Abstract

**Background:** Patient-related delays in acquiring medical care for symptoms of acute coronary syndrome (ACS) remain unacceptably long despite campaigns aimed at raising awareness of the importance of timely presentation to an urgent care facility. Patients who delay seeking treatment for ACS often experience delays in treatment initiation, which can lead to poorer outcomes. Many sociodemographic characteristics associated with treatment-seeking delay are known, however ethnicity and how it relates to delay, have not been extensively evaluated.

**Objective:** The purpose of this study was to explore ethnicity-based factors to determine how they relate to the treatment-seeking decisions of patients experiencing symptoms of ACS.

**Method:** Data for this descriptive study were collected for the Acute Coronary Syndrome Care in Emergency Departments (“ASCEND”) study. The ASCEND study is a prospective, observational study in which patients presenting to hospital emergency departments and triaged as having symptoms suggestive of ACS are identified.

The primary outcome of this study, the patients’ time-to-treatment interval, was defined as the time between the occurrences of symptom onset and appropriate treatment seeking. The predictor variable, ethnicity, was measured with the self-reported data and categorized as Chinese, South Asian, or “Other” ethnic groups. Univariate and multivariate analyses were used along with nonparametric testing.

**Results:** The study sample consisted of 401 participants; 30 Chinese, 102 South Asian, and 269 participants who were characterized as “Other”. The median time-to-treatment-seeking interval, for the total sample, was 180 minutes (IQR = 1,170 minutes). A Kruskal-Wallis test
demonstrated no statistically significant differences in the time-to-treatment intervals by ethnicity; however, the sample may not have provided sufficient statistical power to detect a difference. No ethnic differences were found in the participants’ reasons for employing the coping strategies or actions that led to their treatment-seeking delay. A statistically significant relationship was found between ethnicity and the actions taken by the participants in response to their symptoms of ACS. The South Asian participants were most likely to call for the help of a family member, co-worker or stranger nearby, or telephoned a family member, which likely prolonged the time it took to obtain medical care.
Preface

This thesis is based on data from the Acute Coronary Syndrome Care in Emergency Departments ("ASCEND") study, a prospective, observational study (Dr. Martha Mackay is the principal investigator). None of the text of the thesis is taken from previously published manuscripts. The study was approved by the University of British Columbia, Providence Health Care Research Ethics Boards (REB) (certificate UBC-PHC #H13-00617).
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<tr>
<td>ACC</td>
<td>American College of Cardiology</td>
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<td>ACS</td>
<td>acute coronary syndrome</td>
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<td>AHA</td>
<td>American Heart Association</td>
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<td>AMI</td>
<td>acute myocardial infarction</td>
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<td>ASCEND</td>
<td>Acute Coronary Syndrome Care in Emergency Departments</td>
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<td>CABG</td>
<td>coronary artery bypass graft</td>
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<td>CCP</td>
<td>Cooperative Cardiovascular Project</td>
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<td>CHD</td>
<td>coronary heart disease</td>
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<td>CTAS</td>
<td>Canadian Triage and Acuity Scale</td>
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<tr>
<td>ECG</td>
<td>electrocardiogram</td>
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<td>GUSTO</td>
<td>Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries</td>
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<td>MILIS</td>
<td>Multicenter Investigation of Limitation of Infarct Size</td>
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<td>NSTEMI</td>
<td>non ST-segment elevation myocardial infarction</td>
</tr>
<tr>
<td>PCI</td>
<td>percutaneous coronary intervention</td>
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<tr>
<td>PHAC</td>
<td>Public Health Agency of Canada</td>
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<tr>
<td>RA</td>
<td>research assistant</td>
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<tr>
<td>REACT</td>
<td>Rapid Early Action for Coronary Treatment</td>
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<tr>
<td>SPSS</td>
<td>Statistical Program for the Social Sciences</td>
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<tr>
<td>SRM</td>
<td>Self-regulation of Health and Illness Model</td>
</tr>
<tr>
<td>STEMI</td>
<td>ST-segment elevation myocardial infarction</td>
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<tr>
<td>U.S.</td>
<td>United States</td>
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To my family, especially my husband Christiaan, this was a long haul but your constant encouragement and support is what pulled me through from beginning to end.
Chapter One: Introduction

Coronary heart disease (CHD) is a highly prevalent condition with potentially devastating outcomes. CHD accounts for more than one half of all cardiovascular events (incidents that may cause damage to the heart muscle) in both men and women under 75 years of age (Go et al., 2013), and is considered to be the underlying cause of death in one of every six deaths in Canada (Public Health Agency of Canada, 2009). Although it is difficult to project the future prevalence of CHD, the increasing prevalence of high-risk conditions, including diabetes and obesity, and the increasing number of elderly, suggests that it will remain a significant concern.

CHD is most often caused by atherosclerosis, a process in which deposits of plaques are formed within the arteries with the subsequent potential to obstruct blood flow (PHAC, 2009). Acute coronary syndrome (ACS) represents a spectrum of processes that occur as atherosclerosis progresses. These include unstable angina, non ST-segment elevation myocardial infarction (NSTEMI), and ST-segment elevation myocardial infarction (STEMI), which are associated with an increased risk of cardiac death (Leeper, Cyr, Lambert, & Martin, 2011). These life-threatening illnesses are a significant health concern in Canada, are major contributors to emergency department use and hospitalizations, and have a negative effect on people’s quality of life, including income.

