Development of the McSweeney acute and prodromal myocardial infarction symptom survey.

By: Jean C. McSweeney, Patricia O'Sullivan, Marisue Cody and Patricia Crane

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Abstract:

Background/Objectives: Coronary heart disease (CHD) is the number one cause of death in women, yet, little is known about women's symptoms. Early symptom recognition of CHD in women is essential but most instruments do not assess both prodromal and acute CHD symptoms. Our aims were to develop an instrument validly describing women's prodromal and acute symptoms of myocardial infarction and to establish reliability of the instrument, the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS).

Methods: Four studies contributed to the content validity and reliability of this instrument. Two qualitative studies provided the list of symptoms that were confirmed in study 3. The resulting instrument assesses 37 acute and 33 prodromal symptoms. In study 4, 90 women were retested 7 to 14 days after their initial survey. We used the kappa statistic to assess agreement across administrations.

Results: The women added no new symptoms to the MAPMISS. The average kappa of acute symptoms was 0.52 and 0.49 for prodromal. Next we calculated a weighted score. The mean acute score for time 1 was 19.4 (SD = 14.43); time 2 was 12.4 (SD = 8.79) with Pearson correlation indicating stability ($r = .84$; $P < .01$). The mean prodromal score at time 1 was 23.80 (SD = 24.24); time 2 was 26.79 (SD = 30.52) with a Pearson correlation of $r = .72$; $P < .01$.

Conclusions: The tool is comprehensive, has high content validity, and acceptable test-retest reliability. Low kappas were related to few women having those symptoms. The symptom scores remained stable across administrations.

Keywords: myocardial infarction | cardiovascular nursing | nursing | acute heart disease symptoms | coronary heart disease

Article:

Although researchers have focused on cardiovascular disease for the previous 50 years, it remains the number one cause of death in men and women. 1 Cardiovascular disease has retained this ranking in part because health care professionals do not recognize and subsequently treat early warning or prodromal symptoms of coronary heart disease (CHD). 2–4 Prodromal symptoms, those symptoms that come and go prior to and change after a myocardial infarction (MI), are especially important to identify in women since they experience both higher morbidity and disability than men do after a MI. 1 However, only 7% of women identify CHD as women's greatest health threat. 5,6 Because most women are unaware of their risk for CHD or do not believe their symptoms indicate heart problems, they often ignore prodromal symptoms. Likewise, since health care providers learn the symptoms indicative of CHD from studies predominately of men whose symptoms often differ from women's symptoms, they have difficulty recognizing and treating women's symptoms appropriately. 5–8

Limited studies, primarily with men, have addressed variability of acute MI symptomatology, but consensus is growing that women's symptoms of MI vary from men's. 8–14 Although larger MI studies included women, they often did not differentiate women's symptoms from men's, 15–18 or used tools that excluded some important symptoms frequently reported by women, according to our preliminary work. 11,12,19–21 Further, no large-scale study has investigated both prodromal and acute symptoms in women. Therefore, development of a symptom instrument was warranted for earlier diagnosis of CHD in women.

This article discusses 4 studies that contributed to the development and establishment of validity and reliability for the symptom portion of an instrument to describe the full range of prodromal and acute symptoms: the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS). This article will describe the content development of the symptom portion of the instrument by summarizing 2 qualitative studies (1 and 2). Then, it will describe tool development, validity, and reliability by summarizing 2 quantitative studies (3 and 4). The University Human Research Advisory Committee approved all studies.

Content Development of the MAPMISS

Study 1: Content Development of Acute Symptoms

This qualitative study explored women's (N = 20) perceptions of causes and symptoms of MI with funding from the American Nurses Foundation and Southern Nursing Research Society in 1993–1994. Women, who had experienced their first MI within the past 24 months, participated in individual in-depth interviews about their MI symptoms. Women had no difficulty remembering their symptoms since they considered this a life changing experience. The sample consisted of white (n = 13; 65%), Hispanic (n = 4; 20%), and black (n = 3; 15%) women. Educational levels ranged from less than an eighth grade education (n = 3; 15%) to master's degree (n = 4; 20%). Ages ranged from 34 to 77 with a mean age of 61, and 40% had incomes of $20,000 or less. Further descriptions of the sample, methods, and findings appear elsewhere.[22,23] One researcher interviewed each woman twice: the first interview lasted 1.5 to 2 hours while the second interview, used to clarify and expand upon content from the first interview, averaged 30 minutes. Interviews were tape-recorded, transcribed verbatim, and checked for accuracy. The researcher analyzed the narrative using content analysis and constant comparison.

