EVALUATING ACUTE MYOCARDIAL INFARCTION SYMPTOM RECOGNITION IN WOMEN

by

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ABSTRACT

When acute myocardial infarction (AMI) occurs, prompt medical treatment is of critical importance for the best outcome. Reducing the time between the onset of symptoms and treatment seeking is considered important in reducing mortality among women with AMI.

A telephone survey using random digit dialing was conducted to assess the current understanding of acute myocardial infarction of 349 women in the Greater Vancouver area. This preliminary work is important for designing strategies designed to educate women and reduce the help-seeking portion of treatment delay in women experiencing acute myocardial infarction. Two response variables were examined: intention to delay and likelihood of responding appropriately to myocardial infarction symptoms.

The results of this study revealed that women have not yet personalized information that they are at risk for AMI. The participants indicated a need for more information pertaining to symptom recognition for AMI; they were largely unaware that females experience AMI somewhat differently than do males. The participants were less aware of the risks that diabetes, obesity and menopause pose for AMI. The findings of this study illuminate the concern that women have problems recognizing AMI symptoms and are not likely to respond appropriately. Women who indicated that they would feel embarrassed if they made a “false alarm visit” to an emergency room (ER) for suspicious symptoms were significantly less likely to indicate that they would respond appropriately to AMI symptoms. Additionally, women who had visited ER in the past were less likely to indicate that they would respond appropriately to AMI symptoms. Furthermore, there is cause for concern that 36% of women intend to delay treatment seeking for AMI. Variables significantly associated with intention to delay were embarrassment of a false alarm, preference for self-care management, being an immigrant, and lower educational attainment.
A multidimensional approach will be needed to address the information needs of women pertaining to AMI recognition and treatment seeking. Not only should health promotion campaigns deliver the information women need, but clinicians in direct contact with women, particularly those women at risk for AMI, should be aware that treatment delay for women with AMI is problematic. Health-care providers can help disseminate information to women encouraging prompt and appropriate treatment seeking for AMI. Because women who had visited ER were significantly less likely to respond appropriately to AMI symptoms, it is important that strategies for improving ER experiences be considered.

Recommendations for further research include the consideration that the decision to seek treatment for AMI symptoms is likely to be multidimensional. Psychological, emotional, and social factors, in addition to cognitive understanding, are components of the complicated process of deciding to seek treatment for AMI.
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Keep dreaming King!
CHAPTER 1: INTRODUCTION

Prompt Treatment for Acute Myocardial Infarction is Critical

When an acute myocardial infarction (AMI) occurs, or is in the process of occurring, rapid attention and treatment, preferably obtained from a knowledgeable health-care provider, is a priority. A critical factor in the prevention of premature death or disability from AMI is the assurance that patients receive prompt, effective treatment to minimize heart muscle damage (Meischke et al., 1999; Ruston, Clayton, & Calman, 1998). Current knowledge indicates that thrombolytic therapy (TT) or percutaneous coronary intervention such as angioplasty are the treatments of choice for AMI because the size of an infarction can be reduced, resulting in less cardiac muscle death and thus significantly improving survival rates. However, time is a critical factor in the efficacy of such treatments, which must be initiated early (Cole, 1991). This knowledge brings about many challenges as health-care providers seek to reduce mortality from AMI. Now more than ever, it is important for health-care providers to seek ways to help AMI victims obtain rapid treatment.

Scope of the Problem

In a recent, thorough review of published literature concerned with patient delay in seeking treatment for AMI symptoms, Zerwic (1999) illuminated three phases of delay: patient delay, emergency medical system delay, and hospital delay. Of the three phases of delay, the greatest source of time loss is patient delay. Consequently, the objective of reducing patient delay in seeking treatment for AMI is recognized as a key factor in decreasing morbidity and mortality in individuals with AMI (Meischke et al., 1999; Mosca et al., 1997; Moser & Dracup, 1993). Seeking ways to provide earlier treatment for AMI has been made an international priority (Fuster, 1999).
The signs and symptoms of AMI vary widely and often do not manifest as the dramatic chest grabbing, sudden death episodes commonly depicted in television programs and the movies (Ruston et al., 1998). The onset of AMI may include less ‘typical’ symptoms such as nausea, back discomfort, jaw pain, non-exertional chest pain and what many interpret as simple fatigue (Chiamvimonvat & Sternberg, 1998). A surprising number of persons having AMI do not experience chest pain at all (Canto et al., 2000). Knowing that chest pain is considered to be the hallmark sign of AMI, perhaps the most alarming finding Canto et al. reported is that among women with AMI, almost one half did not have chest pain upon presentation. It follows that if a woman experiences an AMI and is unable to recognize her symptoms as urgent and pertaining to AMI, prompt treatment seeking is unlikely to occur. And, without prompt attention, prevention of death or the more common debilitating after effects of AMI is jeopardized. The myth that AMI is a dramatic, precipitate event needs to be dispelled and public perceptions of AMI and its associated symptoms need to be changed (Ruston et al., 1998).

A recent American study identified that women were unable to correctly identify the AMI symptoms most frequently experienced by women (Meischke et al., 1999). This study, conducted in Washington State, identified that women also were unable to correctly prioritize AMI symptoms as warranting emergency medical services. Because no Canadian study has addressed the knowledge level of women concerning their recognition and prompt attention seeking for AMI, it is timely that this be examined in British Columbia.

Ignorance is a Problem

The prevalence of heart disease is considered to be at the magnitude of an epidemic by both the American Heart Association and the Heart and Stroke Foundation of Canada. In light of rapid knowledge development and the burden heart disease presents, it is not surprising to find that the
public is largely ignorant about AMI and its symptoms. In the United States, for example, researchers found that despite general knowledge about coronary artery disease, individuals with known risk factors continue to be largely ignorant of their personal risks and to some extent of the course of the disease (Zerwic, King, & Wlasowicz, 1997).

Perhaps one of the most dangerous myths held, pertaining to ischemic heart disease, is that ischemic heart disease occurs only in men, particularly middle aged, highly stressed men. The Heart and Stroke Foundation of Canada (1997) reported the disturbing realization that the problem of cardiovascular disease for Canadian women is 'especially pronounced'. The truth is that women in North America are as likely to have heart disease as are men. Although the onset of the disease occurs at an older age, on average, for women, they are more likely to die from heart disease than men (Heart and Stroke Foundation of Canada, 1997; Mosca et al., 1997). Chiamvimonvat and Sternberg (1998) went a step further than the Heart and Stroke Foundation of Canada in saying that coronary artery disease is the leading cause of mortality in women, with its incidence in postmenopausal women being equal to that of men. Clearly, a better understanding of heart disease in women is called for, and both the American Heart Association and the Heart and Stroke Foundation of Canada have included this issue among their concerns and research agendas.

**Purpose of the Study**

The purpose of this study was to identify what women in the Greater Vancouver area understand about AMI symptom recognition and general factors pertaining to AMI risk. The study was designed to examine how well women identify AMI symptoms and their likelihood of an appropriate response. An exploration was undertaken of possible factors associated with women's likelihood of responding appropriately to AMI symptoms. Finally, this study was
designed to glean some understanding of women’s intention to delay treatment seeking and factors associated with such intention to delay.

**Significance**

The Heart and Stroke Foundation of Canada has been clear that the research questions posed here are not only worthy of investigation but also deserving of targeted research support. “Further studies on medical issues concerning Canadian women’s heart health need to be conducted in order to have reliable data for clinical decision making and public health recommendations” (Heart and Stroke Foundation of Canada, 1997, p.16 ). In that delayed recognition of AMI is more likely to result in lifetime, chronic, low level functioning in survivors, it is prudent to investigate barriers to effective and expeditious treatment. Education and public awareness are vital to meeting the challenge of optimal treatment for AMI. It is important to educate women about AMI symptoms and their similarity with symptoms of other chronic illnesses (Meischke et al., 1999). It will be difficult, if not impossible, to dispel the myths surrounding women and heart disease without a better understanding of the information needs and knowledge deficits of women. This research is critical in order to heed the recommended goals articulated by Fuster (1999), including that health professionals must seek better ways to implement earlier treatment of AMI. This study was designed to help health-care professionals and policy makers concerned with health promotion make better decisions about what and how to best deliver health information to women in an effort to reduce the devastating effects of AMI.

**Scope of the Study**

Singling out women for study in this area is considered to be a useful first step in tackling the issue of treatment-seeking delay for AMI. It is recognized that while treatment-seeking delay for
men is no less important, all researchers who have documented a difference in delay times by
gender have noted that women delay longer (Dracup et al., 1995). Additionally, because women
continue to be underrepresented in research pertaining to coronary syndromes, giving research
attention to women regarding treatment seeking for AMI is timely (Lee, Alexander, Hammill,
Pasquali, & Peterson, 2001). Focusing on those at risk and those persons who probably delay
longest is considered a prudent measure toward the goal of reducing treatment-seeking delay for
AMI (Dracup et al., 1997).
CHAPTER II: LITERATURE REVIEW

A search for published literature related to women and treatment delay for AMI was carried out using the databases Medline and Cumulative Index of Nursing and Allied Health Literature (CINAHL). The search was limited to English language manuscripts published between 1990 and 2000. Works included in this literature review were limited to pertinent key studies. Ancestry searching was also used, hence a few important works predate 1990. Canadian government internet sites were accessed for statistical information. Organizations dedicated to improving knowledge of heart disease such as the Heart and Stroke Foundation of Canada and the American Heart Association were electronically accessed for relevant information. Manual searching of pertinent publications was another strategy incorporated in the search for literature. For the purpose of the literature search, the following key words and key word combinations were used: “acute myocardial infarction”, “gender bias”, “coronary artery disease”, “denial”, “female”, “gender differences”, “heart attack”, “treatment delay”, “treatment seeking”, “women”, and “women’s health”.

Cardiovascular Disease is Both a Global and National Problem

Cardiovascular disease is now recognized as a global problem (Huston, 1997). Recent international conferences on preventive cardiology provide evidence of the growing emphasis placed on coronary disease in particular. Ischemic heart disease specifically is now known to be the leading cause of death world-wide (Murray & Lopez, 1997). Canadians, too, suffer greatly from this problem. In 1994, cardiovascular disease was the leading cause of death for Canadians accounting for 38% of all deaths (Health Canada, 1998).

Cardiovascular disease is the leading cause of hospitalization for Canadian men and women (excluding childbirth) (Health Canada, 2000b). Health Canada reported that AMI and ischemic
heart diseases account for 801 per 100,000 hospital separations. Examining the rates of hospitalization by age group, it is apparent that AMI and ischemic heart disease become significant health problems for Canadians starting at age 45 for men and 55 for women (Health Canada, 1999). Health Canada also reported that cardiovascular disease, in general, is the leading cause of death of over one third of Canadians, affecting not only the elderly, but also being the third leading cause of premature death in persons less than 75 years of age.

Women and Cardiovascular Disease

Despite prevailing beliefs, women are seriously affected by cardiovascular disease in general and ischemic heart disease in particular. In 1997, diseases of the circulatory system accounted for 42.9% of deaths in Canadian women aged 65 and above; in women of all ages, the rate was 38.2% (Health Canada, 1998). Diseases of the heart have been established as the leading killer of Canadian women (Heart and Stroke Foundation of Canada, 1997; Statistics Canada, 1995). Of all cardiovascular deaths in Canadian women, AMI accounts for 24% (Health Canada, 1998). The widespread notion that cardiovascular disease and specifically ischemic heart disease pertains only to men is not only false, but does an extreme disservice to the many women suffering and dying with this all too common problem.

There is increasing, albeit controversial, concern that the prognosis and outcomes for women with AMI are worse than those for men (MacIntyre et al., 2001). One very large American study found that women are 20% more likely than men to die in hospital after AMI (Maynard, Every, Martin, Kudenchuk, & Weaver, 1997). Many questions related to women’s experience of cardiovascular disease persist. Health professionals and organizations are taking note of the concern that women’s heart disease is poorly understood (Heart and Stroke Foundation of Canada, 1997; Mosca et al., 1997; Vaccarino, Parsons, Nathan, Barron, & Krumholz, 1999).
There is particular need for better appreciation of cardiovascular disease as a major public health concern for older women (Mosca et al., 1997). Vaccarino et al. also expressed concern about younger women and reported that younger women with AMI represent a high mortality risk group deserving special study. Although some researchers have sought to explain the differences in gender-specific mortality rates after AMI by adjusting for age, known risk factors, interventions and comorbidities, the fact remains that women die more often than men as a result of AMI (Mosca et al., 1997).

The Burden to Canadian Society

Cardiovascular disease, particularly coronary heart disease, has an enormous impact on Canadian society. In terms of economic burden alone, the cost of cardiovascular disease is considerable. It is estimated that $19.7 billion were spent in 1993 in direct costs for cardiovascular diseases. This is the highest dollar amount of any diagnostic category, accounting for 15.3% of the total cost of illness classifiable by diagnostic category. It is much more difficult to measure the overall burden Canadians bear as a result of cardiovascular disease. In terms of human suffering, heart disease has a major impact on a person’s quality of life, including chronic pain or discomfort, activity restriction, disability, and unemployment (Health Canada, 1999).

Disability due to cardiovascular diseases is also tremendously costly for Canadians. Disability costs for cardiovascular diseases are second only to musculoskeletal diseases and cost approximately $4.5 billion. Of the indirect costs Canadians shoulder for cardiovascular disease, mortality accounts for a considerable share amounting to 60.2%. Specifically, coronary heart disease costs Canadians $4.6 billion in indirect costs and accounts for two thirds (61.8%) of the mortality costs of all cardiovascular diseases (Environmental Risk Assessment and Case Surveillance Division, Laboratory Centre for Disease Control, 1997). The direct costs for
Canadian women who suffer from AMI are also large; in 1993 the costs totalled $725 million (Heart and Stroke Foundation of Canada, 1997).

**Treatments For Acute Myocardial Infarction**

There is hope for sufferers of AMI. The health-care team has a large repertoire of interventions and treatments that can not only provide relief of AMI symptoms but can improve victims’ chances of survival. Percutaneous transluminal coronary angioplasty (PTCA) can be done to mechanically reopen occluded coronary arteries. Coronary angioplasty, now considered a treatment of choice in reducing mortality from AMI is time sensitive and must be performed as soon as possible after AMI begins to occur (Widimsky et al., 2000; Zijlstra et al., 1999). Intracoronary stents, highly effective in maintaining coronary patency, are also widely used.

Prompt administration of nitroglycerin, delivered either by mouth or intravenous infusion during AMI, can assist in dilating narrowed coronary arteries. Some therapies extremely important for AMI victims, can be readily administered en route to the emergency department. There exists as well an entire arsenal of medications aimed at decreasing myocardial workload and increasing myocardial perfusion. With these it is possible to salvage precious myocardium if treatment is initiated early in the process of AMI.

Thrombolytic therapy has been established to be useful for improving myocardial perfusion early in the process of AMI (Cole, 1991; Weaver et al., 1991). Thrombolytic agents such as streptokinase, tissue plasminogen activator (t-pa), and others are designed to chemically break up, or lyse, any coronary artery thrombus and thereby re-establish coronary perfusion (Canobbio, 1990). Because cellular and tissue death quickly ensues in the absence of vascular perfusion, thrombolytic therapy must be initiated early in the process of AMI in order for myocardial tissue to be salvaged. Time between AMI onset and thrombolytic therapy administration has been
shown to be a critical factor in the efficacy of the treatment in restoring myocardial perfusion. Although treatment protocols may differ slightly by facility and prescribing physician, generally those treated within six hours of onset of AMI have a significantly better chance of survival (Cole, 1991).

**Acute Myocardial Infarction Symptom Recognition**

Because first cardiovascular events are often fatal in women, it is extremely important that women know how to recognize AMI symptoms and to act quickly to seek treatment (Mosca et al., 1999). Empirical work has shown that those persons who can describe a wider range of possible AMI symptoms or less common symptoms are more likely to seek treatment early in the course of AMI (Dracup et al., 1995; Meischke et al., 1999; Ruston et al., 1998). However, to conduct educative efforts designed to help women recognize AMI and seek prompt treatment, it is important to first gain an understanding of what women already know.