Treatment for ACS has received widespread attention in the past few decades because of the availability of drugs and interventions that can salvage affected myocardium. The best available treatment for STEMI, in particular, is immediate reperfusion (achieved with either thrombolytic agents or percutaneous coronary intervention). However, the success of these
therapies is extremely time dependent. Accordingly, a substantial amount of research has been conducted worldwide to improve time-to-treatment intervals within the healthcare system.

Effective, time-sensitive therapy for ACS is widely available in developed countries. Over the past 15 years, delays in the time to receive treatment, once a patient enters hospital, have been significantly reduced, resulting in reductions in adverse patient outcomes and death (Atzema et al., 2011). Indeed, instituting definitive treatment for ACS within one hour of symptom onset is now the established standard (Moser et al., 2006). Over the past few decades, recognition of the importance of initiating treatment quickly has led to many successful initiatives to reduce delays in the emergency department and in-hospital components of care. More consistent use of guideline-based medications within 24 hours of hospital presentation, the use of antiplatelet agents, revascularization procedures, and more sensitive cardiac biomarkers for the detection of myocardial damage, as well as general improvements in care processes have been attributed to the decline in hospital mortality rates for acute myocardial infarction (AMI) (Peterson et al., 2008). However, these system-related components represent only a modest portion of the overall duration from symptom onset to reperfusion treatment (Mackay et al., 2014).

Despite intensive campaigns aimed at raising the public’s and patients’ awareness, patients’ treatment-seeking decision phase has not achieved the same improvement as that made to the system-related components of care. Research demonstrates that “symptom-to-door” times have remained relatively constant, ranging from 1.5 to 6 hours, with an estimated 49.5% of patients delaying seeking treatment for more than four hours (Moser et al., 2006). This is troubling considering that patients who delay seeking treatment for ACS often experience a delay in treatment initiation, which in turn can lead to poorer outcomes. It is estimated that 20-
25% of patients who have an AMI die either before they reach a hospital or while in an emergency department (PHAC, 2009). Reducing patient-related delays could reasonably be expected to result in a reduction in mortality.

To make a significant contribution to the reduction of ACS-related morbidity and mortality, patients’ treatment-seeking behaviour must be better understood. Although many clinical and sociodemographic characteristics have been found to be associated with patients’ time-to-treatment intervals (Moser et al., 2006), many other aspects of treatment-seeking behaviour, such as the reasons patients prolong seeking treatment, remain underexplored or unknown. Ethnicity and how it relates to treatment seeking for ACS is an area of research that would benefit from further study, especially because the current Canadian literature in this area remains sparse. A 2006 American Heart Association (AHA) Scientific Statement provides a summary of evidence related to treatment-seeking behaviour for ACS and stroke symptoms, and offers suggestions for future research. One recommendation was for further study of any ethnic group specific features in treatment-seeking behavior and to develop appropriate interventions aimed at reducing delay (Moser et al.). This is the inspiration for this thesis research, which is to better understand if ethnicity contributes to treatment-seeking delay in patients with symptoms of ACS. The aims of this study is to examine ethnicity-based differences in the treatment-seeking decision phase, identify reasons people delay seeking appropriate treatment and the actions taken if they do realize that they need help.

1.1 Research Questions

Primary research question:
1. Are there ethnicity-based differences in the time-to-treatment-seeking intervals of patients experiencing symptoms of ACS?

Secondary research questions:

2. Is the relationship between the time-to-treatment-seeking interval and ethnicity moderated by other clinical or sociodemographic variables?

3. Are there ethnicity-based differences in the actions people take when they decide that they need help for symptoms of ACS?

4. Are there ethnicity-based differences in patients’ reasons for choosing coping strategies or actions that lead to treatment-seeking delay when experiencing symptoms of ACS?

Answers to these questions could lead to the development of better-informed interventions aimed at reducing patient-related delays and could result in significant reductions in the overall mortality associated with ACS.

A study investigating ethnicity-based differences in the emergency care of patients with ACS symptoms, the Acute Coronary Syndrome Care in Emergency Departments (“ASCEND”) study, is currently being conducted. The collection of data for this larger study is occurring at three hospital sites within two health regions in Vancouver, British Columbia. The data used for this thesis was collected for the main ASCEND study and was used in this sub-study to address the specific questions posed here.

1.2 Purpose

The purpose of this study was to identify factors that contribute to the treatment-seeking delay of patients with symptoms of ACS. This understanding will assist in developing appropriate, tailored interventions to reduce this delay.
Chapter Two: Literature Review

There has been continual improvement in the use of evidence-based and guideline-recommended therapies for patients with acute coronary syndrome (ACS) over the past few decades; prompt diagnosis and initiation of appropriate therapy are the central goals in the management of these patients (Sheifer et al., 2000). These practices are largely based on evidence demonstrating that the lifesaving benefits of reperfusion therapies in ST-segment elevation myocardial infarction (STEMI) are time-dependent. Delay in achieving reperfusion can be catastrophic, resulting in adverse patient outcomes, including death.