Results indicated that, along with some classic symptoms, women reported many nontraditional symptoms both before and during the MI. For instance, one 34-year-old woman experienced prodromal symptoms of left arm and shoulder pain and recounted 2 episodes of temporary blindness in 1 eye in the month prior to her MI. She associated her blindness episodes with her impending MI since she never experienced another episode in the year after her MI. She also reported increasingly severe fatigue prior to her MI. In fact, 75% of the participants reported the prodromal symptom of unusual fatigue, including 86% of the women of color (n = 7).[4] Interestingly, 40% of the women initially reported no pain but acute symptoms of indigestion and shortness of breath with their MI. Eventually, 30% developed late severe crushing chest pain while 25% reported mild-to-no pain throughout the acute MI episode. Women reported symptoms of pain in the back under the shoulder blades (30%), in both arms (30%), and in the left arm (25%). They also experienced numbness, tingling, or heaviness in the arms. Two women had their first migraine headache prior to and did not experience another in the year after the MI. Therefore, the majority of women reported experiencing some nontraditional prodromal and acute symptoms of MI.

Although this study was designed to focus on acute symptoms, the women reported a surprising number and variability of early warning prodromal symptoms that they clearly differentiated from their acute symptoms. The definition of prodromal symptoms evolved from their descriptions of these early warning symptoms. Results underscored the need to develop an in-depth list of symptoms women experience before or during MI.

Study 2: Content Development and Validation for Acute and Prodromal Symptoms

This 2-year study, funded by the Arkansas Affiliate of the American Heart Association from 1996 to 1998, ascertained women's prodromal and acute symptoms associated with their first MI. The researcher used in-depth interviews (2 per women) in this descriptive naturalistic study of 40 women 6 weeks to 1-year post MI and analyzed symptoms using content analysis and constant comparison. Because this study focused on describing symptoms before and during the MI event, the researcher encouraged the women to describe the precipitating factors, timing, frequency, and duration of the symptoms. As in the first study, women had no difficulty recalling their symptoms and separating prodromal from acute symptoms. The sample consisted of white (n = 35; 87.5%), black (n = 4; 10%), and Native American (n = 1; 2.5%) women with 50% having a high school education or less. Ages ranged from 27 to 79 years (mean 58.5; SD = 12.53) and 36% had household incomes of less than $20,000 per year. A complete list and description of prodromal and acute symptoms is reported elsewhere. 4,24 The following discussion highlights the most frequent prodromal and acute symptoms and compares the most important findings of study 2 to those of study 1.

Prodromal Symptoms

Of the 40 women, 37 reported experiencing early warning prodromal symptoms up to 2 years but generally about 6 months prior to their MI. They described these symptoms as intermittently appearing prior to their MI and as either new symptoms or symptoms they commonly experienced prior to the MI but that increased in intensity or frequency prior to the MI. Importantly, these symptoms reverted back to previous intensity or frequency or disappeared after the MI. The most frequently experienced prodromal symptoms were unusual fatigue (n = 27), discomfort in the shoulder blade area (n = 21), and chest sensations (n = 20). Eight defined the chest sensation as mild discomfort. Fifteen, including all of the Black women, experienced shortness of breath, especially with exertion. Eleven women reported frequent indigestion. They also noted neurological symptoms of dizziness (n = 11), change in headache intensity/frequency

or first migraines (n = 11), and vision problems (n = 5). 24 According to the women, the neurological/vision problems resolved or resumed at typical frequency/intensity after the MI. The frequency of the symptoms varied greatly. Some women identified specific precipitating events, such as walking up stairs, while others could not identify any.