Chest pain has been considered to be the cardinal clinical feature of AMI (Braunwald, 1992). Nursing textbooks teach nurses that chest pain is classically seen in persons with AMI. Descriptions of pain, pain severity, pain location and other characteristics of pain are provided in nursing texts for the purpose of helping nurses identify and differentiate chest pain resulting from AMI or anginal pain (Canobbio, 1990; LeMone & Burke, 1996). The problem is that we now understand that chest pain, chest pain descriptions, and particularly chest pain severity often are not accurate indicators of the presence or severity of AMI (Canto et al., 2000). Awareness is increasing, albeit slowly, that AMI symptom presentation varies, and that chest pain does not always occur with AMI, particularly among the elderly (Wenger, 1994). The longstanding belief that chest pain is a classic or hallmark clinical feature of AMI has been eroded further with the work of Canto et al. (2000). This research team undertook a large prospective, observational
study and found that a startling one third of persons presenting with AMI had no chest pain on presentation. For women, the proportion was roughly one half. The revelation that approximately one in two women having AMI do not present with chest pain presents health-care providers with the imposing task of rethinking education campaigns designed to help women recognize AMI.

**Clinical Presentation of Acute Myocardial Infarction in Women**

The published literature strongly suggests that women experience AMI somewhat differently than men (Douglas & Ginsburg, 1996). Women with AMI are more likely to have clinical presentations that are less ‘typical’ with symptoms less commonly associated with the ‘classic’ AMI description (Canto et al., 2000; Chiamvimonvat & Sternberg, 1998; Hochman et al., 1999; Mosca et al., 1997; Penque et al., 1998). It appears that these gender differences in presentation, outcomes and prognosis cannot be entirely explained by other baseline differences. It is plausible that gender differences may be the result of anatomic and pathophysiologic differences between the sexes (Hochman et al., 1999).

Certain now that woman often present with clinical pictures different from that of men, health-care professionals recognize that it is important to distinguish and clarify the specific gender differences. The published literature in this area is less clear. Various researchers have uncovered different clinical variations in females’ presentation. Dyspnea and nausea are noted as more common in women with AMI, while diaphoresis is noted as less common (Meischke, Larsen, & Eisenberg, 1998). Fatigue, non-exertional chest pain, pain in other locations such as the back, jaw, arms, abdomen and epigastrum also are believed to be more common in women (Chiamvimonvat & Sternberg, 1998; Lusiani, Perrone, Pesavento, & Conte, 1994; Mosca et al., 1997). Women also have been noted to be more likely to experience paroxysmal nocturnal
dyspnea with AMI (Penque et al., 1998). Women are more likely to have no chest pain or chest pain differing qualitatively from what has been thought of as the 'classic' description of heavy or crushing chest pain (Canto et al., 2000; Meischke et al., 1998). Exact statistics pertaining to the reported presenting symptomatology in women with AMI remain a mystery. Canto et al. acknowledge that even with the development of better methods to detect AMI, the prevalence of atypical presentations of patients with documented AMI still remain unknown.

Although differences in symptomatology may explain disparities in treatments and promptness of AMI recognition by health professionals, these problems are multifaceted (Moser & Dracup, 1993). Most disturbing are studies that strongly suggest that women fare worse after AMI compared to men (Barakat, Wilkinson, Suliman, Ranjadayalan, & Timmis, 2000; Greenland, Reicher-Reiss, Goldbourt, & Behar, 1991; Maynard et al., 1997). Perhaps the thinking has been that the less ‘typical’ AMI symptoms are associated with less severe damage. It is now known that AMI with atypical presentation is not less severe and that it is important for health-care providers to remain highly suspicious of AMI, particularly in (although not exclusively) elderly females with any of the above-mentioned symptoms less commonly associated with AMI (Lusiani et al., 1994). Women with AMI are treated differently than men by health-care providers in that they are less likely than men to have angiography or to receive intravenous nitroglycerin, intravenous heparin, thrombolytic therapy, beta blockers or aspirin (Barakat et al., 2000; Malacrida et al., 1998; Penque et al., 1998). An official and international statement issued by the American Heart Association acknowledged that, following AMI, women have a poorer prognosis than men (Mosca et al., 1997). Perhaps telling of current educational efforts in this area, research suggests that three quarters of AMI victims experience symptoms different than those expected (Johnson & King, 1995). Johnson and King alert health-care
providers that among this large group of persons experiencing AMI symptoms in a way unlike their (the patients') expectations, treatment delay was significantly increased.

**Treatment Delay**

Knowing that prompt treatment, particularly with thrombolytic therapy or percutaneous coronary intervention, can help salvage myocardium and reduce mortality from AMI, it becomes important to understand the process of delay for AMI treatment. Delay in treatment for AMI has been examined by a few researchers (e.g., Schmidt & Borsch, 1990; Zerwic, 1999). Zerwic (1999) offered arguably the clearest categorization of types of treatment delay. The three phases of treatment delay for AMI victims are: patient delay, emergency medical system delay, and hospital delay (Zerwic, 1999). Of the three phases of delay, the greatest proportion of delay results from patient delay (Zerwic, 1999). Schmidt and Borsch (1990) found that the time between symptom onset and reaching a decision that medical care should be sought was 62% of the average prehospital time.

The importance of reducing treatment delay for AMI becomes clearer after considering the evidence demonstrating significant mortality increases among persons who receive delayed emergency department treatment. Turi et al. (1986) found that patients arriving two hours or more after the onset of chest pain in the presence of AMI had significantly higher mortality rates. Reducing delay for treatment of AMI is critical to reduce the likelihood of death.

**Treatment Delay and Women**

Reducing patient delay in seeking treatment for AMI is recognized as important in decreasing morbidity and mortality in women (Meischke et al., 1999; Mosca et al., 1997; Moser & Dracup, 1993). There is little dispute that women delay significantly longer in seeking treatment for AMI than men (Barakat et al., 2000; Maynard et al., 1997; Meischke, Eisenberg, & Larsen, 1993;
Penque et al., 1998; Turi et al., 1986). In an extensive literature review, Dracup et al. (1995) reported that all researchers who have documented a difference in delay times between men and women have noted that women delay longer. This evidence leads to the understanding that reducing treatment delay for women suffering from AMI is one way of reducing mortality for women with ischemic heart disease.

Knowing that AMI often presents without chest pain in women, and that much of what is understood at the moment about ischemic heart disease was learned in men as research participants, health-care providers face an enormous challenge. It is an important task to right the gender imbalance in our knowledge of ischemic heart disease. The problem of helping women to seek prompt and effective treatment is now receiving well-deserved attention from a number of researchers (e.g., Dempsey, Dracup, & Moser, 1995; Douglas & Ginsberg, 1996; Meischke et al., 1999; Moser & Dracup, 1993; Penque et al., 1998; Vaccarino et al., 1999). Particularly toward the goal of decreasing treatment delay for women with AMI, a much better understanding of the process of treatment seeking is needed. Logically, in planning an educational strategy, one must know what women currently understand, so that knowledge deficits can be prioritized and addressed. Additionally, it would be beneficial to have a better understanding of current determinants of treatment-seeking behaviour.

**Determinants of Treatment Seeking for Acute Myocardial Infarction in Women**

The literature contains empirical work and extensive literature reviews by a number of dedicated professionals who have demonstrated a commitment to minimizing treatment delay for victims of AMI. Because of the previously discussed problem that treatment seeking for AMI tends to be much longer in women, and that women tend to fare worse after AMI, much work specific to women has been undertaken (American Heart Association, 1997; Maynard et al.,
1997; Meischke et al., 1998; Murray, O'Farrell, & Huston, 2000; van Tiel, van Vliet, & Moerman, 1998). Several commonalities among research findings have been noted and for the purposes of this review are discussed in terms of currently understood determinants of AMI treatment-seeking behaviour in women.

**Erroneous Risk Perception**

The perception of being at risk for AMI plays a large role in identifying oneself as a possible AMI victim. Using grounded theory, Miller (2000) identified that awareness of personal risk factors for cardiac disease is a strong motivation for some women to seek medical consultation. In fact, at least among American women, a misperception that heart disease is a male malady is problematic. Women tend to believe that their most significant health threat is cancer, rather than heart disease (American Heart Association, 1997). Stereotypic expectations about who is at risk for coronary heart disease can produce delays in obtaining necessary health care. Although AMI can occur in premenopausal women, and they are considered to be particularly at risk for death from AMI, the stereotype of a “cardiac victim” as male reduces women’s sense of vulnerability (Miller, 2000). In light of the magnitude of the coronary heart disease epidemic, everyone should be made aware of their personal risk of developing coronary heart disease and the manifestation of its symptoms (van Tiel et al., 1998). Mindful of the higher mortality rate and poorer prognosis women face as a result of AMI, researchers and practitioners must pay special attention to efforts to help women gain greater understanding of their risk and the impact of this disease. The problem is multifaceted and complex. If women made decisions based entirely on cognitive knowledge, the role of the health educator would be reasonably simple. The problem is that psychology and the social environment also play roles in women’s decisions to seek treatment for AMI.
Poor Knowledge of Symptomatology

Women generally have knowledge deficits pertaining to AMI symptom recognition and these misunderstandings adversely affect their treatment-seeking behaviour and chances of survival. Despite the knowledge that women often experience AMI differently than men, the American Heart Association (1997) has found that the majority of women believe that men and women experience the same symptoms. Zerwic (1998) noted that most people in her study expected to be unable to physically move if AMI occurred. Meischke et al. (1995) noted that a primary reason for treatment-seeking delay among AMI victims included patients thinking that their symptoms were caused by another illness. In the only Canadian study identified in the literature on this topic, Murray et al. (2000) reported that all their subjects with confirmed heart disease had difficulty recognizing their symptoms as being related to their heart. Women, particularly those who do not attribute their symptoms to their heart, delay longer than men (van Tiel et al., 1998).

Compounding the problem of symptom recognition is the need to choose the best method of help seeking. Perhaps the public is unaware of the benefits early treatment can have on AMI outcomes. Meischke, Ho, Eisenberg, Schaeffer, and Larsen (1995) found that the main reason why patients did not dial '911' for emergency help was their misunderstanding that self-transport is faster. Part of our educational efforts need to emphasize how specifically to access prompt, effective treatment for AMI.

Symptom Severity is Misunderstood

One knowledge gap involves how people understand chest pain, particularly pain severity and its association with AMI. It may be the case that people associate AMI with disabling pain much like dramatic television and media depictions of victims experiencing AMI. The work of Canto
et al. (2000) is an alert to health educators that sudden, dramatic, excruciating chest pain, as an initial AMI symptom, is a myth urgently in need of being dispelled. In fact, several research studies have highlighted that women do not understand that AMI chest pain is not necessarily severe and may not even be present at the onset of AMI. Zerwic (1998) found that more than 88% of her subjects expected the intensity of AMI pain to be at least 9 out of 10 with 1 meaning “no pain” and 10 meaning “the worst pain imaginable”. Zerwic found no gender differences in symptom severity expectation in her study. Slow symptom progression has been identified as an independent predictor of prehospital time in both men and women (Schmidt & Borsch, 1990). This finding means that when symptoms occur gradually and slowly magnify as AMI progresses and evolves, victims are more likely to delay treatment until they can no longer bear the severity of their symptoms. This finding is substantiated by Dracup and Moser (1997) who identified that persons with intermittent symptoms delayed help seeking longer. Meischke et al. (1995) also identified that patients who believed that their AMI symptoms were not severe and that their symptoms would abate or subside would likely delay treatment seeking. There appears to be widespread misunderstanding that AMI always brings about sudden, severe symptoms and nearly intolerable chest pain.

Affective Determinants

It is possible that women experience emotional responses more commonly than men when faced with problems. Evidence from the University of Ottawa Heart Institute suggests that when faced with ischemic heart disease, women, particularly those less than 60 years of age, predominantly focus on their emotional concerns (Murray et al., 2000). Dracup and Moser (1997) identified that both cognitive and emotional responses affect patients' decisions to seek treatment. They noted that patients with longer treatment seeking delays were women, were
older, were poorer and did not appraise their AMI symptoms as serious. The patients who delayed longest were found to be fearful of what might happen to them and worried about troubling others. Women experiencing AMI seem to wrestle with emotional concerns in deciding to seek help. For example, embarrassment over a 'false alarm' AMI was found to increase intention to delay if future AMI symptoms occurred (Meischke et al., 2000). This is an important finding because it is an issue that theoretically could be relatively easy to address with educative measures by primary health-care providers or health-promotion educators.

**Denial**

What health-care providers have in the past referred to as 'denial' of AMI deserves some scrutiny. It might be argued that, because persons with heart disease tend to deny the disease and its symptoms, attempts to increase recognition of AMI are futile. Although the term ‘denial’ has been used, it is unclear whether what is intended is an actual process of denial, reasonable problem-solving behaviour, or a social hesitancy to seek emergency care (Dracup et al., 1995). Is denial an appropriate concept to consider in attempting to explain treatment delay? Do patients really know how serious their symptoms are and choose to ignore them? The qualitative research of Dempsey et al. (1995) illuminated the process of women either maintaining or relinquishing control of their symptoms and provided valuable clues for how health educators might revisit the idea. The women interviewed for the grounded theory study done by Dempsey et al. did not seem to 'deny' their symptoms. These women tended to use a variety of coping mechanisms and self-treatment behaviours intended to reduce the threat and to maintain their control. While these women delayed seeking professional treatment for their AMI, they were actively trying to help themselves. For example the women self-administered medications, attempted to distract themselves, used deep breathing exercises, applied heating pads and
changed their positions in their efforts to alleviate their symptoms. What women need to understand is that there are benefits to be gained by seeking early emergency treatment for AMI (Dempsey et al., 1995).

Lowery (1991) warned nurses that the question of whether denial impacts patient outcomes is unclear. Furthermore, Lowery argued that data regarding the encouragement or discouragement among denying AMI patients are equivocal and therefore do not help nurses determine an appropriate intervention strategy. What appears to be the best approach nurses can offer in this area is that of open communication with patients (Lowery, 1991).

**Acting on Current Information**

Research efforts in the past have tended to pertain to the emergency medical treatment of AMI such as medication choices and resuscitative efforts. Such work was aimed at helping health-care providers to make good decisions in dire circumstances. While such research continues, attempts to reduce mortality due to AMI now include consideration of both primary and secondary prevention of death from AMI. To reduce mortality from cardiovascular disease Health Canada (1999) alerted health-care providers and researchers to the idea that all prevention efforts must attain priority. Targeting high-risk individuals is one part of an effective strategy towards reducing the time between AMI symptom onset and treatment time (Fuster, 1999). Because first cardiovascular events are often fatal in women, targeting women for educative efforts may be the best way to reduce mortality (Mosca et al., 1999).

**Better Understanding Needed by Both the Lay Public and Professionals**

There is agreement that ignorance of the issues concerning women and AMI is a problem not limited to lay persons. Health professionals also have knowledge gaps in this area. There is evidence that physicians often view women presenting with suspected AMI with less urgency
than men presenting with similar symptoms (Green & Ruffin, 1993). Efforts targeted toward helping lay women recognize and seek prompt treatment of AMI, albeit worthwhile, will not be sufficient to combat the problem of female mortality from AMI. Health-care professionals need to better understand women's responses to AMI. Both health-care professionals and lay people should be targeted to receive information concerning the severity and consequences of cardiac diagnosis in women and the problem of delay in women (Moser & Dracup, 1993). The Heart and Stroke Foundation of Canada (1997) has listed among its future directions that issues particular to women's cardiovascular health should receive greater attention in medical and other health professional curricula and continuing education programs.