The time to treatment is an important predictor of patient morbidity and mortality found in numerous clinical trials of reperfusion therapy. If reperfusion is achieved within one hour of symptom onset, survival rates improve by up to 50%, and by up to 23% if it is achieved within three hours (Moser et al., 2006). Delay also affects morbidity, in that a shorter interval between symptom onset and treatment is associated with better ventricular function, and the level of ventricular function is the best predictor of morbidity and mortality (Moser et al.).

2.1 Phases of Treatment Seeking

Phases of treatment seeking for ACS have been defined and evaluated. The total treatment-seeking interval comprises three phases and includes (1) the interval between symptom onset and the decision to seek medical attention, (2) the interval between the decision to seek medical attention and the first medical contact, and (3) the interval between the first medical contact and hospital arrival (Moser et al., 2006). Research has shown that transportation to the hospital consumes only a very small proportion of the pre-hospital interval (Dracup et al., 1995). The longest phase of the total interval, by far, continues to be the time from the onset of
symptoms to the decision to seek care (Rasmussen, Munck, Kragstrup, & Haghfelt, 2003), and it is in this phase that the most improvement could be achieved.

2.2 Characteristics Predictive of Delay

Over the past three decades, an extensive amount of research has been conducted to identify characteristics associated with prolonged patient delay in response to symptoms of ACS. Of these studies, most have concentrated on the relationships between sociodemographic and clinical factors and the relevant intervals (Dracup & Moser, 1997; Goff et al., 1999; Moser et al., 2006). This work has been crucial to improving our understanding of how different groups react to symptoms of ACS and for identifying groups considered to be at high-risk and therefore in need of intervention. However, there are many other important factors that influence patients’ decisions to seek care. Contributing factors include many social, cognitive and emotional variables (Dracup & Moser, 1997); however, these variables have been included only sporadically in the past few decades of research examining this phenomenon.

2.2.1 Age. A fairly consistent finding, throughout the literature, is the relationship between older age and delayed treatment seeking for ACS symptoms (Grossman et al., 2003; Moser et al., 2006). Although some studies have found that age is not associated with the treatment-seeking interval (Dracup et al., 1995; Lesneski, 2010), these findings may be a result of methodological problems. Many of the studies that have not found statistically significant differences in the interval, based upon age, have been small and therefore may not have had the statistical power to detect any differences (Dracup et al.). In contrast, studies conducted with much larger sample sizes, including the Multicenter Investigation of Limitation of Infarct Size (MILIS), which included 778 patients with acute myocardial infarction (AMI) (Turi et al., 1986),
as well as data from large registries, such as the Cooperative Cardiovascular Project (CCP) with a database of 234,769 patients, have demonstrated that older age is associated with a prolonged interval (Sheifer et al., 2000). Though there are widely varying ideas of what constitutes “older age”, for the purpose of this work, it is defined as greater than 70 years of age, which is the most consistently used definition in the relevant literature (Gorelik et al., 2007; Grossman et al., 2003).

Investigators speculate that people who are older are likely to delay seeking treatment as a result of their often experiencing vague symptoms or uncertainty, owing to a less typical symptom presentation in which severe chest pain is not dominant (Moser, McKinley, Dracup, & Chung, 2005). They also are more likely to have symptoms related to co-morbidities, which can further cloud the matter. That is, as people age, they may accept that having symptoms is a part of everyday life; therefore, identifying their origin may be more difficult because they may consider their symptoms to be unimportant or related to a pre-existing illness. This may result in delayed recognition of and response to cardiac symptoms and to accessing medical care.

2.2.2 Sex. There are conflicting data concerning an association between sex and treatment-seeking intervals for symptoms of ACS. Several studies have found no differences in the time men and women take to seek treatment, while some have reported that women delay longer than do men. In a study conducted by Dracup and Moser (1997), which was designed to determine the impact of sociodemographic, clinical, cognitive, emotional and social factors related to patients’ treatment seeking for symptoms of ACS, no meaningful difference was found in the intervals of men and women. Similar results were reported in the Rapid Early Action for Coronary Treatment (REACT) trial (Goff et al., 1999). Even data from some large registries
indicate that if women do delay longer than do men, the difference is negligible and may not be clinically significant (Moser et al., 2006).

Conversely, several other investigators have found sex differences in treatment-seeking intervals, and the results of these studies demonstrate that, in general, women delay longer than do men. A retrospective, observational study that examined over 2,000 cases from a registry database of STEMI patients found that women had significantly longer intervals than men when seeking treatment for their symptoms (Ladwig et al., 2011). Female sex was also found to be a predictor of delayed hospital presentation in the Global Utilization of Streptokinase and Tissue Plasminogen Activator for Occluded Coronary Arteries (GUSTO) trial, an international, randomized study with over 41,000 patients (Newby et al., 1996).