Acute Symptoms

During the acute episode, which women defined as the time from onset of unrelenting symptoms to time surrounding the diagnosis of the MI, 26 (65%) women experienced some type of chest sensation while 16 (40%) complained of sensations in both arms. Fourteen (35%) stated most of their discomfort occurred in their back under or between their shoulder blades. Although severe chest pain is typically associated with acute MI in men, only 11 women (28%) experienced severe pain during their MI. An almost equal number of women, 9 (23%) stated they had no pain or only mild discomfort during the acute episode. Further, 3 of the 4 black women reported experiencing no pain while the fourth stated she had only mild discomfort. Other frequent acute symptoms during the MI were shortness of breath (n = 22), feeling hot and flushed (n = 21), unusual fatigue (n = 18), and nausea (n = 16). 24

Comparisons Between Study 1 and 2

To compare the results from these 2 studies, individual acute and prodromal symptoms reported in each study were examined for similarities and differences along with comparisons of percentages of women who reported individual symptoms. Compared with the women in Study 1, the women in Study 2 experienced similar acute symptoms of back pain beneath or between the shoulder blades, generalized chest discomfort, unusual fatigue, nausea, dizziness, sensations in both arms, and feeling hot or flushed. Although only 1 black woman in Study 1 reported prodromal episodes of temporary blindness, 4 women in Study 2 complained of blurred vision prodromally while one woman complained of “not being able to see.” All 4 black women in Study 2 reported experiencing shortness of breath and fatigue with their MI.

Women in Study 2 reported the following unique symptoms: (a) losing the taste for cigarettes prodromally or during the MI, (b) edema in upper arms, hands, or feet immediately prior to or during the acute MI, and (c) prodromal anxiety related to feeling something was “not right.” One

intriguing finding was that women who reported prodromal symptoms typically experienced vague, slowly evolving acute symptoms and delayed seeking treatment for hours, while all 3 of the women who experienced only typical acute rapidly evolving symptoms quickly sought treatment. Only 1 woman with prodromal symptoms reported rapidly evolving typical acute symptoms. No women expressed difficulty remembering their symptoms associated with the life-threatening event. Studies 1 and 2 were based on small samples; therefore, the researcher decided to validate the results with a larger sample of women, using quantitative methodology. Thus, the results from Studies 1 and 2 served as the content basis for developing the MAPMISS and also provided the definitions for prodromal and acute symptoms.

Development of the MAPMISS

Study 3: Instrument Development: Administration and Content Validity

The Principal Investigator collaborated with a quantitative researcher and statistician to design Study 3, funded by an institutional intramural grant, to (a) develop an instrument that incorporated the full range of prodromal and acute MI symptoms and the characteristics of the symptoms as reported in studies 1 and 2, and (b) determine the feasibility of administering this tool via telephone survey. We collected data from 1999–2000.

To convert the qualitative findings to a quantitative measure, we identified all of the acute and prodromal symptoms from the first 2 studies. There were 31 general acute symptoms with 2 components: actual symptoms such as shortness of breath or nausea; and locations, such as pain in the back between the shoulder blades. For prodromal symptoms, there were 24 general symptoms with the same 2 components as the acute symptoms.

Initially, questions addressing the acute symptoms determined presence or absence and time frame (ie, weeks, days, hours, minutes). The questions addressing the prodromal symptoms queried the frequency, time frame, and pattern of symptoms. Intensity was initially assessed as an overall measurement (no, little, medium, or severe pain) for both acute and prodromal symptoms.

Seven content experts, cardiologists, and cardiac nurses established content validity. Five women from Study 2 validated the content of the instrument. Neither the experts nor the women added any symptoms. At this stage, no further changes were made.

We developed the instrument to be administered by telephone as it would allow for recruitment of a large sample from multiple sites and inclusion of women with marginal reading skills. Also, data could be collected at a central location, thereby, minimizing the number of data collectors, decreasing cost, and increasing reliability.

An expert in survey methods examined the initial draft of the acute and prodromal symptom instrument. She suggested numerous revisions for ease in telephone administration. In response, we shortened the length of the question stems, reduced the number of choices per question by combining choices, and altered the sequence and the timing descriptors of the symptoms.

Next, we pilot tested the instrument with 20 different women who had experienced a MI in the previous 12 months. We identified women by medical record review from 2 medical centers in Arkansas, then telephoned and asked them to answer and critique the symptom questions. Based upon their feedback and our experience of administering the pilot telephone survey, we developed the prototype survey instrument. This prototype instrument incorporated numerous modifications. For instance, the wording of some items was changed to facilitate clarity and some descriptors were added that more clearly described the intensity of the symptoms. The sequencing of some questions was revised based on these interviews. Initially, the tool was structured in chronological order of symptoms. However, while conducting the interviews, women consistently discussed their acute symptoms prior to answering the questions about their prodromal symptom intensity and initial occurrence. They used the intensity of the acute symptoms to gauge the intensity of the prodromal ones. Also, the women needed to focus on the date of the acute event to identify the length of time they had experienced prodromal symptoms prior to the acute MI. Therefore, the questions were sequenced to query acute symptoms prior to prodromal symptoms. An open-ended question was added to both the prodromal and acute sections to allow women to add symptoms that the qualitative studies (1 and 2) may have missed because the samples had limited ethnic diversity. The women had no difficulty answering the questions using the telephone survey method.