Knowledge as an Important Factor In Treatment Seeking

The ability to recognize symptoms as cardiac in origin has bearing on patients' treatment-seeking time (Leslie, Urie, Hooper, & Morrison, 2000; Meischke et al., 1999; Ruston et al, 1998). It makes sense that improving the public's knowledge of symptoms should aid treatment-seeking behaviour and the time from onset of symptoms to treatment. Some public information campaigns have been conducted to encourage people to seek prompt treatment for AMI, particularly in the United States. The results of this work, however, have been discouraging because the gains have been short-lived or influenced relatively few individuals (Luepker et al., 2000; Meischke et al., 1997). Dracup et al. (1995) warned health educators that the phenomenon of delay for AMI patients is not well understood and that better understanding is important before designing education and counselling strategies. What appears to be missing from the above-mentioned efforts to reduce treatment delay for AMI is a preliminary assessment of the public's knowledge and factors influencing that level of knowledge. Nonetheless, there still is room to believe that improved educational efforts could help. Although differences do exist in
health systems among nations, Swedish health educators provided a very encouraging example of an effective educational campaign that successfully decreased prehospital delay time for AMI patients (Herlitz et al., 1989). The Canadian context is likely to be more similar to the Swedish health-care system than to the American system. By first conducting a study aimed at achieving a better understanding of what the Canadian public currently understands about AMI symptoms and treatment seeking, better education strategies can be developed.

**Recognizing Gender Bias**

There is increasing awareness among health researchers that gender bias in research is a problem (Lee, et al., 2001; O’Rourke, 1984; Thurau, 1997; Wenger, 1992). There is pressing and significant need to conduct research on women (Health Canada, 2000a; Hirsch & Meagher, 1984; National Institutes of Health, 1999). Women have been excluded from cardiovascular clinical research and there is growing recognition of the importance of understanding how heart disease affects the long-neglected female half of society. There has been recognition that women have been excluded from clinical trials of the management of AMI (Gurwitz, Col, & Avorn, 1992). Unfortunately, women continue to be underrepresented relative to their disease prevalence in published randomized control trials of acute coronary syndromes (Lee et al., 2001). Current American research also suggests that there are significant differences between women and men with cardiovascular disease and that our limited knowledge of how women respond to cardiovascular disease is insufficient (Jensen & King, 1997). This knowledge gap has been noted in Canada as well. The Heart and Stroke Foundation of Canada (1997) has expressed concern that marked differences exist in the rates of cardiac-related hospitalization and procedures for men and women that are still unexplained.
Conclusion

To heed the advice of scholars interested in improving health education for women with AMI, some key conditions appear to be necessary for women to make good treatment-seeking decisions. Firstly, women need to understand that prompt treatment has the potential to save not only their life but their functional ability as well. Women need to be aware that advancements in treatments for AMI are only useful if they can be applied to those persons in need of them. Furthermore, many technological treatment advances are time sensitive; patients need to understand the need for swift response to a cardiovascular emergency (Fuster & Smaha, 1999). Additionally, the affective aspects of decision making must be considered (Dracup & Moser, 1991). Potential embarrassment as a result of false alarms has already been uncovered as hindering women in seeking help with AMI symptoms (Meishke et al., 2000). There are other affective aspects women likely struggle with in deciding to seek help for AMI. Educational strategies must address these affective aspects as well. Interventions that consider the normal evaluative processes involved in treatment seeking are needed to avoid excessive evaluation, paralyzing fear, anxiety and defence mechanisms that impede and prolong care seeking (Alonzo & Reynolds, 1997).

Public educational materials pertaining to AMI recognition for women are available in the Vancouver area, where this study was conducted. However the author is concerned that these materials lack some important details required to make appropriate care-seeking decisions. One leaflet, made available by the Heart and Stroke Foundation of British Columbia and Yukon (1999), discusses risk and encourages women to call for an ambulance if AMI symptoms occur. Unfortunately, the leaflet makes no mention of the importance and advantage of early treatment. Additionally, the symptoms likely to be experienced by women having AMI, such as abdominal
and back pain are not included. The affective aspects women may struggle with in deciding to seek help for AMI, such as the embarrassment that may result from false alarms, are also not mentioned. A commercially prepared patient-education leaflet designed to address heart disease for women was found at a local hospital (Krames Communications, 1996). The leaflet, available near the entrance of the hospital for a fee, provides more information than that provided free of charge by the Heart and Stroke Foundation of British Columbia and Yukon (1999). Unfortunately this leaflet contains no information pertaining to the benefits that can be derived from prompt treatment should AMI occur. This is information that could potentially help encourage women to seek help.

This literature review points to gaps in our understanding of women and heart disease, especially symptom recognition. Improving public awareness of the warning signs of AMI is critical to reduce the ‘door-to-needle time’ upon which the lives of many women suffering AMI depend (Fuster, 1999). Before considering possible strategies aimed at educating women to seek prompt treatment for AMI symptoms, it is important to identify what information women lack and what possible factors might prevent women from seeking appropriate treatment. Health professionals need to expand the knowledge of heart disease and women so that our ability to care for the female half of the population can be improved (Wexler, 1999). Much work has already been done in this area, and indeed some scholars and researchers have dedicated great efforts toward decreasing treatment delay time for women with AMI. However, the bulk of the work originates in the United States, with American women as study participants. To date, no studies have been located that assess the knowledge and understanding of AMI symptom recognition of Canadian women.
CHAPTER 3 METHODS

Theoretical Background

Further study is needed to develop efficacious public educational efforts aimed toward reducing treatment-seeking delay for women with AMI. The best approach to planning and implementing any educational intervention designed to help women recognize and seek prompt treatment for AMI, is to first conduct an assessment. It stands to reason that when an information campaign or educational intervention is carried out with advance knowledge of what the target population currently understands, then the likelihood of success increases. An understanding of the target audience on such matters as beliefs, attitudes, values and skills is important for health promotion and education to be effective (Glanz, Lewis, & Rimer, 1997). To date, no Canadian studies have been identified that offer insight into the informational needs of Canadian women regarding their ability to recognize and respond appropriately to AMI symptoms.

The theoretical framework guiding this study is based on the Health Belief Model (HBM) (Strecher & Rosenstock, 1997). Generally, the theory asserts that persons are more likely to engage in behaviour intended to maintain or improve their health if they believe the following: (a) they are susceptible to the relevant health concern or condition, (b) the condition has serious consequences, (c) taking an action would be beneficial in reducing either the susceptibility or the severity of the condition, and (d) the anticipated barriers to (or costs of) taking the action are outweighed by the benefits. This study did not examine or test all components of the HBM, but was designed with these assertions serving as central assumptions.

For the purposes of this study several key concepts deserve clarification. Perceived susceptibility is defined as one’s opinion of one’s chances of acquiring a condition. Perceived
benefit is another key concept in this study, and is defined as one’s opinion of the efficacy of the advised action to reduce risk or seriousness of impact. Finally the concept of perceived barrier is incorporated into this study and is defined as one’s opinion of the tangible and psychological costs of the advised action (Strecher & Rosenstock, 1997).

**Delimitations of the Study**

For the purposes of this work, the necessity of providing women with needed life-saving information was given priority. The concept of denial, while possibly an important factor in AMI symptom recognition, was set aside in favour of attempting to illuminate the information women need to recognize AMI and the impediments to prompt treatment seeking.

The health of women encompasses their emotional, social, cultural, spiritual and physical well being and is influenced by social, political and economic factors as well as by their biology (Cohen, 1998). The problem of helping women to seek prompt treatment for AMI, like the majority of problems pertaining to health, is multidimensional. Affect and emotions play a role in the process of treatment seeking but there are many factors affecting a woman’s ability to first identify herself as in need of attention and then to seek appropriate help. To best design an effective education strategy aimed at decreasing treatment delay for women with AMI, there must be careful consideration of many factors, including affect and emotion, that influence women and their decisions to seek appropriate treatment. This study was not designed to fully assess every affective determinant or knowledge deficit influencing women and their decisions to seek treatment for AMI. The affective determinants identified in the literature (preference for self care, preference not to inconvenience others and embarrassment) were examined. Additionally, this study was not designed to describe the qualitative experience associated with a woman’s decision to seek help for suspicious symptoms suggestive of AMI. The deeper
meanings women may attach to the process of AMI and their motivations to seek help while equally important could not be described with this particular study design.

Summary of Research Project

This survey study was designed with the intent of gaining a better understanding of Greater Vancouver women's knowledge, knowledge deficits, their ability to recognize, as well as their likelihood of responding appropriately to, AMI symptoms. The study was intended to be a preliminary investigation toward the long-term goal of helping reduce treatment delay for women with AMI. The researcher sought to gain a better understanding of the educational needs of women for AMI treatment seeking in order to inform the design of strategies for intervention.

In keeping with the HBM, the research was directed towards illuminating factors affecting treatment-seeking decisions for women. A survey questionnaire was constructed to allow for examination of factors influencing women in their decisions to either delay or seek treatment for AMI symptoms. The two major objectives were: (a) to describe the current understanding pertaining to AMI symptom recognition and treatment seeking in women in the Greater Vancouver area, and (b) to examine factors affecting AMI symptom recognition and treatment seeking. Because the survey contained 63 items, there were a multitude of research questions that could possibly be asked of the data. What follows are the six key questions posed for the purpose of this project.

Research Questions

1. What do women understand about their susceptibility to AMI and the general risk factors for AMI?
2. How accurately and completely can women identify symptoms of AMI?
3. How likely are women to take appropriate action in the event AMI symptoms occur?
4. Are the following factors (some of which are potential barriers) associated with the likelihood of responding appropriately to symptoms of AMI in women? (a) personal characteristics including age, (b) education level, (c) years in Canada as immigrants, (d) presence of a partner, (e) knowledge of AMI risk factors, (f) knowledge of ‘atypical’ AMI symptoms, (g) perceived susceptibility to AMI, (h) ever having visited an emergency room and perceived effectiveness of most recent visit, (i) potential embarrassment, (j) preference for self-care, (k) concern regarding inconveniencing others, as well as cardiac health status including (l) actual experience with AMI, (m) having been prescribed nitroglycerin, (n) diagnosis of angina, (o) close relative or friend with AMI, and (p) ever having visited an emergency services facility for symptoms suggestive of AMI).

5. To what extent must women be certain of their condition before taking action to seek assistance for symptoms of AMI (i.e., what is their intention to delay)?

6. Are the following factors (some of which are potential barriers) associated with women’s intention to delay treatment seeking for AMI? (a) personal characteristics including age, (b) education level, (c) years in Canada as immigrants, (d) presence of a partner, (e) knowledge of AMI risk factors, (f) knowledge of ‘atypical’ AMI symptoms, (g) perceived susceptibility to AMI, (h) ever having visited an emergency room and perceived effectiveness of most recent visit, (i) potential embarrassment, (j) preference for self-care, (k) concern regarding inconveniencing others, as well as cardiac health status including (l) actual experience with AMI, (m) having been prescribed nitroglycerin, (n) diagnosis of angina, (o) close relative or friend with AMI, and (p) ever having visited an emergency services facility for symptoms suggestive of AMI).
Sampling and Data Collection

Using random digit dialling in the Greater Vancouver area, this telephone survey was conducted by the researcher and two research assistants. Canada Survey Sampler, a professional survey research organization, provided a list of random telephone numbers from the Greater Vancouver area. Study participants were limited to English-speaking women, 18 years of age and older, who verbally agreed to participate by telephone. The original plan was to complete as close to 500 interviews as could be obtained during the 12 weeks allotted for data collection. Canada Survey Sampler estimated the total number of telephone numbers required with the understanding that approximately 10% would be "dead" numbers (i.e., would not reach households) and that approximately 60% of the contacts would be eligible, and that 50% would consent. The number of telephone numbers needed to provide approximately 500 participants was estimated to be 2,000. In a population of this size, 500 randomly selected participants would produce sampling errors associated with point estimates not greater than ± 4.4% 19 times out of 20.

The Survey Questionnaire

A questionnaire with 63 items was developed for this study (see Appendix A). The author, except where indicated in the following section, developed most items. A preliminary assessment of the questionnaire was conducted by completing surveys with five women who discussed their ability to comprehend the questions, the appropriateness of the available responses read by the interviewer and the acceptability of the length and nature of the questionnaire. Minor changes were made to address any concerns raised. The operationalization of the relevant variables is discussed in the following section.
Operationalization of Response Variables

Two response variables were determined: (a) intention to delay and (b) likelihood of responding appropriately to AMI symptoms (LRS index). The main objectives of this study were to explain the variability of, or to identify associations with, these two variables. Corresponding with the HBM, the response variables represent the health behaviour of interest, that women will engage in behaviour conducive to early and appropriate intervention when faced with the threat of AMI.

Intention to Delay

The literature provides scant information as to the best way to measure intention to delay treatment seeking with the exception of Meischke et al. (2000). Intention to delay was measured in much the same way that Meischke et al. (2000) measured it in their study of emergency department patients with AMI symptoms. This item, number 30 on the questionnaire, read: “Before going to the emergency room to be examined for a heart attack, you would want to be sure you were really having a heart attack.” The item was measured with a 4-point Likert scale with 1 being “strongly disagree”, and 4 being “strongly agree”.

Likelihood of Responding Appropriately to AMI Symptoms

The variable, “likelihood of responding appropriately to AMI symptoms (LRS)” was a summated score of questionnaire items 19-28. The items, developed by the researcher, were intended to measure how well women recognize AMI symptoms and identify the need to seek emergency assistance by calling “911”. Inclusion of these items was based on literature describing the symptoms of AMI most likely to occur in females (Chiamvimonvat & Sternberg, 1998; Hochman et al., 1999; Lusiani et al., 1994). A readily available patient information leaflet, provided to the public by a local hospital (Krames, 1996), also influenced the development of
items for this variable. The questions were posed in the form of hypothetical situations and were measured with a 5-point scale, 0 for "wait to see what happened", 1 for "phone to make an appointment with your family doctor", 2 for "visit your family doctor immediately", 3 for "go to the hospital emergency room", 4 for "call an ambulance", and 5 for "other". Response 5 was not read to the respondents, however any responses other than 0-4 were made noted. The 10 items were summed with low scores indicating little likelihood of responding appropriately to AMI symptoms. This operationalization, based on the work of Meischke et al. (1999), produced possible scores ranging from 0 to 40. The aggregated score was considered the best presently known approach to measuring a woman's ability to assess potential AMI symptoms and her likelihood of responding appropriately.

The Explanatory Variables

In keeping with the guidance the HBM provides, the explanatory variables were grouped according to the HBM constructs represented. The basis for many of these items was derived from a readily available public information leaflet published by the Heart and Stroke Foundation of British Columbia and Yukon (1999); these questionnaire items were designed to measure understanding of basic information pertaining to basic risk factors for heart disease.

Health Belief Model Construct – Knowledge and Beliefs

Knowledge of atypical acute myocardial infarction symptoms.

Three survey items measured knowledge of atypical AMI symptoms. Item 1, an open-ended question asked participants, “What would you say are the signs and symptoms of a heart attack?” This item was asked first to prevent the suggestive effect that was likely to occur with the subsequent items. This survey item was taken from a study by Meishke et al. (1999) and was intended to measure how well women identify AMI symptoms. An aggregate score was
computed for knowledge of the less 'typical' AMI symptoms considered to be most common in women. A score of zero indicated that neither nausea nor shortness of breath were mentioned. A score of 1 indicated that one of the two symptoms was mentioned. A score of two indicated that the respondent gave both nausea and shortness of breath as responses. Item 2 on the questionnaire asked participants to mention any other symptoms and read, “Are there any others?” Items 1 and 2 were used to determine the aggregate score. Lastly, item 16 on the survey provided another estimate of participants’ understanding of ‘atypical’ AMI symptoms and was measured with a 4-point Likert scale. Participants were asked to respond to the statement, “If a woman has a heart attack, her symptoms would be just like that of a man”.

**Perceived ability to recognize acute myocardial infarction.**

Perceived ability to recognize AMI was measured with item 31 on the survey. The item read, “You feel you know all you need to know in order to recognize the symptoms of a heart attack.” The item was measured with a 4-point Likert scale with 4 being “strongly agree” and 1 being “strongly disagree”.

**Knowledge of pain severity.**

Knowledge of pain severity was measured with items 33 and 38 on the survey. Item 33, “A heart attack always causes severe chest pain” was measured with a 4-point Likert scale with 4 being "strongly agree" and 1 being "strongly disagree". Item 38 was taken from the work of Zerwic (1998) and read, “On a scale of 1 to 10 with 1 being the very least and 10 being the worst pain you can imagine, how much pain would you expect there to be if you had a heart attack?” Participants’ responses between 1 and 10 were recorded.
Reasons to dial 911

Open-ended questions 42 and 43 were intended to illuminate whether participants would include possible AMI as a reason for dialling 911. Participants were asked, “What kind of situation would you call 911 for?” The latter item asked participants, “Can you think of any others?”