With contradictory findings, it is difficult to ascertain whether women do delay longer than men when seeking treatment for ACS symptoms. However, some research suggests that some contributing factors that are more often attributed to women may put them at greater risk of delay. For example, although men and women seem to report symptoms of chest or typical ischemic discomfort with equal frequency (Mackay, Ratner, Johnson, Humphries, & Buller, 2011), women are more likely to experience unique symptom patterns, which may not be recognized as being related to their hearts (Shin, Martins, & Suls, 2010). Women also may be less likely to identify their symptoms as heart-related because gender stereotypes emphasize the vulnerability of men, rather than women, in having heart disease. Concern for troubling others is considered to be a contributing factor in prolonging the treatment-seeking interval, and this has been determined to pertain significantly more to women than to men (Moser et al., 2005). In addition, some authors have reported that women ignore their symptoms because they believe that their family responsibilities are too important and cannot be delegated to others.
(Schoenberg, Amey, Stoller, & Muldoon, 2003). As a consequence of these sex-specific factors, women may in fact be at greater risk than men of treatment-seeking delay.

2.2.3 Socioeconomic factors. Researchers studying the effects of socioeconomic status on treatment-seeking intervals have found that economically disadvantaged populations delay significantly longer than those considered to be middle class or “better off” (Goff et al., 1999; Sheifer et al., 2000). However, many of the studies that have found an association between prolonged intervals and lower socioeconomic status were conducted in the United States (U.S.), which may reflect the negative consequences of having limited or no health insurance. These findings may not reflect the population in Canada where universal health care exists and the economic burden of seeking treatment may not be as substantial.

Unlike research conducted in the U.S., research conducted in Canada and other countries with universal healthcare systems has not demonstrated clear links between socioeconomic status and treatment seeking. However, in a Canadian-based study of the general public, conducted by Ratner et al. (2006), which examined ACS symptom recognition and the enlisting of emergency medical services, people with a total household income of more than $80,000 were 2.7 times more likely (95% Confidence Interval: 1.05-7.02) to recognize typical symptoms as being heart-related relative to the lowest income group. Ratner et al. also found that if symptoms were recognized as being heart-related, the respondents were significantly more likely to recommend enlisting emergency medical services in the event that such symptoms occurred. This suggests that there is a discrepancy in the knowledge of ACS symptoms among different socioeconomic groups within Canada, and that it is likely that those with lower socioeconomic status may be at greater risk of delaying seeking treatment for symptoms of ACS.
2.2.4 Ethnicity. “Ethnicity” is a term that is often used interchangeably with “race” or conflated as “ethnicity/race” contributing to a narrow categorical conceptualization of the term (Varcoe, Browne, Wong, & Smye, 2009). It is important to note that ethnicity and race are not mutually exclusive; rather, they intersect (i.e., racial diversity occurs within ethnically defined groups and ethnic diversity occurs within racial groups) (Nestel, 2012). For the purpose of this study, the following conceptual definition of ethnicity was accepted. Ethnicity is defined as “a self-chosen category” that reflects distinctness based on ancestry, culture, language, religion, and geographic location (O’Loughlin, 1999). Race, or racialized identities, on the other hand, is a term that often refers to conferred identities based on a fabricated hierarchy of human value related to phenotypes, skin colour, and other putative biological features of inferiority (Nestel, 2012).

Ratner et al. (2006) suggested that ethnicity may contribute to treatment-seeking delay. People of ethno-cultural backgrounds who are different from the cultural and linguistic majority group may be more likely to delay seeking treatment for symptoms of ACS. These groups are at a substantial disadvantage in relation to the added risk of the limited opportunity to acquire knowledge about, and to access appropriate courses of action in response to, symptoms of ACS (Ratner et al., 2006).

Adequate familiarity with common ACS symptoms is generally limited among adults, and therefore, symptom recognition and response are poor. Investigators have found that those with limited general knowledge of ACS are least able to distinguish ACS symptoms. In a Canadian study conducted by Ratner et al. (2006), a random sample of the public was given a hypothetical scenario of a person experiencing symptoms suggestive of AMI to determine (1) whether gender affects lay people’s assessments, (2) whether ethnicity is associated with
symptom recognition, and (3) the factors associated with an offered recommendation of calling 9-1-1. They found that people who identified themselves as Chinese were less likely to recognize ACS symptoms, and had limited knowledge of ACS. In addition, the investigators found that the primary predictors of recommending the engagement of emergency services (calling 9-1-1) were: ethnic group and correct symptom recognition, with people who identified themselves as Chinese and South Asian being about one half as likely to recommend calling emergency services when compared with other ethnic groups.

Another Canadian study conducted by King, Khan, and Quan (2009) examined ethnic variation in symptom presentation and access to care for patients presenting to an emergency department with AMI, through a retrospective review of 406 health records. A significant proportion of ethnic-minority patients in this study did not present with classic cardiac symptoms. However, the investigators found that even among those patients who did report classic symptoms of ACS, many from ethnic-minority groups in particular, substantially delayed seeking treatment. For example, patients who identified themselves as being South Asian were significantly less likely (Odds Ratio: 0.33, 95% Confidence Interval: 0.15-0.61) than “white” people to report to the emergency department within three hours of symptom onset, after controlling for differences in age and gender.

The findings described above suggest that ethnicity may affect treatment seeking in a variety of ways. Chaturvedi, Rai, and Ben-Shlomo (1997) investigated whether South Asians and Europeans in the United Kingdom interpret and act upon angina symptoms differently and found that South Asian people were more likely to seek care via their general practitioner than to attend an emergency department. This course of action resulted in delayed hospital presentation and
may have accounted for some of the delay, even in the presence of classic AMI symptoms. However, why these patients chose this particular course of action was not determined.