This prototype was tested with 48 women recruited from 4 medical centers in the South who were 6 weeks to 1-year post MI. First, a recruiter from each site telephoned women and received

verbal agreement to release their names to the research team. Then a member of the research team called the woman, obtained consent, and conducted the interview by telephone. The interviews were recorded on paper copies of the instrument. Data were entered and analyzed using SPSS for Windows version 11.0.

Of the 48 women who completed the survey, most were white (n = 42; 87%), while two (4%) were black, 3 (6%) were Hispanic, and 1 was Native American (2%). Most (n = 33; 68%) had at least a high school education. Ages ranged from 42 to 95 with a mean age of 64, and 33 (64%) had annual incomes of less than $30,000. It took them an average of 20 minutes to complete the symptom portion of the interview and 40 minutes to finish the entire survey. No subjects complained about the length of the interview.

In summary, for acute symptoms, women indicated the presence or absence of symptoms and an overall intensity of symptoms. Women had difficulty selecting the timing of onset for their acute symptoms (ie, weeks, days, hours, and minutes). Instead, they ordered the sequence of symptoms so this was changed on the revised MAPMISS.

For prodromal symptoms the women not only gave presence and absence but also frequency without difficulty. Women had difficulty selecting an overall intensity rating because the intensity of each prodromal symptom varied. Therefore, an intensity rating was added for each prodromal symptom. Women could only describe onset of prodromal symptoms in broad categories of week, month, or more than a month prior to MI. The instrument was revised to reflect this finding.

Although the list of symptoms in the MAPMISS captured the majority of responses, it was necessary to add numbness of hands (detecting whether in both hands or just one) and arms (detecting both, right, or left). Similarly, the general chest pain location was clarified by dividing it into 2 questions to more precisely describe location. This resulted in an additional question. One question regarding flu-like symptoms was eliminated since no one experienced it. The final instrument had 38 acute symptoms (37 plus “other”). (See Table 1 for sample of items). The women identified 3 additional prodromal symptoms that were added to the instrument: sleep disturbance, difficulty breathing at night, and loss of appetite. The arm, hand, and chest questions were split in this section to correspond with the changes in the acute questions. Thus, the final instrument had 35 general prodromal (33 plus 2 “other”) symptoms. (See Table 2 for sample of items). Five of the women were reinterviewed to test the revised questions. The changes were easier for them to answer, and they stated the revised questions more accurately described their experiences. This revised version of the MAPMISS was now ready for reliability testing with a

larger sample of women who had experienced a MI.

With the assistance of a computer programmer, the MAPMISS was converted into an access database for direct computer entry of responses. We believed direct data entry would minimize missing data, decrease data entry errors, and make telephone administration easier.

Study 4: Reliability Testing of the MAPMISS

This study determined the reliability of the acute and prodromal symptom sections of the MAPMISS. The MAPMISS relies completely on recall, which may be influenced by time and reflection. Because asking women about their symptoms might cause the women to reflect on their symptom experience and alter their responses, it was necessary to confirm test-retest reliability of their responses. This study did not address construct validity because in this phase of tool development the focus continued to be descriptive with the intent of capturing the broadest definitions of symptoms experienced by women with a known MI.