Health Belief Model Construct – Susceptibility

Knowledge of risk factors for acute myocardial infarction.

The susceptibility construct was measured with items 7, 9, 11, 13 to 15, and 18. These items were measured on a 4-point Likert scale. A score of 1 indicated strong agreement and a score of 4 indicated strong disagreement. Item 7 stated, “Smoking has nothing to do with heart attack.” Item 9 stated, “High levels of cholesterol in the blood have no relationship to heart attack.” Item 13 stated, “Even very overweight people are healthy as long as they have no diseases.” Item 14 stated, People with diabetes have the same chance of having a heart attack as every one else.” Item 15 stated, Just because someone in your family had a heart attack doesn’t mean that you’re at greater risk for heart attack than anyone else.” Item 18 stated, “Once a woman goes through menopause, she has the same chance of a heart attack as a man.”

Perceived susceptibility of having an acute myocardial infarction.

The variable, “perceived susceptibility” was measured with items 29 and 49 on the survey. Item 29 stated, “Women are less likely to have heart attacks than men”. Item 29 was measured with a 4-point Likert scale with “strongly agree” being 1 and “strongly disagree” being 4. Item 49 on the survey asked: “What is the likelihood that you will have a heart attack during your lifetime?” Measured with a 4-point Likert scale, 1 indicated a response of "not at all likely" and 4 indicated a response of "very likely".
Health Belief Model Construct - Consequences

The HBM construct, “consequences” was measured with item 11 on the survey. Item 11 read, “Even if a person has high blood pressure, high blood pressure causes no real harm” and was intended to estimate how well women understand that hypertension increases susceptibility to AMI. This item was measured with a 4-point Likert scale. A score of 1 indicated strong agreement and a score of 4 indicated strong disagreement.

Health Belief Model Construct – Potential Barriers to Treatment Seeking

Embarrassment.

The literature indicates that affective or emotional factors are an important component of the decision-making process for women experiencing symptoms of AMI (Dracup & Moser, 1997; Meischke et al., 2000; Murray et al., 2000). One such emotion is embarrassment. The embarrassment variable was measured with item 34 on the survey questionnaire. This variable was considered to be an affective determinant of, and a barrier to, treatment seeking consistent with the HBM. The variable was derived from the work of Meischke et al. (2000) and used a 4-point Likert scale to estimate how much potential embarrassment influences treatment-seeking decisions. The item stated, “If you were to go to an emergency room because you thought you might be having a heart attack it would be embarrassing to have a false alarm.” Participants in strong agreement measured 4 on this variable, strong disagreement was scored with 1.

Preference for self care and preference not to inconvenience others.

Preference for self-care and preference not to inconvenience others were two variables considered to be affective components of the treatment-seeking process. These variables were formulated in response to the findings of Dracup and Moser (1997) who found that patients who delayed their treatment seeking for AMI longest were found to be worried about troubling others.
These variables were measured with items 35 and 36 on the survey questionnaire. Item 35 read, “If you feel unwell you prefer taking care of yourself.” Responses were measured on a 4-point Likert scale with 4 being "strongly agree" and 1 being "strongly disagree". Item 36 stated, “You would rather not inconvenience others when you don’t feel well.” Responses were measured on a 4-point Likert scale with 4 being "strongly agree" and 1 being "strongly disagree".

**Personal experiences.**

A number of personal experiences were measured as explanatory variables with survey items 39-41, 44-48, and 50-52. These personal experience variables were examined as possible barriers to treatment seeking:

- Ever having visited an emergency room for a possible AMI
- Close friend with AMI and gender
- Close relative with AMI and gender
- Pre-existing diagnosis of angina
- Ever being prescribed nitroglycerin
- Actual previous experience of AMI

**Reasons to delay going to an emergency room.**

The open-ended question, item 37, stated, “Can you think of any other reason that might cause you to wait before going to an emergency room if you thought you might be having a heart attack?” All responses provided by participants were noted.

**Demographic variables.**

The demographic variables, items 53 through 63 on the survey, were examined as possible barriers to treatment seeking. These items measured age, ethnicity, socio-economic status,
approximate area of residence, educational level, household size, employment status, and occupation.

Health Belief Model Construct – Action as Beneficial

The HBM construct that a person is more likely to take action if the action is believed to be beneficial was measured with items 3, 8, 10, 12, 17 and 32, which were measured on 4-point Likert scales. A score of 1 indicated strong agreement and a score of 4 indicated strong disagreement. Four of the actions were specifically related to the prevention of ischemic heart disease. Item 3 read, “There is nothing you can do to reduce your chance of having a heart attack”. Item 8 read, “High cholesterol is something that just happens and there isn’t much that can be done for it”. Item 10 read, “High blood pressure just happens, there isn’t much one can do about it”. Item 12 read, “Exercising for physical fitness will not improve health”. Two items measured actions specifically related to AMI symptoms. Item 17 read, “If a person is having a heart attack, it does not really matter how quickly he or she seeks medical help”. Lastly for this construct was item 32, which stated, “Even if you were having a heart attack, there’s nothing much that can be done to stop it.”

Analysis

In the first stage of data analysis, descriptive statistics were used to examine participants’ responses for both the explanatory and the response variables. Linear regression analysis was completed to identify possible predictors of the response variable, likelihood of responding appropriately to AMI symptoms (LRS). Logistic regression analysis was used to identify the possible predictors of the second response variable, intention to delay.

Linear regression analysis was conducted to calculate how much of the variation in the likelihood of responding appropriately to AMI symptoms (LRS) measure could be explained by:
• Personal characteristics (age, immigrant status, years in Canada, presence of a partner, education level)

• Knowledge of AMI risk factors

• Knowledge of atypical AMI symptoms

• Cardiac health status (actual experience with AMI, ever being prescribed nitroglycerin, diagnosis of angina, close relative or friend with AMI specified by gender, and ever having visited an emergency services facility for symptoms suspicious of AMI)

• Ever having visited an emergency room for self or someone else and perceived effectiveness of most recent visit

• Perceived susceptibility to AMI

• Embarrassment

• Preference for self-care

• Preference not to inconvenience others.

Further analysis using logistic regression estimated how much of the variation in the binary variable, intention to delay could be explained by:

• Personal characteristics (age, immigrant status, years in Canada, presence of a partner, education level)

• Knowledge of AMI risk factors

• Knowledge of atypical AMI symptoms

• Cardiac health status (actual experience with AMI, ever being prescribed nitroglycerin, diagnosis of angina, close relative or friend with AMI specified by gender, ever having visited an emergency services facility for suspicious AMI)
• Ever having visited an emergency room for self or someone else and perceived effectiveness of most recent visit
• Perceived susceptibility to AMI
• Embarrassment
• Preference for self-care
• Preference not to inconvenience others

Data Quality

Every effort was made to produce data as free of error as possible. Role playing with the research assistants was done in advance. The two research assistants conducting the interviews were provided a 'test run' simulation of the interview and then independently conducted a role play before collecting data. Throughout the data collection phase the research assistants were encouraged to share their opinions pertaining to the instrument and how readily usable it was during actual data collection. Most feedback was positive, however some changes were made to the prologue statement used to invite participants into the study. This resulted in a more concise, introductory statement being read to potential study participants.

Ethical Considerations

Ethical approval to conduct this study was obtained from the Behavioural Research Ethics Board of the University of British Columbia (see ethics certificate in Appendix B). Every effort was made to protect participants' privacy. The participants were made aware that their participation was voluntary. Verbal telephone consent was used, and participants were made aware of their right to withdraw their participation at any time during the survey. The participants were also assured that their identity would be protected and that at no point would specific names or telephone numbers be noted, or associated with any particular survey response.
Participants’ telephone numbers and postal codes were kept locked and at no time were telephone numbers made known to any persons other than the investigator and research assistants carrying out data collection.
CHAPTER IV: ANALYSIS AND RESULTS

Efficiency of Sampling

A total of 1,699 randomly selected telephone numbers from the greater Vancouver area provided by Canada Survey Sampler, were sampled resulting in 349 completed interviews. Table 1 provides details of the final disposition of the telephone numbers.

Table 1.

Final Disposition of Telephone Numbers (N = 1,699)

<table>
<thead>
<tr>
<th>Final Disposition</th>
<th>Number</th>
<th>Percentage of all Sample Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Number not in service</td>
<td>228</td>
<td>13.4</td>
</tr>
<tr>
<td>b. Fax or data line</td>
<td>88</td>
<td>5.2</td>
</tr>
<tr>
<td>c. Business phone</td>
<td>64</td>
<td>3.8</td>
</tr>
<tr>
<td>d. No eligible woman in the home</td>
<td>233</td>
<td>13.7</td>
</tr>
<tr>
<td>e. Unable to contact after 6 or more attempts</td>
<td>177</td>
<td>10.4</td>
</tr>
<tr>
<td>f. Unable to contact after 5 or fewer attempts</td>
<td>216</td>
<td>12.7</td>
</tr>
<tr>
<td>g. Language barrier</td>
<td>108</td>
<td>6.4</td>
</tr>
<tr>
<td>h. Unable to speak to an adult</td>
<td>3</td>
<td>0.2</td>
</tr>
<tr>
<td>i. Refusal by male household respondent</td>
<td>19</td>
<td>1.1</td>
</tr>
<tr>
<td>j. Refusal by eligible respondent</td>
<td>214</td>
<td>12.6</td>
</tr>
<tr>
<td>k. Completed interview</td>
<td>349</td>
<td>20.5</td>
</tr>
</tbody>
</table>

1Could not determine if eligible woman was in household.

A range of response rates for the study is presented in Table 2. The gross efficiency of the sampling pool was 86.5%. The efficiency of the sampling pool in reaching households was estimated to be approximately 77.6% or more conservatively calculated to be 54.5%. The conservative completion rate was calculated to be 59.7% and the most reasonable completion rate or liberal estimate was calculated to be 62.0%.

Because of excessive missing data four respondents were dropped from some of the analyses. The remaining 345 cases were used for both of the multivariate regression analyses that were
conducted. Post hoc power analysis calculation revealed that with 95% confidence, approximately ± 5.25% sampling error could have occurred for point estimates of binary splits of 50% - 50% with 350 cases (Decision Analyst, 1998).

Table 2.

Response Rates

<table>
<thead>
<tr>
<th>Type of Rate</th>
<th>Comparison¹</th>
<th>Numerator/Denominator</th>
<th>Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gross efficiency of sampling pool</td>
<td>Working numbers (N-a)/All numbers</td>
<td>1471/1699</td>
<td>86.6</td>
</tr>
<tr>
<td>Efficiency of sampling pool in reaching households</td>
<td>Possible households (N - a+b+c)/All numbers</td>
<td>1319/1699</td>
<td>77.6</td>
</tr>
<tr>
<td>Conservative estimate of the efficiency of the sampling pool in reaching households</td>
<td>Probable households (d+g+h+i+j+k)/All numbers</td>
<td>926/1699</td>
<td>54.5</td>
</tr>
<tr>
<td>Gross completion rate</td>
<td>All completions/All numbers</td>
<td>349/1699</td>
<td>20.5</td>
</tr>
<tr>
<td>Conservative completion rate</td>
<td>All completions/All possible households</td>
<td>349/1319</td>
<td>26.5</td>
</tr>
<tr>
<td>Most reasonable completion rate (conservative estimate)</td>
<td>All completions/All possible eligibles (h+i+j+k)</td>
<td>349/585</td>
<td>59.7</td>
</tr>
<tr>
<td>Most reasonable completion rate (liberal estimate)</td>
<td>All completions/All known eligibles (j+k)</td>
<td>349/563</td>
<td>62.0</td>
</tr>
</tbody>
</table>

¹ Letters refer to final disposition noted in Table 1.

Characteristics of the Participants

The average age of the study participants was 47 years (SD = 18.2, range 18-91 years). Other demographic information pertaining to marital status, employment status, immigration status, ethnicity, educational level and household income is presented in Table 3. Most of the participants (61.3%) were partnered, either married or in common law relationships. Over one-half (59.9%) were employed and earning an income either inside or outside the home. As expected, the sample was ethnically diverse. Of the sample, 100 (28.7%) reported being
“Canadians”. Although approximately one third (30.9%) or 108 of the participants were classified as immigrants because they had originated from a country other than Canada, nearly three quarters (247; 71.2%) of the participants reported their main ethnic background as something other than Canadian. The majority of the sample was at least high school educated with only 34 (9.7%) indicating that they had less than a high school education.

Table 3.

Characteristics of the Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
</tr>
<tr>
<td>Partnered (married or common law)</td>
<td>214 (61.3)</td>
</tr>
<tr>
<td>Never married</td>
<td>69 (19.8)</td>
</tr>
<tr>
<td>Separated/divorced/widowed</td>
<td>62 (17.8)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
</tr>
<tr>
<td>Not employed</td>
<td>133 (38.1)</td>
</tr>
<tr>
<td>Employed and earning an income either inside or outside the home</td>
<td>209 (59.9)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>7 (2.0)</td>
</tr>
<tr>
<td><strong>Originating from somewhere other than Canada</strong></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>224 (64.2)</td>
</tr>
<tr>
<td>Yes</td>
<td>108 (30.9)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>17 (4.9)</td>
</tr>
<tr>
<td><strong>Self-reported Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>Canadian</td>
<td>100 (28.7)</td>
</tr>
<tr>
<td>British, Irish, Scottish or Welsh</td>
<td>104 (29.8)</td>
</tr>
<tr>
<td>Asian (Chinese, Taiwanese, Japanese, Filipino)</td>
<td>25 (7.2)</td>
</tr>
<tr>
<td>European</td>
<td>70 (20.1)</td>
</tr>
<tr>
<td>South Asian (Indian, Sri Lankan)</td>
<td>24 (6.9)</td>
</tr>
<tr>
<td>Aboriginal/ First Nations</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td>Other (African, Australian, Muslim, Middle Eastern, Russian, Fiji, Hispanic, Caribbean)</td>
<td>20 (5.7)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>2 (0.6)</td>
</tr>
</tbody>
</table>
### Educational Level

<table>
<thead>
<tr>
<th>Level</th>
<th>Frequency (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; High school</td>
<td>34 (9.7)</td>
</tr>
<tr>
<td>High school graduate</td>
<td>96 (27.5)</td>
</tr>
<tr>
<td>Some college or university</td>
<td>72 (20.6)</td>
</tr>
<tr>
<td>Associate degree completed</td>
<td>15 (4.3)</td>
</tr>
<tr>
<td>Technical school certificate</td>
<td>14 (4.0)</td>
</tr>
<tr>
<td>Received university bachelors degree</td>
<td>85 (24.4)</td>
</tr>
<tr>
<td>Post graduate studies undertaken or in progress</td>
<td>23 (6.6)</td>
</tr>
<tr>
<td>Received masters degree</td>
<td>6 (1.7)</td>
</tr>
<tr>
<td>Professional degree completed (i.e., medicine or law)</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>2 (0.6)</td>
</tr>
</tbody>
</table>

### Household Income

<table>
<thead>
<tr>
<th>Income Range</th>
<th>Frequency (Percentage)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>16 (4.6)</td>
</tr>
<tr>
<td>Under $5,000</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td>$5,000 to $19,999</td>
<td>15 (4.3)</td>
</tr>
<tr>
<td>$20,000 to $59,999</td>
<td>74 (21.2)</td>
</tr>
<tr>
<td>$60,000 to $99,999</td>
<td>66 (18.9)</td>
</tr>
<tr>
<td>$100,000 and above</td>
<td>38 (10.9)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>136 (39.0)</td>
</tr>
</tbody>
</table>

### Cardiac Health Status of the Sample

Table 4 presents the frequencies for the four items included on the survey pertaining to the participants' cardiac history. There were 18 (5.2%) participants who reported ever being prescribed nitroglycerin. When asked whether they had ever been diagnosed with angina, 16 (4.6%) of the participants said "yes". Four (1.1%) of the sample ever had a myocardial infarction and 25 (7.2%) ever visited an emergency department for a suspected myocardial infarction.
Table 4.
Cardiac Health Status of the Sample

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past prescription of nitroglycerin</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>329 (94.3)</td>
</tr>
<tr>
<td>Yes</td>
<td>18 (5.2)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Past diagnosis of angina</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>331 (94.8)</td>
</tr>
<tr>
<td>Yes</td>
<td>16 (4.6)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Past diagnosis of myocardial infarction</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>343 (98.3)</td>
</tr>
<tr>
<td>Yes</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Ever visited ER for suspicion of myocardial infarction</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>320 (91.7)</td>
</tr>
<tr>
<td>Yes</td>
<td>25 (7.2)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>4 (1.1)</td>
</tr>
</tbody>
</table>

Table 5 contains the frequencies for the survey items pertaining to participants’ association with others with AMI. Interestingly, 51% of the participants reported having a relative who had experienced AMI. Among those 178 persons with a close relative who had experienced AMI, 70% of them had affected male relatives, 17% had affected female relatives, and 12% had both men and women relatives who had experienced AMI. Approximately 25% of the participants had a close friend who had an AMI.
Table 5.
Participants' Association With Others With AMI

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Has a close friend of yours ever had a heart attack?</td>
<td>N=349</td>
</tr>
<tr>
<td>No</td>
<td>258 (73.9)</td>
</tr>
<tr>
<td>Yes</td>
<td>88 (25.2)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Gender of friend with heart attack (n=88)</td>
<td></td>
</tr>
<tr>
<td>Woman</td>
<td>24 (27.3)</td>
</tr>
<tr>
<td>Man</td>
<td>48 (54.5)</td>
</tr>
<tr>
<td>Both</td>
<td>16 (18.2)</td>
</tr>
<tr>
<td>Has a close relative of yours ever had a heart attack?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>168 (48.1)</td>
</tr>
<tr>
<td>Yes</td>
<td>178 (51.0)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Gender of close relative with heart attack (n=178)</td>
<td></td>
</tr>
<tr>
<td>Woman</td>
<td>31 (17.4)</td>
</tr>
<tr>
<td>Man</td>
<td>125 (70.2)</td>
</tr>
<tr>
<td>Both</td>
<td>21 (11.8)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>1 (0.6)</td>
</tr>
</tbody>
</table>

The remainder of the findings and analysis are presented in the order in which the research questions were written.

