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Acute symptoms

Most studies have assessed chest pain as the major acute MI symptom.9,22,24,31,32 Women in the current study reported their pain or discomfort as centered high in the chest (54%) or generalized throughout the chest area (36%). Thus, 90% of the women experienced discomfort in some part of the chest. Goldberg et al 24 concurred that chest pain was a common acute MI symptom in women but noted that women experienced significantly more back pain than men

did ($p < .05$). In the current study, 45% of the women reported shoulder blade/upper back pain as the next most frequent location of pain or discomfort.

Women also experienced tiredness and fatigue (59%) and shortness of breath (59%) as acute symptoms. The literature supports these findings.22,25,32 As reported earlier, women often attributed prodromal fatigue to aging or stress and typically failed to seek medical attention or report this symptom until other acute symptoms developed and persisted. In addition, women often viewed shortness of breath, also a frequent prodromal symptom, as a normal consequence of aging and being deconditioned. However, the acute onset of unrelenting shortness of breath, especially in conjunction with upper back or chest discomfort, was often the triggering symptom for seeking treatment. Because women report attributing these general prodromal symptoms to aging and being deconditioned, it raises the possibility that some women are experiencing these generalized symptoms as acute symptoms. However, due to the mildness of the acute symptoms and their similarity to these same symptoms prodromally, the women may ignore them but are later diagnosed as having had a silent MI. A recent article by Kearney 34 addresses women's lack of knowledge about symptoms of CHD, which influences interpretation of their symptoms. Therefore, researchers must query women who have experienced a previously unrecognized MI about their prodromal and acute symptoms to expand our knowledgebase of women's most frequently experienced CHD symptoms.

Further evaluation of the results of this study in light of other studies is difficult. The most frustrating issue is the lack of consistency in how prodromal and acute symptoms are defined or, more precisely, the lack of definition and delineation of prodromal and acute symptoms. Clear definitions are necessary before we can identify the most common prodromal and acute symptoms in women. Common definitions would assist with performing a meta-synthesis of women's CHD symptoms to develop an algorithm for clinical practice.

Relationship of symptoms

When exploring the relationship of prodromal symptoms, race, age, and specified comorbid conditions with acute symptoms, no statistically significant results were found. This finding may

be due to the small sample size and the large number of variables. Future studies must have large enough sample sizes to detect potential differences among the variables.

IMPLICATIONS FOR PRACTICE

We need to change women's perceptions about their risk for developing CHD by revising educational materials and increasing publicity about the impact of CHD on women's health. Although we instruct women to be aware of their cardiac risk factors such as family history, hypertension, obesity, high cholesterol, and physical inactivity,7 we lack appropriate lay educational materials on the normal aging process. More specific educational material must be developed to assist all women, especially those at high risk for CHD, to know the normal changes associated with aging, potential symptoms of MI, and appropriate time to seek medical assistance. Further, educational materials should be updated to reflect current research on how women may experience CHD symptoms. We can expect women to seek treatment for vague symptoms, such as fatigue, only if we assist them in identifying these symptoms as possible indicators of CHD or MI.

Because angina has historically meant chest pain 35 and has been viewed as the primary prodromal symptom of MI, women and health professionals tend to focus on chest pain as the key indicator of CHD and MI. Consequently, when women present with other symptoms, such as fatigue or shoulder blade pain, health care professionals do not readily associate these symptoms with CHD. Practitioners must develop a new awareness of and practice strategy for women at high risk for CHD and recognize that other symptoms besides chest pain may signal underlying cardiac disease. To facilitate diagnosis of CHD in women, practitioners need to search for clues beyond an isolated presenting symptom by completing a thorough health history. For example, they need to thoroughly explore the meaning, timing, and severity of fatigue with women who are at high risk for CHD. Due to the state of the science, practitioners must be especially vigilant in assessing possible CHD symptoms in women until research findings, such as those presented in this study, may be combined to formulate clinical guidelines to facilitate earlier diagnosis and treatment of this costly and often elusive disease in women.

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