Other research conducted in the United Kingdom found that South Asian cardiac patients often experience language barriers (Astin, Atkin, and Darr, 2008; Chauhan, Baker, Lester, & Edwards, 2010; King-Shier et al., 2015), may take longer to appreciate cardiac symptoms, and as a result, often delay seeking treatment (King-Shier et al., 2015). Language barriers experienced by the South Asian patients meant that access to health information was often inadequate and discussions between patients, health professionals and family members were limited in a way that was not experienced by their White-European counterparts (Astin et al., 2008). These investigators found that South Asian children were often required to interpret for their parent during interactions with healthcare professionals due to linguistic barriers experienced by their parents.

Other studies from the U.S., which often tend to conflate race with ethnicity, have documented differences in treatment-seeking intervals for symptoms of ACS. Most studies have examined race, rather than ethnicity, however, because this is the variable typically collected in the U.S. healthcare system. 1 In general, data from these studies demonstrate that African American patients delay significantly longer than do white patients (Moser et al., 2006). In a study conducted by Sheifer et al. (2000) of CCP registry data, non-white patients were significantly more likely to present to hospital more than six hours after symptom onset. Similarly, the REACT trial reported that non-Hispanic black patients delayed presenting to hospital substantially longer than did other ethnic groups (Goff et al., 1999). However, these U.S.

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1 Although many of the terms in this section pertaining to ethnicity have been used imprecisely, they have been taken directly from the cited studies and are not necessarily a reflection of my definition of ethnicity.
studies tend to group patients in either two or three ethnic/racial groups, including black (non-Hispanic black), white (non-Hispanic white), Hispanic, or other. Few U.S.-based studies have examined treatment-seeking intervals in the multiple ethnic or racial groups whose ancestry was from areas such as Asia (e.g., Korean, Chinese, or Vietnamese), the Middle East, or who would identify as being Indigenous. Analysis by ethnicity, either overall or across their various subgroups, has been largely ignored in studies of this kind.

These U.S.-based studies do not necessarily reflect the predominant ethnic groups residing in Canada and therefore are not as likely to inform our understanding of ethnicity-based variables associated with treatment-seeking intervals. European, South Asian, East and Southeast Asian are amongst the largest ethnic populations in Canada (Statistics Canada, 2011). It is therefore important for Canadian researchers to explore the factors associated with treatment-seeking intervals within these ethnic groups.

### 2.2.5 Clinical factors
In general, people with a history of chronic illness, such as diabetes, hypertension, heart failure, or prior angina, as well as high-risk behaviour, such as cigarette smoking, have been found to have an increased risk of delayed hospital arrival for symptoms of ACS (Moser et al., 2006). Newby et al. (1996) analyzed data from the GUSTO-I trial to examine patients’ characteristics as they related to time-to-treatment variables and assessed the relationships between time-to-treatment and its major components, which included pre-hospital intervals. Their analysis of this large data-set revealed that diabetes, hypertension, and prior angina are associated with delay in treatment seeking. The CCP registry data demonstrated similar results, with diabetes, a prior history of angina, chronic obstructive pulmonary disease, difficulty walking, and active bleeding being some of the most likely conditions to be associated with an interval of more than six hours (Sheifer et al., 2000).
The increased risk of pre-hospital delay associated with chronic conditions may be related to problems with symptom perception and interpretation commonly associated with chronic illnesses. For example, patients with diabetic neuropathy may have atypical symptom patterns and perceptions, possibly leading to delayed hospital arrival, and patients with prior angina may initially interpret their ACS symptoms as being a typical anginal episode and thus delay hospital presentation (Sheifer et al., 2000). Similarly, patients who have other significant comorbid conditions or engage in high-risk behaviour may live with chronic discomfort and therefore may have difficulty distinguishing an episode of ACS symptoms from other symptoms related to their current health state.

A common notion is that patients who have experienced a previous AMI will exhibit relatively prompt treatment seeking, upon the onset of ACS symptoms. It is often assumed that these patients will not delay seeking medical care because of their familiarity with the medical system and AMI symptoms (McKee et al., 2013). However, research has consistently documented that having a prior AMI does not facilitate timely care seeking. Patients with a previous AMI have longer treatment-seeking intervals and present to hospitals later than do patients without such a medical history.

In a study conducted by Dracup et al. (2008), more than 3,500 patients with a history of AMI or a previous cardiac procedure for coronary heart disease (CHD) were asked to identify the possible symptoms of a heart attack. Despite their history of CHD, 46% of these high-risk respondents had limited knowledge of AMI symptoms, and 43% underestimated their future risk of having an AMI. Similarly, Gao and Zhang (2013) found that one third of their study patients who had a history of AMI were not able to make an accurate self-diagnosis of their AMI symptoms during a subsequent event. Of interest, Dracup et al. (1995) found that knowledge of
AMI symptoms does not ensure that patients will recognize and act upon symptoms of their own; research continues to demonstrate this, especially when symptoms occur in clusters, the onset of symptoms is gradual, or the symptoms are relatively atypical (Gao & Zhang, 2013; McKee et al., 2013; O’Donnell, McKee, Mooney, O’Brien, & Moser, 2014). These findings help to explain why there is no reduction in the time to hospital presentation for ACS symptoms for those with a previous history of AMI.