Research Question 1: Perceived Risk of Acute Myocardial Infarction

The first research question asked what women understand about their susceptibility to AMI. Table 6 contains the frequencies of the responses for the survey items pertaining to perceived risk; general risk factor knowledge items are presented in Table 7. Most of the participants (85.7%) either strongly disagreed or disagreed with the statement that women are less likely to have heart attacks than men. When participants were asked what they thought their likelihood was of having a heart attack during their lifetime, 83 (23.8%) reported it to be “not at all likely”,...
192 (55.0%) considered the likelihood as "possible", 42 (12.0%) indicated they thought it was "likely", and 29 (8.3%) indicated they thought the possibility was "very likely".

Table 6.

Participants' Perceived Susceptibility to Acute Myocardial Infarction

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women are less likely to have heart attacks than men.</td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>95 (27.2)</td>
</tr>
<tr>
<td>Disagree</td>
<td>204 (58.5)</td>
</tr>
<tr>
<td>Agree</td>
<td>45 (12.9)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>3 (0.9)</td>
</tr>
</tbody>
</table>

What is the likelihood that you will have a heart attack during your lifetime?

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all likely</td>
<td>83 (23.8)</td>
</tr>
<tr>
<td>Possibly</td>
<td>192 (55.0)</td>
</tr>
<tr>
<td>Likely</td>
<td>42 (12.0)</td>
</tr>
<tr>
<td>Very likely</td>
<td>29 (8.3)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>3 (0.9)</td>
</tr>
</tbody>
</table>

Participants' Knowledge of Risk Factors

Table 7 presents the participants' responses regarding their cardiac risk factor knowledge. When presented with the statement that "smoking has nothing to do with heart attack", only 14 (4.0%) of the participants indicated agreement. In response to the statement that "high levels of cholesterol in the blood have no relationship to heart attack", six participants (1.7%) either agreed or strongly agreed. Only one participant (0.3%) agreed with the statement that "even if a person has high blood pressure, high blood pressure causes no real harm". The majority of participants (80.8%) indicated disagreement or strong disagreement with the statement that "even very overweight people are healthy as long as they have no diseases". In response to the statement that "people with diabetes have the same chance of having a heart attack as everyone
else”, the responses were more varied with 164 (47%) either strongly agreeing or agreeing and 157 (45%) either disagreeing or strongly disagreeing. Perhaps indicating uncertainty, 28 (8%) participants did not provide responses. In response to the statement that “just because someone in your family had a heart attack doesn’t mean that you’re at greater risk than anyone else”, the majority of participants, 286 (81.9%) either disagreed or strongly disagreed. Finally as seen in Table 7, responses were more varied for the statement that “once a woman goes through menopause she as the same chance of a heart attack as a man” with 205 (58.7%) either strongly agreeing or agreeing and 116 (33.2%) either disagreeing or strongly disagreeing. Again perhaps due to uncertainty of the participants, 28 (8%) of the participants’ responses were either missing or unanswered for this item.

The seven survey items related to knowledge of risk factors were used to create a summated index of participants’ knowledge of AMI risk factors. Binary variables for each of the 7 items were created. “Agree” and “strongly agree” were counted as agree and scored 0. “Strongly disagree” and “disagree” were scored as 1. The seven binary variables were then summed resulting in possible scores of 0 to 7 for the knowledge of risk factors index. Excluding 4 cases with missing data, the mean score for 345 participants was 5.4 (SD = 1.1). The scores ranged from a minimum of 2 to a maximum of 7.
Table 7.

Participants’ Cardiac Risk Factor Knowledge

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smiling has nothing to do with heart attack.</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>14 (4.0)</td>
</tr>
<tr>
<td>Disagree</td>
<td>146 (41.8)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>188 (53.9)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>High levels of cholesterol in the blood have no relationship to heart attack.</td>
<td></td>
</tr>
<tr>
<td>Strongly agree</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Agree</td>
<td>5 (1.4)</td>
</tr>
<tr>
<td>Disagree</td>
<td>196 (56.2)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>146 (41.8)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Even if a person has high blood pressure, high blood pressure causes no real harm.</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>Disagree</td>
<td>205 (58.7)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>143 (41.0)</td>
</tr>
<tr>
<td>Even very overweight people are healthy as long as they have no diseases.</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>65 (18.6)</td>
</tr>
<tr>
<td>Disagree</td>
<td>210 (60.2)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>72 (20.6)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>People with diabetes have the same chance of having a heart attack as everyone else.</td>
<td></td>
</tr>
<tr>
<td>Strongly agree</td>
<td>11 (3.2)</td>
</tr>
<tr>
<td>Agree</td>
<td>153 (43.8)</td>
</tr>
<tr>
<td>Disagree</td>
<td>127 (36.4)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>30 (8.6)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>28 (8.0)</td>
</tr>
</tbody>
</table>
Just because someone in your family had a heart attack doesn't mean that you’re at greater risk than anyone else.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Agree</td>
<td>57 (16.3)</td>
</tr>
<tr>
<td>Disagree</td>
<td>242 (69.3)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>44 (12.6)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>4 (1.1)</td>
</tr>
</tbody>
</table>

Once a woman goes through menopause she has the same chance of a heart attack as a man.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly agree</td>
<td>5 (1.4)</td>
</tr>
<tr>
<td>Agree</td>
<td>200 (57.3)</td>
</tr>
<tr>
<td>Disagree</td>
<td>103 (29.5)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>13 (3.7)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>28 (8.0)</td>
</tr>
</tbody>
</table>

Question 2: The General Ability of Women to Identify Acute Myocardial Infarction Symptoms

The survey items measuring the general ability of women to identify AMI symptoms are presented in Table 8. Most women (75.6%) indicated a need to better recognize the symptoms of AMI. In response to the statement that “if a woman has a heart attack, her symptoms would be just like that of a man”, 198 (56.7%) participants either strongly agreed or agreed and 144 (41.2%) participants either disagreed or strongly disagreed.

The first item on the survey asked participants, “What would you say are the signs and symptoms of a heart attack?” The second survey item asked, “Are there any others?” All responses were recorded. Of particular interest was the ability of participants to identify nausea and shortness of breath, which are thought to be more common AMI symptoms in women. The frequency results for these first two survey items are provided in Table 8. The majority of participants 208 (59.6%) mentioned neither nausea nor shortness of breath. More participants mentioned shortness of breath than nausea with 108 (30.9%) mentioning shortness of breath and
17 (4.9%) mentioning nausea. Very few participants (3.2%) mentioned both nausea and shortness of breath.

**Table 8**

Participants’ Ability to Identify Acute Myocardial Infarction Symptoms

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>You feel you know all you need to know in order to recognize the symptoms of a heart attack.</td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>51 (14.6)</td>
</tr>
<tr>
<td>Disagree</td>
<td>213 (61.0)</td>
</tr>
<tr>
<td>Agree</td>
<td>74 (21.2)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>7 (2.0)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td>If a woman has a heart attack, her symptoms would be just like that of a man.</td>
<td></td>
</tr>
<tr>
<td>Strongly agree</td>
<td>6 (1.7)</td>
</tr>
<tr>
<td>Agree</td>
<td>192 (55.0)</td>
</tr>
<tr>
<td>Disagree</td>
<td>123 (35.2)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>21 (6.0)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>7 (2.0)</td>
</tr>
<tr>
<td>What would you say are the signs and symptoms of a heart attack?</td>
<td></td>
</tr>
<tr>
<td>Neither nausea nor shortness of breath mentioned</td>
<td>208 (59.6)</td>
</tr>
<tr>
<td>Nausea mentioned</td>
<td>17 (4.9)</td>
</tr>
<tr>
<td>Shortness of breath mentioned</td>
<td>108 (30.9)</td>
</tr>
<tr>
<td>Both nausea and shortness of breath mentioned</td>
<td>11 (3.2)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>5 (1.4)</td>
</tr>
</tbody>
</table>

Item 38 on the questionnaire asked participants, “On a scale of 1-10 with one being very little and 10 being the worst pain you can imagine, how much pain would you expect there to be if you had a heart attack?” Responses were categorized as mild, moderate or severe pain; the results are in Table 9. The majority of the participants expected their pain to be severe; as 219 (62.8%) indicated that they expected the pain to be seven, eight, nine or ten (M = 6.7, Mode = 8, SD = 2.6).
Table 9.

Expected Level of Pain With Acute Myocardial Infarction

<table>
<thead>
<tr>
<th>(Answers on a Scale of 1-10)</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild pain</td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td>13 (3.7)</td>
</tr>
<tr>
<td>Moderate pain</td>
<td></td>
</tr>
<tr>
<td>4-6</td>
<td>94 (27.0)</td>
</tr>
<tr>
<td>Severe pain</td>
<td></td>
</tr>
<tr>
<td>7-10</td>
<td>219 (62.8)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>23 (6.6)</td>
</tr>
</tbody>
</table>

Question 3: The Likelihood of Taking Appropriate Action

The Health Belief Model construct, perceived benefits of taking action was considered to be important in the analysis of this question; Tables 10 and 11 present the five survey items pertaining to this construct. The survey items pertaining to this construct were separated into two parts. The three items pertaining to prevention of AMI were set apart from the two items pertaining to the treatment of AMI. Research question 3 asked, how likely are women to take appropriate action in the event AMI symptoms occur? In response to the statement, “There is nothing you can do to reduce your chances of having a heart attack”, only 11 (3.2%) of the participants either strongly agreed or agreed. In response to the statement, “High cholesterol is something that just happens and there isn’t much that can be done for it”, only a small percentage of participants (1.4%) agreed. For the statement, “high blood pressure just happens, there isn’t much one can do about it”, 10 participants (2.9%) agreed. The majority of participants, 338 (96.8%), either strongly disagreed or disagreed. In response to the statement, “If a person is having a heart attack, it does not really matter how quickly he or she seeks medical help”, the majority of participants, 340 (97.4%), either disagreed or strongly disagreed. In response to the statement, “There is nothing that can be done to stop a heart attack”
### Table 10.
**Action as Beneficial for Prevention of Acute Myocardial Infarction**

<table>
<thead>
<tr>
<th>Survey Item Pertaining to Prevention of Acute Myocardial Infarction</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N=349</strong></td>
<td></td>
</tr>
<tr>
<td>There is nothing you can do to reduce your chances of having a heart attack.</td>
<td></td>
</tr>
<tr>
<td>Strongly agree</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td>Agree</td>
<td>8 (2.3)</td>
</tr>
<tr>
<td>Disagree</td>
<td>133 (38.1)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>204 (58.5)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>1 (0.3)</td>
</tr>
<tr>
<td>High cholesterol is something that just happens and there isn’t much that can be done for it.</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>5 (1.4)</td>
</tr>
<tr>
<td>Disagree</td>
<td>186 (53.3)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>158 (45.3)</td>
</tr>
<tr>
<td>High blood pressure just happens, there isn’t much one can do about it.</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>10 (2.9)</td>
</tr>
<tr>
<td>Disagree</td>
<td>206 (59.0)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>132 (37.8)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>1 (0.3)</td>
</tr>
</tbody>
</table>

### Table 11.
**Action as Beneficial for Acute Myocardial Infarction Treatment**

<table>
<thead>
<tr>
<th>Survey Item Pertaining to Having Acute Myocardial Infarction</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N=349</strong></td>
<td></td>
</tr>
<tr>
<td>If a person is having a heart attack, it does not really matter how quickly he or she seeks medical help.</td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>9 (2.6)</td>
</tr>
<tr>
<td>Disagree</td>
<td>153 (43.8)</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>187 (53.6)</td>
</tr>
<tr>
<td>There is nothing that can be done to stop a heart attack</td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>73 (20.9)</td>
</tr>
<tr>
<td>Disagree</td>
<td>220 (63.0)</td>
</tr>
<tr>
<td>Agree</td>
<td>48 (13.8)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>8 (2.3)</td>
</tr>
</tbody>
</table>
For the third research question, the likelihood of responding appropriately to AMI symptoms index (LRS) provided an estimate of how likely women in the greater Vancouver are to respond appropriately to AMI symptoms. The LRS is a summed score of survey items 19-28. Participants were asked what their most likely response would be to potential scenarios pertaining to AMI symptoms. For example, survey item 19 read: “If you started feeling extremely weak and tired and could not do your usual activities would you: wait to see what happened, phone to make an appointment with your family doctor, visit your family doctor immediately, go to the hospital emergency room, or would you call an ambulance?” Each subsequent item contained an AMI symptom. With each item the symptom became progressively more ‘typical’, serious and potentially life-threatening. The ninth item of this 10-item index asked participants how they would most likely respond if they had unexplained chest pain lasting longer than 10 minutes. The last item asked participants how they would respond if two or more of the previously mentioned symptoms happened to them at once. Participants were scored 4 for the “call an ambulance” response, 3 for “go to the hospital emergency room”, 2 for “visit your family doctor”, 1 for “phone to make an appointment with your family doctor”, and 0 for “wait to see what happened”. Responses other than the four that were offered were noted but received a score of 0. Participants could potentially score between 0 and 40 for the LRS summed index. Because four cases were excluded due to excessive missing data, descriptive statistics of the summated index are reported for 345 cases. The average score was 17.2 (SD = 7.4). LRS scores ranged from 0 to 35.

The frequencies for the last four items on the LRS index are presented in Table 10. Because of the potential seriousness of the symptoms presented in these four scenarios, they have been singled out for analysis. Of note is that for each of the four scenarios, difficulty breathing, chest
pressure, unexplained chest pain and two or more of the previously mentioned symptoms at once, participants consistently chose the option of going to the emergency room by their own means more frequently than activating emergency services and calling for an ambulance.

Table 12.