As part of a larger ongoing study funded by the National Institute of Nursing Research (McSweeney, September 15, 1999), 90 women from 4 sites in 3 states agreed to participate. We conducted this phase of the study from 2001–2002. The procedures for recruitment were similar to Study 3. The MAPMISS was administered by telephone. The research assistant conducting the telephone interviews defined acute symptoms (unrelenting from initial appearance until treatment for MI) to the women prior to asking the acute questions. Similarly, they defined prodromal symptoms (intermittent, new onset or change in intensity or frequency prior to MI and reverted to former levels or disappeared after the MI) prior to collecting data on prodromal symptoms. Since there are multiple symptoms in each category, the research assistants routinely repeated the definitions while querying about symptom experiences to facilitate accurate recall. Then 7 to 14 days later, the women were recontacted and asked to complete just the symptom section of the MAPMISS. This section consisted of questions about women's acute and prodromal symptom experiences and took approximately 10 minutes to readminister. The sample consisted of white (n = 83; 92%) and black (n = 7; 8%) women. Educational levels ranged from less than fourth grade to graduate school with 41% (n = 37) having less than a high school education. Ages ranged from 30 to 90 years (mean = 67.6; SD = 11.2) and 53% (n = 48) had household incomes of less than $20,000 per year.

During study 4, we added intensity questions for the acute section similar to those for the prodromal section. Women could describe the intensity of each acute symptom they experienced, and this more accurately reflected their experience rather than an overall intensity rating for their acute episode. Women who had completed the survey prior to this change were recontacted and completed this revised section. This change allowed us to calculate an overall acute and prodromal score for each woman as described below.

To determine stability, agreement coefficients were calculated at the item level across both administrations. The kappa statistic for agreement of symptoms was used to correct for chance. Kappa was the only statistic that we could use with acute symptoms recorded as either present or absent. 25 With the prodromal symptoms, we used both gamma and kappa statistics. Findings were similar so only the kappas are reported here since this allows for comparative results for acute and prodromal symptoms. Acute and prodromal scores also were calculated for each woman. The acute score was the sum of each symptom weighted by its intensity (0 = no symptom to 3 = severe). To examine the stability of the acute score, we correlated the scores obtained at both times. Next, to determine overall stability of the prodromal symptoms, a prodromal score was constructed for each symptom that was the product of its presence/absence, intensity, and frequency. All of these scores were summed to create an overall prodromal score. The prodromal score from time 1 was correlated with the score from time 2.

Table 3 lists the 37 acute symptoms; no woman reported another symptom. The first 2 columns indicate the percent of women reporting each acute symptom at time 1 and time 2. The next column gives the raw agreement between these reports. The last column shows kappa, the coefficient correcting for chance agreement. Of the 37 acute symptoms, less than 5% of the women reported the leg location and numbness in right arm; therefore, their kappas were excluded from the overall average since they were likely to be unstable. The average kappa was an acceptable 0.52.

The mean acute symptom score was 19.4 (SD = 14.43; median = 17), and ranged from 0 to 70 for time 1 and 12.4 (SD = 8.79; median = 11.5, range 0–42) for time 2. The score could have ranged from 0 (no acute symptoms) to 99 (severe rating for 33 symptoms; symptoms for numbness in hands and arms are mutually exclusive). The average number of symptoms at time 1 was 9.2 (SD = 5.7) with a median of 8 acute symptoms. The reports for time 2 were similar with a mean of 9.1 (SD = 5.9) symptoms and a median of 8 acute symptoms. Since the data were skewed, we transformed the scores using a logarithmic transformation. However, the results were comparable to the untransformed results. For ease of interpretation, the untransformed results are reported. Pearson correlation of the acute scores constructed from the 37 acute

symptoms weighted by their intensity at time 1 and time 2 resulted in a strong relationship ($r = 0.84$; $P <= 0.01$).

No woman added any other prodromal symptoms, resulting in 33 symptoms. Kappa was calculated for whether or not they reported the prodromal symptom at time 1 and time 2. Table 4 provides all of the kappa values. Using the same approach of excluding kappa's when less than 5% of the sample had the symptom (n = 5 symptoms), the average acceptable kappa was 0.49.

The mean prodromal score was 23.80 (SD = 24.24; median 15, range 0 to 97) at time 1 and 26.79 (SD = 30.52; median 16, range 0–175) at time 2. The score could range from 0 (no prodromal symptoms) to 522 with all 29 symptoms (the numbness is mutually exclusive) rated as severe (3) and occurring at the highest frequency (6). At time 1, the women reported a mean of 6.2 (SD = 5.2) prodromal symptoms with a median of 5. At time 2, the number was 6.4 (SD = 5.9) and a slightly higher median of 6 symptoms. As reported with the acute symptoms, the logarithmic transformation yielded comparable results; so the untransformed data results are reported. Using Pearson correlation, we examined the correlations of the prodromal score between time 1 and time 2. The prodromal score had an acceptable correlation ($r = 0.72$; $P <= .01$).