2.2.6 Social, cognitive and emotional factors. Decision making about treatment seeking is thought to be influenced by a patient’s social context, cognitive processes, and emotional responses, but these aspects of treatment seeking remain underexplored in the literature. Some studies over the past three decades have incorporated these variables in their analyses; however, literature of this kind has been published sporadically.

A major factor affecting a patient’s time-to-treatment interval is the patient’s location when the symptoms begin. A substantial amount of research has shown that experiencing symptoms at home is significantly associated with delayed hospital arrival, compared with first experiencing the symptoms elsewhere (Dracup et al., 2005). This finding is especially important considering that almost three quarters of patients are at home when their symptoms begin (Moser et al., 2006). If a patient is a long distance from a hospital, lives in a rural setting, or is on the way home at the time of symptom onset, delay is also likely.

Some investigators have argued that conclusions concerning the effect of location at the time of symptom onset cannot be drawn because of conflicting findings reported in the literature. In addition, some researchers have suggested that factors other than location influence an individual’s decision to seek care. These authors assert that ACS symptoms occur in a social
context, and therefore, who a person is, and whom they are with, may also affect the timing of their presentation to a hospital. For example, living alone or being alone at the time of symptom onset has been found to significantly prolong the treatment-seeking interval (Moser et al., 2006). Similarly, those who have reported that they first consulted family members were more likely to choose alternative coping strategies and, as a result, delayed their hospital presentation (Dracup et al., 1997). Dracup et al. (1997) reported that the shortest time to treatment was found when an unrelated person (e.g., friend, co-worker, or stranger) assisted the individual in arriving at a decision to seek care. These results have been replicated in other studies highlighting the importance of the social context of patients’ decisions to seek care.

A person’s social context is affected by ethnicity and culture. For example, people who are Chinese, South Asian, Southeast Asian or First Nations may have a more collectivist than individualist social outlook (that is, these cultures tend to downplay the goals of individuals in favour of those of the group) (McLaughlin & Braun, 1998). In collectivist cultures, many decisions are not made by individuals, but are more likely to involve family members or an assigned decision maker, such as the eldest son in many Japanese and Chinese families (McLaughlin & Braun, 1998). In a social context, decision making that is individualistic or collectivistic may help to explain why there are ethnicity-based differences in treatment seeking for symptoms of ACS.

Emotional responses to symptoms also have been attributed to patients’ treatment-seeking intervals, although the literature exploring these particular factors is limited. The emotional factors found to increase the interval include: (1) worry related to troubling others and (2) fear of what might happen if treatment is sought (Dracup et al., 1997). Worry related to troubling others is likely related to social propriety (Moser et al., 2006). That is, individuals may
not want to disrupt others or cause others to worry, especially if their symptoms are vague or the cause of their symptoms is uncertain. Also, people from ethnic groups that are more collectivist may be less willing to share bad news within the group, especially if they believe that they will inconvenience others or disrupt the harmony of the group (McLaughlin & Braun, 1998).

Feeling embarrassed also is associated with delay in seeking treatment (Moser et al., 2006) and may influence patients’ decisions about whether they want to share their symptom experiences with another person. Fear of what might happen if treatment is sought was also found to be associated with patients’ treatment-seeking delay (Dracup et al., 1997). In a Swedish study that examined the decision to seek treatment for suspected AMI, the majority of patients reported hesitation as a significant factor influencing their decision to seek medical care (Johansson, Strömberg, & Swahn, 2004). This hesitation may reflect denial, a common reaction among patients with signs and symptoms of AMI. Denial, failure to recognize symptoms, and fear were found to be common symptom responses.

Patients who do not realize that their symptoms are important or serious are more likely to delay seeking treatment for symptoms of ACS. This is often the result of patients not recognizing their symptoms to be heart-related. Research has demonstrated that patients who thought that their symptoms were heart-related sought treatment faster than did individuals who did not relate their symptoms to a heart problem (Johansson et al., 2004; Lesneski, 2010). Johansson et al. found that patients who did not perceive their symptoms to be serious delayed the decision to go to hospital for more than one hour after symptom onset, as opposed to patients who thought that they might die or believed that their symptoms were heart-related, and who were significantly more likely to present to an emergency department within one hour of the onset.
2.3 Interventions to Reduce Patient-related Delay

Public education has been a key strategy to reduce patients’ delay in seeking treatment for ACS, but the studies evaluating its effectiveness have had mixed results. In a majority of studies conducted over the past three decades, investigators have documented little or no improvement in patient-related treatment-seeking intervals with community education programs focused on symptom recognition and the timely use of emergency medical services (Moser et al., 2006). Arguably, the most ambitious study trialing a community-based intervention designed to reduce patients’ treatment-seeking delay for ACS symptoms was the REACT trial. In this study, investigators trialed an 18-month long intervention aimed at educating multiple groups within several communities. These groups included community leaders, the general public, healthcare providers, and patients and families considered to be at high-risk of having a cardiac event. The goal of these education programs was to promote knowledge and awareness of ACS symptoms and the appropriate response to those symptoms, with the assumption that this knowledge would reduce treatment-seeking intervals (Goff et al., 1999). However, despite these efforts, no reduction in the interval was observed as a result of the intervention.