Selected Likelihood of Responding Appropriately to AMI Symptoms (LRS) Items

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If you had unexplained difficulty breathing for more than 10 minutes would you?</strong></td>
<td></td>
</tr>
<tr>
<td>Wait to see what happened?</td>
<td>26 (7.4)</td>
</tr>
<tr>
<td>Phone to make an appointment with your family doctor?</td>
<td>34 (9.7)</td>
</tr>
<tr>
<td>Visit your family doctor immediately?</td>
<td>63 (18.1)</td>
</tr>
<tr>
<td>Go to the hospital emergency room?</td>
<td>128 (36.7)</td>
</tr>
<tr>
<td>Call an ambulance?</td>
<td>93 (26.6)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>5 (1.4)</td>
</tr>
</tbody>
</table>

| **If you had a feeling of pressure in your chest for 10 minutes or more would you?** |               |
| Wait to see what happened?                                                  | 39 (11.2)     |
| Phone to make an appointment with your family doctor?                       | 35 (10.0)     |
| Visit your family doctor immediately?                                      | 57 (16.3)     |
| Go to the hospital emergency room?                                         | 131 (37.5)    |
| Call an ambulance?                                                         | 82 (23.5)     |
| Missing or unanswered                                                      | 5 (1.4)       |

| **If you had unexplained chest pain lasting longer than 10 minutes would you?**  |               |
| Wait to see what happened?                                                  | 27 (7.7)      |
| Phone to make an appointment with your family doctor?                       | 29 (8.3)      |
| Visit your family doctor immediately?                                      | 55 (15.8)     |
| Go to the hospital emergency room?                                         | 139 (39.8)    |
| Call an ambulance?                                                         | 95 (27.2)     |
| Missing or unanswered                                                      | 4 (1.1)       |
If you had two or more of these things happen to you at the same time, such as pain in the abdomen and nausea or pressure in your chest and feeling of being extremely tired would you?

- Wait to see what happened? 17 (4.9)
- Phone to make an appointment with your family doctor? 22 (6.3)
- Visit your family doctor immediately? 40 (11.5)
- Go to the hospital emergency room? 144 (41.3)
- Call an ambulance? 121 (34.7)
- Missing or unanswered 5 (1.4)

**Barriers to Appropriate Action**

Before presenting the regression analyses, frequencies for the perceived barrier variables are presented in Table 11. In response to the statement, “if you were to go to an emergency room because you thought you might be having a heart attack, it would be embarrassing to have a false alarm”, 244 (69.9%) of the participants either strongly disagreed or disagreed and 101 (28.9%) either agreed or strongly agreed. For the statement, “if you feel unwell, you prefer taking care of yourself”, 85 (24.4%) participants either strongly disagreed or disagreed and 260 (74.5%) participants either agreed or strongly agreed. In response to the statement, “you would rather not inconvenience others when you don’t feel well”, 94 (27.0%) participants strongly disagreed or disagreed and 249 (71.4%) participants either agreed or strongly agreed. When asked, “have you ever visited an emergency room before?” only 49 (14.0%) participants said “no” and 297 (85.1%) said “yes”. When asked for whom the emergency room visits were made, 74 (21.2%) said “someone else”, 85 (24.4%) said “for themselves”, and 138 (39.5%) said they had made emergency room visits for “both themselves and someone else”. Participants were asked if they believed that their most recent emergency room visit was dealt with effectively; 250 (71.6%) responded “yes”. There were 57 responses (16.3%) that were not applicable, missing or unanswered and 42 (12%) participants answered “no”, indicating that their most recent emergency visit had not been dealt with effectively.
Table 13.
Barriers to Appropriate Action

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>If you were to go to an emergency room because you thought you might be</strong></td>
<td></td>
</tr>
<tr>
<td><strong>having a heart attack, it would be embarrassing to have a false alarm.</strong></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>49 (14.0)</td>
</tr>
<tr>
<td>Disagree</td>
<td>195 (55.9)</td>
</tr>
<tr>
<td>Agree</td>
<td>81 (23.2)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>20 (5.7)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td><strong>If you feel unwell you prefer taking care of yourself.</strong></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>8 (2.3)</td>
</tr>
<tr>
<td>Disagree</td>
<td>77 (22.1)</td>
</tr>
<tr>
<td>Agree</td>
<td>228 (65.3)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>32 (9.2)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td><strong>You would rather not inconvenience others when you don’t feel well.</strong></td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>11 (3.2)</td>
</tr>
<tr>
<td>Disagree</td>
<td>83 (23.8)</td>
</tr>
<tr>
<td>Agree</td>
<td>218 (62.5)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>31 (8.9)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>6 (1.7)</td>
</tr>
<tr>
<td><strong>Have you ever visited an emergency room before?</strong></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>49 (14.0)</td>
</tr>
<tr>
<td>Yes</td>
<td>297 (85.1)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>3 (0.9)</td>
</tr>
<tr>
<td><strong>Was the emergency room visit for yourself or someone else?</strong></td>
<td></td>
</tr>
<tr>
<td>Someone else</td>
<td>74 (21.2)</td>
</tr>
<tr>
<td>Self</td>
<td>85 (24.4)</td>
</tr>
<tr>
<td>Both</td>
<td>138 (39.5)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>52 (14.9)</td>
</tr>
<tr>
<td><strong>Was the emergency room visit dealt with effectively?</strong></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>42 (12.0)</td>
</tr>
<tr>
<td>Yes</td>
<td>250 (71.6)</td>
</tr>
<tr>
<td>Not applicable, missing or unanswered</td>
<td>57 (16.3)</td>
</tr>
</tbody>
</table>
Question 4: Factors Explaining the Variance in the Likelihood of Responding Appropriately to Acute Myocardial Infarction Symptoms (LRS) Measure

Before carrying out linear regression on the LRS variable, four subjects with missing values were deleted, leaving a sample of 345. Because of the strong correlation between the two barrier items pertaining to preference for self care, the two variables were summed and combined into an index to form a “preference for self care” variable. The variable measuring embarrassment as a barrier to AMI treatment seeking was made into a binary variable from the original 4-point Likert scoring.

The variable measuring participants’ years in Canada was centred with its mean subtracted from all observed values to reduce the correlation between it and the variable pertaining to immigration status. Those participants indicating they originated in Canada scored zero for this variable as did the participants who had been in Canada for the mean number of years of the entire immigrant sample. The 108 participants who had come to Canada from elsewhere had been in Canada for an average of 28 years. The year of arrival for these participants ranged from 1920 to 2001.

For the linear regression analysis, the assumptions that the LRS scores were independent and normally distributed were made. Diagnostic tests of these assumptions were conducted and no serious violations were detected. Linear regression analysis was then performed with the LRS as the response variable using SPSS version 10. The 23 entered explanatory variables are listed in Table 12 along with their standardized (Beta) and unstandardized coefficients (B) and the model intercept (constant). Four of the 23 explanatory variables were found to be statistically significant predictors of LRS scores. Women who reported that they would be embarrassed by having a false alarm visit to ER for suspicious AMI symptoms had lower LRS scores. Women
who had visited an ER for themselves had lower LRS scores; this reduction in the score was
offset somewhat by reports that the most recent visit was effective. Those who indicated a
preference for self care also had lower LRS scores. The explanatory variables entered into this
regression model explained approximately 9% of the variance in the LRS scores (adjusted $R^2 =
0.09$).
Table 14.

Linear Regression Model for Likelihood of Responding Appropriately to Acute Myocardial Infarction Symptoms (LRS)

<table>
<thead>
<tr>
<th>Explanatory Variable</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>25.44</td>
<td></td>
</tr>
<tr>
<td>Nausea mentioned as AMI symptom</td>
<td>2.65</td>
<td>0.08</td>
</tr>
<tr>
<td>Shortness of breath mentioned as AMI symptom</td>
<td>0.69</td>
<td>0.44</td>
</tr>
<tr>
<td>Agreement that women are less likely than men to have AMI</td>
<td>-1.70</td>
<td>-0.08</td>
</tr>
<tr>
<td>Perceived risk of having an AMI</td>
<td>0.15</td>
<td>0.01</td>
</tr>
<tr>
<td>Knowledge of risk factors</td>
<td>0.49</td>
<td>0.07</td>
</tr>
<tr>
<td>Embarrassment measure</td>
<td>-1.79*</td>
<td>-0.11*</td>
</tr>
<tr>
<td>Preference for self care</td>
<td>-1.30**</td>
<td>-0.20**</td>
</tr>
<tr>
<td>Visited emergency room (ER) for self</td>
<td>-2.40</td>
<td>-0.16**</td>
</tr>
<tr>
<td>Visited ER for someone else</td>
<td>-0.45</td>
<td>-0.03</td>
</tr>
<tr>
<td>Effectiveness of ER visit</td>
<td>1.28*</td>
<td>0.12*</td>
</tr>
<tr>
<td>Prior visit to ER for suspicious AMI</td>
<td>1.32</td>
<td>0.05</td>
</tr>
<tr>
<td>Female friend with AMI</td>
<td>1.28</td>
<td>0.06</td>
</tr>
<tr>
<td>Male friend with AMI</td>
<td>0.96</td>
<td>0.05</td>
</tr>
<tr>
<td>Female relative with AMI</td>
<td>0.07</td>
<td>0.00</td>
</tr>
<tr>
<td>Male relative with AMI</td>
<td>0.60</td>
<td>0.04</td>
</tr>
<tr>
<td>Diagnosis of angina</td>
<td>-2.91</td>
<td>-0.08</td>
</tr>
<tr>
<td>Prior AMI</td>
<td>0.51</td>
<td>0.01</td>
</tr>
<tr>
<td>Age</td>
<td>-0.02</td>
<td>0.04</td>
</tr>
<tr>
<td>Immigrant</td>
<td>0.25</td>
<td>0.02</td>
</tr>
<tr>
<td>Previous prescription of nitroglycerin</td>
<td>-1.98</td>
<td>-0.06</td>
</tr>
<tr>
<td>Presence of partner</td>
<td>-0.27</td>
<td>-0.02</td>
</tr>
<tr>
<td>Education level</td>
<td>-0.80</td>
<td>-0.10</td>
</tr>
<tr>
<td>Years in Canada</td>
<td>-0.08</td>
<td>-0.11</td>
</tr>
<tr>
<td>$R^2$</td>
<td>0.14</td>
<td></td>
</tr>
<tr>
<td>Adjusted $R^2$</td>
<td>0.09</td>
<td></td>
</tr>
</tbody>
</table>

* significant at alpha < 0.05
** significant at alpha < 0.01

Question 5: Intention to Delay

Research question 5 asked to what extent women must be certain of their condition before taking action to seek assistance for AMI symptoms? The variable used to measure this was a
single item on the survey asking participants the extent to which they agreed or disagreed with the statement: “Before going to an emergency room to be examined for a heart attack you would want to be sure you were really having a heart attack”. Most participants 220 (63.1%) either strongly disagreed or disagreed with this statement and 125 (35.8%) either agreed or strongly agreed. Details of the frequencies for the intention to delay (ITD) variable are presented in Table 13.

Table 15.
Intention to Delay

<table>
<thead>
<tr>
<th>Survey Item</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before going to the emergency room to be examined for a heart attack, you would want to be sure you were really having a heart attack.</td>
<td></td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>40 (11.5)</td>
</tr>
<tr>
<td>Disagree</td>
<td>180 (51.6)</td>
</tr>
<tr>
<td>Agree</td>
<td>111 (31.8)</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>14 (4.0)</td>
</tr>
<tr>
<td>Missing or unanswered</td>
<td>4 (1.1)</td>
</tr>
</tbody>
</table>

The intention to delay variable (ITD) proved to have a skewed distribution and for this reason was treated as a binary variable. Participants who responded “strongly agree” or “agree” to the item were labelled as likely to delay. This resulted in 35.8% of participants being categorized as intending to delay treatment seeking for AMI.

Question 6: Factors Explaining the Variance in Intention to Delay

Logistic regression analysis with SPSS version 10 was used for the purpose of addressing research question 6. This final research question was intended to identify factors or variables associated with ITD. The same 23 explanatory variables used to analyze the LRS response variable were entered in the logistic regression model with the ITD response variable. The prediction success of the model was unimpressive with 86% of non-delayers correctly predicted
but only 51% of those likely to delay correctly predicted. The Hosmer Lemeshow test for
goodness of fit did not identify problems with the model ($\chi^2 = 10.8, p = 0.2$).

Table 14 shows the regression coefficients, Wald statistics, odds ratios and 95% confidence
intervals for the odds ratios for each of the 23 explanatory variables. Four of the explanatory
variables were found to be statistically significant predictors of ITD. Those women who
measured positively on the embarrassment measure were nearly 5 times more likely to intend to
delay treatment seeking for AMI. Preference for self care was also significant with those
preferring self care being 1.4 times more likely to delay treatment seeking for AMI. Being an
immigrant and education level were significant at alpha <0.05. Immigrant women were slightly
more than 2 times more likely to delay while as expected, greater educational attainment reduced
ITD.
Table 16.
Logistic Regression Analysis of Intention to Delay

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>Wald test (z-ratio)</th>
<th>Odds Ratio</th>
<th>95% Confidence Interval for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea mentioned as AMI symptom</td>
<td>0.31</td>
<td>0.25</td>
<td>1.36</td>
<td>0.40 - 4.58</td>
</tr>
<tr>
<td>Shortness of breath mentioned as AMI symptom</td>
<td>0.13</td>
<td>0.19</td>
<td>1.09</td>
<td>0.63 - 2.04</td>
</tr>
<tr>
<td>Agreement that women are less likely than men to have AMI</td>
<td>-0.51</td>
<td>1.68</td>
<td>0.60</td>
<td>0.28 - 1.30</td>
</tr>
<tr>
<td>Perceived risk of having AMI</td>
<td>0.02</td>
<td>0.00</td>
<td>0.98</td>
<td>0.49 - 1.96</td>
</tr>
<tr>
<td>Knowledge of risk factors</td>
<td>0.14</td>
<td>1.14</td>
<td>1.15</td>
<td>0.89 - 1.49</td>
</tr>
<tr>
<td>Embarrassment measure</td>
<td>1.60</td>
<td>29.46</td>
<td>4.97**</td>
<td>2.78 - 8.87</td>
</tr>
<tr>
<td>Preference for self care</td>
<td>0.35</td>
<td>7.26</td>
<td>1.42**</td>
<td>1.10 - 1.85</td>
</tr>
<tr>
<td>Visited emergency room (ER) for self</td>
<td>-0.37</td>
<td>1.68</td>
<td>0.69</td>
<td>0.40 - 1.21</td>
</tr>
<tr>
<td>Visited ER for someone else</td>
<td>-0.08</td>
<td>0.08</td>
<td>0.92</td>
<td>0.52 - 1.57</td>
</tr>
<tr>
<td>Effectiveness of ER visit</td>
<td>-0.31</td>
<td>2.56</td>
<td>0.73</td>
<td>0.53 - 1.60</td>
</tr>
<tr>
<td>Prior visit to ER for suspicious AMI</td>
<td>0.80</td>
<td>2.0</td>
<td>2.24</td>
<td>0.73 - 6.88</td>
</tr>
<tr>
<td>Female friend with AMI</td>
<td>-0.21</td>
<td>0.22</td>
<td>0.81</td>
<td>0.33 - 1.96</td>
</tr>
<tr>
<td>Male friend with AMI</td>
<td>-0.38</td>
<td>1.16</td>
<td>0.68</td>
<td>0.33 - 1.37</td>
</tr>
<tr>
<td>Female relative with AMI</td>
<td>-0.14</td>
<td>0.13</td>
<td>0.87</td>
<td>0.41 - 1.87</td>
</tr>
<tr>
<td>Male relative with AMI</td>
<td>0.18</td>
<td>0.45</td>
<td>1.19</td>
<td>0.70 - 2.05</td>
</tr>
<tr>
<td>Diagnosis of angina</td>
<td>1.50</td>
<td>2.31</td>
<td>4.47</td>
<td>0.65 - 30.80</td>
</tr>
<tr>
<td>Prior AMI</td>
<td>-2.14</td>
<td>1.55</td>
<td>0.12</td>
<td>0.00 - 3.28</td>
</tr>
<tr>
<td>Age</td>
<td>0.01</td>
<td>0.33</td>
<td>1.00</td>
<td>0.99 - 1.02</td>
</tr>
<tr>
<td>Immigrant</td>
<td>0.77</td>
<td>6.33</td>
<td>2.16*</td>
<td>1.19 - 3.95</td>
</tr>
<tr>
<td>Previous prescription of nitroglycerin</td>
<td>-0.54</td>
<td>0.35</td>
<td>0.58</td>
<td>0.97 - 3.49</td>
</tr>
<tr>
<td>Presence of partner</td>
<td>0.15</td>
<td>0.30</td>
<td>1.17</td>
<td>0.67 - 2.01</td>
</tr>
<tr>
<td>Education level</td>
<td>-0.36</td>
<td>6.61</td>
<td>0.70*</td>
<td>0.53 - 0.92</td>
</tr>
<tr>
<td>Years in Canada</td>
<td>0.01</td>
<td>0.29</td>
<td>1.01</td>
<td>0.98 - 1.04</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-2.63</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

* significant at alpha level < 0.05
** significant at alpha level < 0.01
CHAPTER V: DISCUSSION

Findings pertinent to each research question are addressed in the concluding chapter for this study. Limitations of the study follow, and the chapter concludes with implications for nursing practice taken from these findings.