In review, women in Study 4 did not add any acute or prodromal symptoms or locations, indicating that the tool is comprehensive. At the item level, no adjustments were made to the list of acute symptoms. Leg location rarely occurred, which prevented us from estimating the reliability of the symptom. We added intensity questions for each acute symptom similar to those in the prodromal section. For the prodromal symptoms, all symptoms were maintained. Most of the low kappa's for both acute and prodromal symptoms were related to a small number of women having the symptom. Low likelihood may affect the calculation of the coefficient, but is insufficient rationale to delete the symptom.

In summary, the MAPMISS is comprehensive and women remain relatively stable in their responses at the item level. The summary scores for acute and prodromal remained stable across the 2 administrations. Because the scores were positively skewed, a square root transformation was done to correct the skewness, but resulted in no changes in the correlation coefficients reported above.

Conclusions

In conclusion, the list of symptoms in the MAPMISS was carefully developed from 4 studies. The list includes descriptive and location symptoms. We retained the symptom locations and expression of the symptom descriptors as verbalized by the subjects in the initial qualitative studies. This is an important and appropriate technique to ensure that the quality and meaning of qualitative data is maintained while transferring it into a quantitative measure. 26 At this point in instrument development, we based item revisions on qualitative assessments by respondents, interviewers, and investigators. The symptom descriptors had to be easy to answer and accurately reflect the women's experiences. Empirical methods were limited to frequency of reported symptoms and incomplete or inconsistent data. Although content experts did not add any additional symptoms, women in Study 3 added 3 symptoms. The 90 women in Study 4 did not add any further symptoms indicating the tool is comprehensive and has high content validity. This shows qualitative methodology (Studies 1 and 2) successfully generates information for tool development to study larger samples of women.

Reliability studies indicated some fluctuation at the item level likely due to women reconsidering their symptoms after the first interview. However, generally the items had acceptable kappas. The kappa coefficients are sensitive to the distribution of responses. Generally, when there are few responses, the kappas are not particularly stable. The agreement both from raw agreement and from kappa gives us assurance that the reporting of symptoms tends to remain stable. Therefore, when considering using this tool in future research that might allow for predicting MIs, we feel confident that the symptoms are comprehensive and ones that women remain relatively consistent in reporting.

Some symptoms were retained in the MAPMISS even though stability was poor. For example, the elaboration of the numbness symptom occurred through the research process, and we assume that some women will find it meaningful. The rarely occurring prodromal symptoms were retained since they may indicate in future studies the relationship between prodromal and acute symptoms. When summarized into acute and prodromal scores, there was high correlation for the acute and moderately high correlation for the prodromal scores indicating that these are stable scores to use for further research. The prodromal score was the one most likely to shift as a result of participating in the first interview. Prodromal symptoms require the women to undertake the more difficult task of distinguishing between symptoms prior to the MI from those at the time of the MI. This is a task anyone with a MI rarely performs independently (or without prompting).

Research and Practice Implications

With this comprehensive list and the telephone survey methodology, we plan to undertake a variety of studies to explore other aspects of validity. We have demonstrated that the tool has content validity. However, we have not used it to study predictive validity or concurrent validity such as relationship to severity of MI. We are in the position as the number of participants in our database grows to determine if acute and prodromal scores differ among women from different ethnic backgrounds and with varying comorbidities. Future studies should also include men, as prodromal symptoms have not been well studied in any population.

The symptom portion of this instrument may be utilized to assess women's symptoms when they present to the Emergency department or to providers' offices with suspected acute coronary syndromes. Also, this instrument could be used to retrospectively assess women's individual ischemic patterns that occurred prior to and with their MI. Then, discharge teaching could incorporate this individualized information to assist women in identifying their specific ischemic symptoms and when to appropriately use anti-ischemic medications. Further research must be conducted to determine the predictive capability of the prodromal symptoms contained in this instrument and to assess how or if risk factors and comorbidities influence symptom presentation. If prodromal symptoms are predictive of future CHD events, the prodromal section of this instrument will be a useful assessment tool to assist providers in deciding which women should be referred for cardiovascular diagnostic evaluation. Early recognition of women's acute and prodromal symptoms will facilitate appropriate diagnostic testing and treatment, thus, improving outcomes for women with CHD.

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