Only two studies have trialed interventions aimed at individuals (McKinley et al., 2009; Mooney et al., 2014), rather than communities, in an attempt to reduce ACS patients’ treatment-seeking intervals. A randomized controlled trial to test the effect of a one-to-one education intervention focused on knowledge, attitudes and beliefs about ACS symptoms and on responses to symptoms was conducted by McKinley et al. (2009). The aim of their intervention was to reduce delay in treatment seeking by improving patients’ knowledge, attitudes and beliefs, which is considered to be an essential step in promoting appropriate responses to the symptoms. The
findings of this study successfully demonstrated a significant change in the knowledge, attitudes and beliefs about ACS. However, the improvement in interval times was small and statistically non-significant in the patients who received the intervention when compared with a control group. Mooney et al. (2014) conducted a similar study, testing an educational intervention for individuals who had a history of being hospitalized with ACS. The intervention provided information about the recognition and appropriate response to ACS symptoms. This intervention was deemed to be successful because those patients who received it had significantly reducedprehospital treatment-seeking interval times for a subsequent event, when compared with their baseline times. The results from this study suggest that more individualized approaches may be useful in reducing patients’ treatment-seeking delay. However, the sample of patients used is thought to be particularly amenable to such intervention because of their history of ACS and, therefore, the results may not be generalizable. Further, the follow-up period was relatively short, ranging from one to two years (Mooney et al., 2014).

2.4 Summary of the Literature

Although there is a substantial amount of literature demonstrating relationships between sociodemographic and clinical variables, and treatment seeking, there appears to be less known about patient-specific social, cognitive, and emotional aspects related to delay. Also, no study has been conducted about whether there are ethnicity-based differences in the reasons patients delay seeking treatment, or the actions they take if they do decide they need help. Furthermore, many of the trialed interventions that aim to reduce treatment-seeking delay in the general population have been unsuccessful, perhaps because we have little knowledge of the factors that
should be targeted. In a multi-ethnic society, ethnicity-based differences may be extremely important.

2.5 Justification

Treatment-seeking delay in patients with symptoms of ACS is a significant issue affecting the timely initiation of reperfusion treatments that promote favourable patient outcomes. A greater understanding of patients’ treatment seeking is therefore imperative to inform interventions to reduce the interval between symptom onset and the initiation of treatment seeking.

It is possible that time-to-treatment intervals are influenced by ethnicity, but this needs to be carefully examined. Although limited, the literature suggests that there may be ethnicity-based differences in time-to-treatment intervals for symptoms of ACS. However, the magnitude and variability of these ethnicity-based differences are largely unknown. There also is limited research pertaining to the reasons people give for treatment-seeking delay and the actions that they take when they decide that they need help. The goal of this research is to address this knowledge gap.
Chapter Three: Methods

This study is a descriptive study using data already collected for the Acute Coronary Syndrome Care in Emergency Departments (ASCEND) study. What follows is a description of the methods used for the ASCEND study that are relevant to this study; additional methods pertaining to this sub-study are described.

3.1 Research Questions

Primary research question:

1. Are there ethnicity-based differences in the time-to-treatment-seeking intervals of patients experiencing symptoms of acute coronary syndrome (ACS)?

Secondary research questions:

2. Is the relationship between the time-to-treatment-seeking interval and ethnicity moderated by other clinical or sociodemographic variables?

3. Are there ethnicity-based differences in the actions people take when they decide that they need help for symptoms of ACS?

4. Are there ethnicity-based differences in patients’ reasons for choosing coping strategies or actions that lead to treatment-seeking delay when experiencing symptoms of ACS?

3.2 Theoretical Framework

The theoretical model guiding this research is the Self-regulation of Health and Illness Model (SRM). In this model, and in most models of self-regulation, the individual is conceptualized as an active problem-solver whose behaviour is an attempt to close the gap between their current state and a goal, or ideal state (Leventhal & Cameron, 1987). The aim of
the SRM is to explain how behaviour associated with illness can be understood in terms of cognition and symptom experiences (Leventhal, Brisette, & Leventhal, 2003). The model was developed to explain patients’ compliance with health promoting and illness preventing behaviour, but it also has been used to better understand treatment-seeking behaviour in response to new symptoms.

The SRM identifies three stages that regulate the adaptive behaviour elicited by a health threat. The three stages identified are: cognitive representation of the health threat, action plan or coping stage, and the appraisal stage. Each stage contains a cognitive level and an emotional level. At the cognitive level, individuals develop a control process for the objective health threat. At any of the three stages, emotional reactions may be provoked, and the model posits that additional coping plans may be developed by the individual to control the subjectively represented response to the health threat. The processes involved with emotional coping responses are often parallel to and partially independent of the cognitive processes, although they are generally thought to interact.

During the first stage, cognitive representation of the health threat, the symptoms are identified as a sign of illness, the threat is labelled, and the potential causes and consequences are examined. Concurrently, an individual’s emotional response to this labelling may affect coping in the next phase, and is influenced by the individual’s perceived control over the health threat and the level of anxiety experienced.