Research Question 1

Research question one was formulated for the purpose of better understanding what women know about their susceptibility to AMI and the general risk factors associated with AMI. Approximately 86% of the participants either disagreed or strongly disagreed with the statement that, “women are less likely than men to have a heart attack.” Women obviously are receiving the message that the risk of AMI is not necessarily limited to men. In fact, AMI affects many women in at least an indirect way because a large percentage of women have at some time in their lives had someone close to them experience an AMI. Among the participants, 48% had a close relative with an AMI and 25% had a close friend with an AMI. What is not as consistent, however, is that the women in this study were not inclined to view themselves specifically at risk of having an AMI. More than half of the participants (55%) said that their own risk of AMI sometime during their lifetime was “possible”. Only 20% of the participants said that their own risk of AMI sometime during their lifetime was either “likely” or “very likely”. It seems that, while being aware that AMI is not limited to men, and being close to persons who have experienced an AMI, women have not yet personalized themselves to be at risk for AMI. These findings are consistent with that of Meischke et al. (1999).

The women who participated in this study seemed to be clear in their understanding that smoking, high blood cholesterol and high blood pressure are related to AMI. Well over 90% of the participants identified these factors as being related to AMI. Fewer women were able to
identify that family history is related to AMI; approximately 82% of participants either disagreed or strongly disagreed with the statement that, "just because someone in your family had a heart attack doesn’t mean that you’re at greater risk than anyone else.” It would be expected that because family history is a strong risk factor for AMI, a larger majority of women would be aware of this. Further, the participants were far less aware of the risks that diabetes, obesity and menopause pose. Approximately 19% of the participants agreed with the statement, “even very overweight people are healthy as long as they have no diseases.” Participants were also much less clear about how diabetes affects AMI risk; because 47% either agreed or strongly agreed with the statement, “people with diabetes have the same chance of having a heart attack as everyone else.” An additional 8% of the participants failed to respond to this statement at all, further supporting the claim that women in general are unclear that diabetes significantly increases the risk of AMI. Finally, menopause is another risk factor that women seemed to be unclear about. In response to the statement, “once a woman goes through menopause she has the same chance of a heart attack as a man,” the respondents were almost split. About 59% either agreed or strongly agreed and 33% either disagreed or strongly disagreed. Again another 8% of the participants were unable to respond, giving way to the conclusion that women are uncertain or unaware that menopause increases their risk of AMI.

The questionnaire contained no item asking participants specifically what they felt their most significant health risk to be. In retrospect this could have been useful information. American women tend to believe that their most significant health threat is cancer (American Heart Association, 1997). Whether this is true in the Greater Vancouver area remains to be discovered. There are ongoing education campaigns nationwide and in the Greater Vancouver area informing the public and women in particular about heart disease risk factors and symptom recognition.
The Greater Vancouver area also receives similar information by radio and television from the United States. It is unclear how much of an influence that readily available information has on the results pertaining to perception of risk. It is entirely possible that the results of this study reflect an influence of the current and ongoing information campaigns pertaining to ischemic heart disease.

**Research Question 2**

Research question two was designed for the purpose of describing how well women are able to identify AMI symptoms. When asked about the signs and symptoms of AMI, the results were disappointing. Sixty percent of the participants did not mention either nausea nor shortness of breath as an AMI symptom, although these symptoms present relatively frequently in women experiencing AMI. More participants (31%) mentioned shortness of breath than nausea (5%) but only a minute percentage (3%) mentioned both. This is consistent with the work of Meischke et al. (1999) who found that fewer women identified nausea as an AMI symptom than shortness of breath. Far fewer participants of this study (3.2%) however, were able to identify both nausea and shortness of breath as indicative of AMI. This is compared to the results of Meischke et al. who found that 18% of the women studied reported both as being AMI symptoms.

While not unexpected, but disappointing nonetheless, was the finding that 57% of the participants strongly agreed or agreed with the statement, “If a woman has a heart attack, her symptoms would be just like that of a man.” This is consistent with information from the United States reporting that women believe that men and women experience the same symptoms of AMI (American Heart Association, 1997).

The women who participated in this survey indicated an obvious need for more information related to AMI symptom recognition by communicating that they did not feel they were able to
recognize AMI symptoms. A full 76% of the women either disagreed or strongly disagreed with
the statement, “You feel you know all you need to know in order to recognize the symptoms of a
heart attack.” This finding is troubling in light of the findings of Meischke et al., (1995). Meischke
and her colleagues reported that the main obstacle in patient delay appears to be
uncertainty about the symptomatology of an AMI. Additionally, there is evidence that cognitive
understanding of AMI symptoms can be high while persons lack confidence in their ability to
recognize and respond appropriately (Maynard, et al., 1993; Meischke et al., 1995). It may be
that helping women feel confident in their ability to recognize AMI symptoms is an important
aspect of reducing AMI treatment delay. If one follows this reasoning, then, judging by the full
three quarters of women in this study who expressed lack of confidence in their abilities to
recognize AMI, there remains much work to be done. Women, particularly those at risk of AMI,
clearly have information and counselling needs in this area.

**Research Question 3**

The third question was designed for the purpose of better understanding how likely women
are to take appropriate action in the event AMI occurs. The participants of this study did well at
recognizing that there are benefits to be gained from help seeking. No less than 97% of the
participants indicated that heart attack risk can be reduced, high blood pressure and high
cholesterol can be treated, and that seeking prompt treatment for heart attack is useful. However
in taking this investigation further, the results are not as encouraging.

Ten survey items were used to generate the Likelihood of Responding Appropriately to AMI
Symptoms (LRS) score. Because this study is the first time this tool was used, interpretation of
the LRS score is limited, at best. These items posed potential scenarios of AMI symptoms
common to women and the participants were asked to prospectively indicate what their most
likely response would be. The scenarios started with symptoms of extreme weakness and tiredness, thought to be the most benign of the 10 scenarios, progressing to heartburn, nausea, jaw pain, upper abdominal discomfort, unexplained upper back pain, unexplained difficulty breathing, chest pressure, chest pain and finally two or more of the symptoms occurring at the same time. If a participant indicated that she would activate emergency services and call for an ambulance for each of the ten scenarios, her score would have been a perfect 40. It was not expected, however, that participants would actually identify the 'less serious' of the symptom scenarios as requiring activation of emergency services. But, certainly for the most alarming of the symptoms, which were difficulty breathing, chest pressure, chest pain and two or more of the previous symptoms at once, it would be expected that women would be inclined to dial '911'. If participants had consistently indicated that they would call for an ambulance for only the most serious four of the ten scenarios, and responded "wait and see" to the first six 'less serious' symptoms, the total scores would have been 16. We would expect that for the first six symptom scenarios, the participants would have been inclined to choose a response indicating some form of action rather beyond a "wait and see" response, which scored zero. The conclusion here is that the mean of 17 for the LRS in this sample is likely too low, hence a cause for concern.

These findings correspond with those of Murray et al. (2000) who found that all of their participants with confirmed heart disease had difficulty recognizing AMI symptoms as being related to their heart.

Because this tool is untested, the summated LRS score may not provide the most meaningful information. It is probably best to examine each item separately for a better understanding of what the results actually indicate. The most 'serious' symptoms (detailed in Table 12, in Chapter 4) illuminate some public health concerns. For each of the four serious scenarios (difficulty
breathing, chest pressure, unexplained chest pain, and two or more of these things happening at once) more participants indicated that they would go to the hospital emergency room by their own means or transport themselves rather than call for an ambulance. Yet this behaviour lengthens the time between the onset of symptoms and the initiation of treatment. This finding is consistent with the work of Meischke et al. (1995) who found that among the chief reasons that patients with chest pain delay or do not call '911' was the belief that self transport is faster.

It is curious why the majority of women would prefer a self-care strategy, such as self transport, rather than seek help for health concerns. This finding is consistent with the preference for self-care management noted in those women most likely to delay treatment seeking. Very near 75% of the participants indicated a preference for self-care. Mindful that in practice, using ambulance services when faced with possible cardiac symptoms results in more expeditious treatment, hence better outcomes, this finding is particularly concerning. There is a peculiar inconsistency apparent in light of the finding that 97% of the participants either disagreed or strongly disagreed with the statement, “If a person is having a heart attack, it does not really matter how quickly he or she seeks medical help.” It stands to reason then, that there is cause for concern regarding treatment delay for AMI for women. It appears that even though the participants were clear that prompt treatment is helpful, they were not likely to act on that knowledge in the most beneficial fashion. Why might these women be reluctant to use emergency medical services activated by ‘911’? One explanation might be the all too common media reports of overcrowding in hospital emergency departments, staff shortages, and patients’ misuse of emergency services. Treatment-seeking delay may be a by-product of this current climate. Clearly, more research is required to further understand women’s understanding of the
appropriate use of emergency services and the barriers (real or perceived) they face in utilizing those services.

**Research Question 4**

Research question four was designed to identify the factors that influence the likelihood of women responding appropriately to AMI symptoms should they occur. A total of 23 explanatory variables were entered into a linear regression model with the LRS as the response variable, resulting in four of those variables reaching significance at p<0.05. As expected, women who expressed that they would feel embarrassed should they have a false alarm visit to the ER for suspicious AMI symptoms had lower LRS scores. Similarly, those women who preferred self-care management also had significantly lower LRS scores (p< 0.01).

A disturbing finding in this regression analysis, is the result that women who had sought medical attention from an ER in the past had significantly lower LRS scores (p< 0.01). Perhaps there is some encouragement in that the women who rated their most recent ER visit as effective had slightly higher LRS scores. The problem is that the positive standardized beta coefficient for an effective ER visit at 0.12 does not make up for the negative impact of the standardized beta coefficient for the ER visit for self at −0.16. This is a concerning finding because it leads to the conclusion that women who have been to ER in the past do not want to return even if faced with possible AMI symptoms. Making matters worse, even if a woman feels her most recent visit was effective, it seems, based on these findings that she would still rather not repeat a visit to an ER.

**Research Question 5**

Research question five was designed to better understand whether patient treatment-seeking delay for AMI symptoms is indeed of concern for women locally. Because the majority of the literature and research pertaining to treatment-seeking delay for AMI symptoms originates from
the United States, it was thought to be worthwhile that this be examined in the local context. There are many differences in the health-care systems between the United States and Canada, including payment for health care that some might argue should reduce the worry that Canadian women might delay treatment seeking for AMI.

The findings in this study warn that for women in the greater Vancouver area, intention to delay treatment seeking for AMI is likely problematic. The intention to delay variable (ITD) was measured with a single item on the survey that asked women to respond to the statement, “Before going to the emergency room to be examined for a heart attack, you would want to be sure you were really having a heart attack.” This question asks women how they think they would respond should the need arise for them to consider help seeking for AMI, and is therefore a guess at best. Nonetheless, nearly 35% of the participants either agreed or strongly agreed with this statement leaving the investigator to believe that at least as many women would delay should symptoms suggestive of AMI arise. The ITD variable was used based on the work of Meischke et al. (1999). Because the authors did not report on the ITD variable apart from their logistic regression analysis, it is not possible to compare the ITD results obtained with this study to that of Meischke et al.

**Research Question 6**

The final research question was designed to explore some factors that may be associated with intention to delay. The same 23 explanatory variables used for the linear regression analysis were entered into a logistic regression model with ITD as the binary response variable. Four explanatory variables were identified as significant predictors of ITD. Preference for self-care management and embarrassment were highly significant (p< 0.01). The women who indicated that they would be embarrassed if they had a false alarm visit to ER for suspicious AMI
symptoms were nearly five times more likely to delay treatment seeking. This is consistent with
the findings of Meischke et al. (2000). Also, the women who had a preference for self-care were
1.4 times more likely to delay. Having originated from somewhere other than Canada and
educational attainment were also significant predictors of ITD (p<0.05). Those women who had
come to Canada from elsewhere, classified in this study as immigrants, were slightly more than
two times more likely to delay. Finally, those women with lower educational attainment were
more likely to intend to delay help seeking for AMI symptoms. These findings are consistent
with a recent study of persons who had experienced AMI (McKinley, Moser, & Dracup, 2000).
These researchers found that lower educational attainment and embarrassment about seeking
help contributed to AMI treatment delay for Australians and that worry about troubling others
and fearing the consequences of seeking help contributed to delay in North Americans.

Limitations of the Study

The results of this study, although informative, should be interpreted with caution. Perhaps
the most significant limitation of this study was that this was the first time the questionnaire was
used. Even though two nursing research experts and a clinical nurse specialist in cardiac care
carefully examined the questionnaire, every item, with the exception of the demographic items,
and the ITD variable used by Meischke et al. (2000), was newly created and thus unvalidated.
Further testing of the tool, particularly the two response variables, LRS and ITD need further
validity and reliability assessment.

While random digit dialling strengthens the study, it must be borne in mind that only those
women able and willing to communicate in English were allowed to participate. The findings
pertaining to immigrant women, and perhaps the knowledge items may have been different if
women who spoke languages other than English had been included. Perhaps a mixed sampling
approach might be appropriate in future studies to better sample those women of ethnic minority
groups most common in the greater Vancouver area. To examine the representativeness of this
sample of the greater Vancouver area, an examination of census data provided by Statistics
Canada could be used to compare the demographics of this sample of women to the census data
for women in British Columbia. Additionally, while post-hoc power analysis revealed a
maximum error rate of ± 5.25% with 95% confidence, sampling error could have been further
minimized with a larger sample.

Another consideration is that participants were asked prospectively how they would most
likely respond to a number of scenarios. We cannot be certain that the prospective guesses
provided by participants accurately predict the decisions that would be made should these
scenarios actually occur.

Because this study was limited to a sample of women, concerns related to symptom
identification and likelihood of action are related to the behaviour of women. It is not to be
inferred however that men do not have similar attitudes and knowledge gaps. The factors that
influence men’s likelihood of responding appropriately to AMI symptoms could not be discerned
in this study.

The results of this study, albeit worthwhile in informing policy and health education decisions
aimed at meeting the health information needs of women in British Columbia, are limited.
While a preliminary understanding is provided of the information needed by women to recognize
and seek prompt treatment for AMI, what this study does not provide is a rich, qualitative
description of women’s experiences and thoughts in the early phases of AMI. The deeper
meanings and motivations behind women’s treatment decisions and behaviour, while equally
important, could not have been assessed with this particular study design.
Recommendations

The women in this population are in need of information related to cardiac risk factors and AMI symptom recognition. The women who participated in this study have expressed a clear need for information. Obesity and diabetes as risk factors for AMI, in particular, are areas in which women need information. Those organizations seeking to provide information to the public pertaining to heart attack and heart attack recognition should consider emphasizing the facts regarding obesity and diabetes in their education campaigns. Additionally, there is a need for women to understand that AMI symptoms in women are not necessarily the same as those experienced by men and that the female experience of AMI can differ significantly from the male experience. With the LRS tool used here, it becomes obvious that women are not aware of ‘atypical’ symptoms associated more frequently with AMI in women, such as weakness, upper back pain, nausea, and heartburn.

There appears to be a myth concerning appropriate transport to hospital for AMI symptoms. Based on this work and that of Meischke et al. (1995), the public needs greater understanding that the best way to be transported to receive AMI treatment is to activate emergency medical systems by dialling ‘911’. It is likely that valuable treatment time is lost because of public ignorance that AMI treatment includes basic measures such as oxygen and nitroglycerin administration as well as an expedited course through the emergency department facilitated by paramedical support. This information should be disseminated to the public not only by public information services, but also by clinicians in contact with those persons at risk for AMI.

The findings of this study hold implications for those conducting health promotion campaigns for women pertaining to AMI in the greater Vancouver area, but educational efforts must not be limited to large organizations. To increase the likelihood of important information reaching
those who most need it, a multidimensional approach is required (Lee, 1997). While health policy must reflect the importance of encouraging prompt treatment for AMI, health-care providers providing direct services for women are well positioned to provide needed information to those women with whom they are in contact. All women, but particularly those women with identified risk factors for AMI, need information regarding risk factor reduction, AMI symptom recognition and the importance and value of seeking prompt treatment by activating emergency services when AMI symptoms occur. Additionally, women need to be provided with the messages that prompt treatment for AMI results in better outcomes and that prompt treatment is best achieved by dialling '911' so that treatments such as oxygen and nitroglycerin can begin en route to the hospital.

The finding pertaining to prior ER visits being associated with lower LRS scores is particularly troubling. Why is it that women who have had an ER experience are less inclined to return? What is it about the ER experience that seems to discourage women from help seeking for AMI symptoms? This question is a priority. Nurses and other health-care providers in the ER ought to consider what may be occurring in this setting that seems to discourage women from returning. How can nurses and other health providers make the ER experience more positive for women? Strategies for making the ER experience more positive particularly for women must be considered. Health-care providers must examine the clinical area carefully to ensure that those visiting the ER are not being discouraged from returning to ER for future concerns. Furthermore, how can the embarrassment issue be tackled? These are all questions in much need of further research.

It will be important to investigate why it is that women seem to prefer doing something other than dialling '911' for symptoms suggestive of AMI. Further study of the female experience of
AMI may help better illuminate the specific decision trail women follow in choosing whether and how to seek help for AMI symptoms. Qualitative research methods seeking to uncover the female experience related to the ER experience could help shed light on this issue. There is full awareness that how persons make decisions to seek help for AMI symptoms involves much more than the cognitive understanding of risk factors and symptoms and will require a deeper and richer understanding of the psychological and emotional processes involved (Dracup et al., 1995; McKinley et al., 2000).

The decision-making process for women having AMI is very likely multidimensional, involving cognitive understanding and emotional responses as well as perhaps even personal motivating factors that may vary individually. Although Miller (2000) found that awareness of personal risk factors for cardiac disease is a strong motivation for some women to seek medical consultation, this study does not support that thinking. Dempsey et al. (1995) found that women used a variety of coping mechanisms in deciding to seek help for AMI and the results of this study lend support to that argument.

The issue of preference for self-care management is curious and deserves attention. Why is it that women prefer self-care measures as opposed to help-seeking? Because this study revealed that the majority of women prefer self-care, support is lent to those studies indicating that delayers may perceive themselves to be able to control their own symptoms (Dracup et al., 1995). It seems timely that preference for self-care be singled out for careful analysis for a more thorough understanding of how this affects help-seeking for AMI. Preference for self-care management must be carefully dissected if it is to be understood and more importantly for clinical interventions to be appropriately carried out. Certainly there is a great deal of conceptual ambiguity in the literature, as preference for self-care management could be interpreted to be all
or part of any of the following variables described in research pertaining to treatment delay for AMI: worry about troubling others, perceived ability to control one’s own symptoms, and fearing the consequences of help seeking as well as embarrassment (Lee, 1997; McKinley et al., 2000).

Because of their susceptibility for delayed treatment for AMI, directing efforts toward reducing AMI treatment delay in women is called for (Lee, 1997). This study points to the need for a much better understanding of women’s decision-making processes involved in help seeking for AMI symptoms. In the clinical setting, health-care providers in the ER and other acute care settings must find ways to provide reassurance to women who present to ER that their decision to seek help was indeed appropriate. Delivering the message that going to ER for help pertaining to suspicious AMI symptoms or other health concerns is appropriate behaviour must be a priority when caring for women. There is an acute need to provide public reassurance that activating emergency services for a suspected AMI is entirely appropriate and is the action most likely to bring about a positive outcome.

In light of the fact that ischemic heart disease is at the level of an epidemic in Canada, efforts to reduce morbidity and mortality necessitate a multidisciplinary approach. All health-care providers have a role to play in helping reduce the incidence and the impact of this very common killer. It will not suffice to leave the decisions as how to best deliver this information to the public solely to health-promotion experts and policy makers. Because nurses provide health care throughout the health-care system, in communities, schools, home settings, clinics as well as acute-care settings, nurses are particularly well positioned to play a critical role in delivering much needed information to those persons most in need of it. Nursing can play an enormous and
influential role toward influencing women's treatment-seeking behaviour, thus decreasing morbidity and mortality due to this all too common killer.
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Front End Script of Telephone Interview

Hello, my name is Peggy Wyatt and I'm calling from the School of Nursing at UBC. I am conducting research about a woman's health issue and would like to speak to a woman in your household over the age of 18, if there is one.

Hello, my name again is Peggy Wyatt, would you be willing to spare about 20 minutes of your time? I would like to ask you some questions for a research project about women in British Columbia and heart disease. I'm a master's student at UBC School of Nursing. This research project has been approved by the UBC Ethics Board and is designed to gain a better understanding of the needs of women and how nurses and other health professionals can help prevent some of the complications from heart attacks.

You were chosen as a participant in this project purely randomly. At no point in this project will your name or any information identifying you be made public or attached to the results of this study. In fact, I don't know your name, just your telephone number. Your participation is entirely anonymous, confidential, and voluntary. If you decide to participate, I want you to know that you may stop or refuse to answer any question at any time. If you would like to verify the authenticity of this study you are welcome to phone Dr. Sonia Acorn, the head of the School of Nursing at UBC at 822-7457. Dr. Pam Ratner who is supervising this research would be happy to provide you with any other explanations you may need. You are also welcome to phone Dr. Richard Spratley, Director of Research Services at UBC [822-8585] for questions.

These questions are about heart disease. Your opinion or the first response that comes to your mind is what the study is interested in. You may refuse to answer any question or stop at any time. Are you willing to continue? Do you have any questions before we begin?
Survey

1. *To begin, what would you say are the signs and symptoms of a heart attack for women?*

   (record all responses)

2. *Are there any others?*

This first set of questions is about heart attack. I will read some statements to you and I would like you to tell me whether you strongly agree, agree, are neutral, disagree, or strongly disagree. You can also think of your response as being on a scale of 1 to 5 with strongly agree being 1 and strongly disagree being 5.

**LET'S BEGIN**

3. *There is nothing you can do to reduce your chances of having a heart attack.*

   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

4. *Having a heart attack happens by chance, some persons are just unlucky.*

   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

5. *Women are less likely than men to have heart attack.*

   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

6. *Even if a woman has a heart attack, she’s still more likely to die from breast cancer.*

   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

7. *Smoking has nothing to do with heart attack.*

   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

8. *High cholesterol is something that just happens and there isn’t much that can be done for it.*

   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree
9. High levels of cholesterol in the blood have no relationship to heart attack.
   Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

10. High blood pressure just happens, there isn't much one can do about it.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

11. Even if a person has high blood pressure, high blood pressure causes no real harm.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

12. Exercising for physical fitness will not improve health.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

13. Even very overweight people are healthy as long as they have no diseases.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

14. People with diabetes have the same chance of having a heart attack as everyone else.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

15. Just because someone in your family had a heart attack doesn't mean that you're at greater risk for heart attack than anyone else.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

16. If a woman has a heart attack, her symptoms would be just like that of a man.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

17. If a person is having a heart attack, it does not really matter how quickly he or she seeks medical help.
    Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree
18. Once a woman goes through menopause she has the same chance of a heart attack as a man.

Strongly Agree  Agree  Neutral  Disagree  Strongly Disagree

I am going to ask you some "what-if" situations. I would like you to tell me what you would most likely do if this happened to you. Let's start...

19. If you started feeling extremely weak and tired and could not do your usual activities would you:

0.) Wait to see what happened
1.) Phone to make an appointment with your family doctor
2.) Visit your family doctor immediately
3.) Go to the hospital emergency room
4.) Call an ambulance
5.) Other (Response number 5 will NOT be read for items 19 through 28, any responses that do not match 0-4 will be made note of)

20. If you had heartburn for longer than 10 minutes that you could not find a reason for would you?

0.) Wait to see what happened
1.) Phone to make an appointment with your family doctor
2.) Visit your family doctor immediately
3.) Go to the hospital emergency room
4.) Call an ambulance
5.) Other
21. *If you had nausea for longer that you could not find a reason for would you?*

0.) Wait to see what happened

1.) Phone to make an appointment with your family doctor

2.) Visit your family doctor immediately

3.) Go to the hospital emergency room

4.) Call an ambulance

5.) Other

22. *If you had jaw pain which you could not explain for longer than 10 minutes would you?*

0.) Wait to see what happened

1.) Phone to make an appointment with your family doctor

2.) Visit your family doctor immediately

3.) Go to the hospital emergency room

4.) Call an ambulance

5.) Other

23. *If you had pain or discomfort in your upper abdomen for longer than 10 minutes would you?*

0.) Wait to see what happened

1.) Phone to make an appointment with your family doctor

2.) Visit your family doctor immediately

3.) Go to the hospital emergency room

4.) Call an ambulance

5.) Other
24. If you had unexplained pain in your back between your shoulder blades for longer than 10 minutes would you?

0.) Wait to see what happened
1.) Phone to make an appointment with your family doctor
2.) Visit your family doctor immediately
3.) Go to the hospital emergency room
4.) Call an ambulance
5.) Other

25. If you had unexplained difficulty breathing for more than 10 minutes would you?

0.) Wait to see what happened
1.) Phone to make an appointment with your family doctor
2.) Visit your family doctor immediately
3.) Go to the hospital emergency room
4.) Call an ambulance
5.) Other

26. If you had a feeling of pressure in your chest for 10 minutes or more would you?

1.) Wait to see what happened
2.) Phone to make an appointment with your family doctor
3.) Visit your family doctor immediately
4.) Go to the hospital emergency room
5.) Call an ambulance
27. If you had unexplained chest pain lasting longer than 10 minutes would you?

0.) Wait to see what happened
1.) Phone to make an appointment with your family doctor
2.) Visit your family doctor immediately
3.) Go to the hospital emergency room
4.) Call an ambulance
5.) Other

28. If you had two or more of these things happen to you at the same time, such as pain in the abdomen and nausea, or pressure in your chest and feelings of being extremely tired, would you...

0.) Wait to see what happened
1.) Phone to make an appointment with your family doctor
2.) Visit your family doctor immediately
3.) Go to the hospital emergency room
4.) Call an ambulance
5.) Other

For these next few questions please tell me if you strongly agree, agree, disagree or strongly disagree. Another way to think about this is on a scale from 1 to 4, with 4 being strongly agree and 1 being strongly disagree.
29. Women are less likely to have heart attacks than men.

4.) strongly agree
3.) agree
2.) disagree
1.) strongly disagree

30. Before going to the emergency room to be examined for a heart attack, you would want to be sure you were really having a heart attack.

4.) strongly agree
3.) agree
2.) disagree
1.) strongly disagree

31. You feel you know all you need to know in order to recognize the symptoms of a heart attack.

4.) strongly agree
3.) agree
2.) disagree
1.) strongly disagree

32. Even if you were having a heart attack, there's nothing much that can be done to stop it.

4.) strongly agree
3.) agree
2.) disagree
1.) strongly disagree
33. *A heart attack always causes severe chest pain.*

4.) strongly agree  
3.) agree  
2.) disagree  
1.) strongly disagree

34. *If you were to go to an emergency room because you thought you might be having a heart attack it would be embarrassing to have a false alarm.*

4.) strongly agree  
3.) agree  
2.) disagree  
1.) strongly disagree

35. *If you feel unwell you prefer taking care of yourself.*

4.) strongly agree  
3.) agree  
2.) disagree  
1.) strongly disagree

36. *You would rather not inconvenience others when you don’t feel well.*

4.) strongly agree  
3.) agree  
2.) disagree  
1.) strongly disagree
37. Can you think of any other reason that might cause you to wait before going to an emergency room if you thought you might be having a heart attack?

38. On a scale of 1-10 with 1 being the very least and 10 being the worst pain you can imagine, how much pain would you expect there to be IF you had a heart attack?

Ok then, you are very helpful and we've completed much of the survey, I'd like to ask you a few questions about your own experiences and thinking.

39. Have you ever visited an emergency room before?
   a.) No (if no, go to #42)   b.) Yes (go to item 40)

40. Was the visit for yourself or for someone else? (It is possible both responses may be circled)
   a.) someone else   b.) myself

41. Did you feel the problem was dealt with effectively? (Participants will be asked to recall the most recent emergency room visit in the case of having visited emergency room multiple times)
   a.) No   b.) Yes

42. What kind of situation would you call 911 for?
43. Can you think of any others?

44. Have you ever visited an emergency room because you thought you might be having a heart attack?
   a.) No  b.) Yes

45. Has a close friend of yours ever had a heart attack?
   a.) No (go to Q47)  b.) Yes (go to Q46)

46. If yes, was this friend a man or woman?
   a.) Woman  b.) Man  c.) Both

47. Have any of your close relatives ever had a heart attack?
   a.) Yes (go to item 48)  b.) No (go to item 49)

48. If yes, was this relative your father, mother, brother, or someone else?
   father
   mother
   brother
   sister
   other (Specify: __________________________) record gender
49. What is the likelihood that you will have a heart attack during your lifetime?

1.) Not likely at all
2.) Possibly
3.) Likely
4.) Very likely

50. Have you ever been diagnosed with angina (pain or discomfort caused by heart disease or heart problems)?

a.) Yes b.) No

51. Has a doctor at any time ever prescribed nitroglycerin for you?

a.) Yes b.) No

52. Have you ever had a heart attack?

a.) Yes b.) No

Ok then, you have been very helpful and we are almost finished. These last questions will be about yourself. Remember that the information you give me remains anonymous. Neither your name nor your phone number will ever be linked to the study results.

53. How old were you on your last birthday? ____________ (Years)

54. What neighbourhood or municipality do you live in?

55. How many persons live in the same household with you?
This next question is about your ethnic background:

56. Most people in Canada describe themselves as Canadians first but also identify themselves based on their ethnic background or the nationality of their ancestors. What would you say is your main ethnic background? (e.g., First Nations, Punjabi, Scottish, French, Korean, Chinese, etc.).

57. Have you come to Canada from another country at any time in your life?
   a.) Yes       b.) No (if no go to item 54)

58. Approximately what year did you arrive in Canada?

59. What is your marital status? (Circle one of the following.)
   1. Married
   2. living common law with someone
   3. single (never married)
   4. separated
   5. divorced
   6. widowed

60. Are you employed and earning an income of your own either in your home or elsewhere?
    a.) No (go to item 61)       b.) Yes (go to item 60)

61. What is your occupation?
62. What is your highest level of education?

1. No schooling
2. part of primary school
3. completed primary school (grade 7)
4. part of high school
5. completed high school (grade 12)
6. some college or university
7. associate degree completed
8. technical school certificate
9. received university bachelor’s degree
10. post graduate university studies undertaken, in progress or incomplete
11. received master’s degree
12. doctoral degree
13. postdoctoral studies
14. do not know
15. no response

63. What would you estimate was the total income of your household, before taxes, for the past 12 months? (Responses not read)

( ) 1. No household income
( ) 2. Under $5,000
( ) 3. $5,000 to $9,999
( ) 4. $10,000 to $19,999
( ) 5. $20,000 to $39,999
( ) 6. $40,000 to $59,999
( ) 7. $60,000 to $79,999
( ) 8. $80,000 to $99,999
( ) 9. $100,000 and above
( ) 10. No response

This is the end of the survey. Thank you for giving your time to help nurses and other health care providers get a better understanding of the needs of women. I want to assure you that your participation is anonymous and that your identity will never be associated with this study or any specific responses. Do you have any questions?