During the second stage, the action plan or coping stage, a plan of action is formulated and initiated. The coping actions are self-generated in response to the individual’s representation
of the health threat, the possibilities for coping, and the relationship between coping and the threat.

During the third stage, the appraisal stage, the individual uses criteria to appraise the success of his or her coping actions. If it is perceived that there has not been enough progress, the representation of the health threat or the plan of action is reassessed and changed. During any stage, the response to any emotional experiences provokes the individual to generate different coping plans to control the emotions.

Both the cognitive system for coping with the health threat and the parallel emotional responses to the health threat are triggered by internal stimuli (such as symptom experiences) and external stimuli (such as health messages from the media) (Leventhal & Cameron, 1987). According to the SRM, individuals have lay, common-sense perceptions of various illnesses, which are known as “illness representations” (Leventhal et al., 2003). These mental representations are constructed by the internal and external stimuli and affect the behavioural response. Accordingly, different people will develop different representations of the same illness threat and may seek different actions to cope. The SRM also asserts that the same person may perceive the same illness in different ways at different times, choose alternative action plans to cope with the threat, and use different criteria to appraise the accuracy of the illness representation. Figure 1 depicts a model adapted from the original SRM and illustrates the influence of social/cultural factors (e.g., ethnicity).
The SRM is different from other models of self-regulation because the influence of social and cultural factors of self-regulation (e.g., ethnicity) is described. That is, the social and cultural factors are thought to shape the individual’s representation of his or her health condition (Leventhal & Cameron, 1987). Symptoms are thought to play a powerful role in generating illness representations, and cultural differences in beliefs about symptoms or illness attributes can lead to different representations and different coping strategies and behaviour for various cultures (Leventhal & Cameron, 1987). Social and cultural factors are depicted in the following ways. First, culture is thought to influence an individual’s illness representation by providing the linguistic labels that differentiate and categorize the events that constitute illness. Second, social context is thought to influence the interpretation of somatic information and the acquisition of
procedures for self-management. Social context is influenced by ethnicity through the specific values, thoughts or ideas that are considered important by different ethnic groups (e.g., individualistic versus collectivistic) (McLaughlin & Braun, 1998). Social context is also influenced by ethnicity through exposure to certain vulnerabilities. For example, immigrants and those from some ethnic groups in Canada may face considerable barriers associated with language, racism, discrimination, gender roles, mistrust of Western medicine, and lack of knowledge of opportunities experienced by the broader population (Newbold & Danforth, 2003). These ethnicity-related factors act through their influence on symptom interpretation and behaviour.

Baxter and Allmark (2013) conducted a systematic review of the theoretical frameworks used in studies examining treatment-seeking delay in the setting of ACS symptoms, and found that the SRM model was the most frequently cited model in the studies examined. The authors concluded that this theory helped researchers focus attention on patient-related factors and emphasized the need to examine the subjective experiences of health threats to understand the ways individuals adapt to the threats. The model highlights that people are active problem-solvers who select and manage threats based on their perceptions of the problem. It is thought to provide important insight regarding why symptoms of ACS may not always trigger immediate help seeking in all patients, and is therefore considered to be a valuable framework to guide research.

For the purpose of this research, I have examined if there are ethnicity-based differences within the final stage of the SRM, appraisal, to determine if there are ethnicity-based differences in the reasons given for why the participants, with symptoms of ACS, waited to seek help. Responses to questions about appraisal (reasons), derived from an interview tool used to collect
patient-reported data for the primary study, have been analyzed for ethnicity-based differences. The participants’ reasons are thought to be triggered by cognitive, emotional or cognitive/emotional responses to the health threat. Dracup et al. (2006) demonstrated this by utilizing the SRM to categorize factors related to internal stimuli, coping/action plans, and appraisal based on whether the factor was cognitive or emotional. The SRM was integral to their research by providing an interpretation of these factors and how they relate to delay. This model has been used in a similar fashion to interpret how ethnicity-based factors interact with the participants’ responses relating to why participants delayed treatment seeking, based on whether the responses are triggered by cognitive, emotional or cognitive/emotional reactions.

3.3 Research Purpose and Design

The main goal of the larger ASCEND study is to determine if there are ethnicity/racialized identity-based differences in the initial care received (operationalized as door-to-electrocardiogram (ECG) time) by patients presenting to a hospital emergency department who are triaged as having symptoms suggestive of ACS. The ASCEND study is a prospective, observational study in which patients presenting to hospital emergency departments and triaged as having symptoms suggestive of ACS are identified. The goal the ASCEND study is to identify factors related to receiving care, specifically to determine whether there is an association between the outcome, care received, and ethnicity/racialized identity. Accordingly, nursing and medical staff members themselves are the objects of observation in this study, and so they were not made aware of the specific research objectives. A purposely vague (yet plausible) research objective was described when discussing the study with medical, nursing and administrative leaders. Masking was continued throughout screening, recruitment, and data collection.
3.4 Setting and Sample

The ASCEND study is being conducted at three hospitals. One of the sites is an inner-city hospital located in downtown Vancouver and the other two sites are community-based hospitals; one located in Surrey and the other in Richmond, both of which are areas with large populations of “ethnic groups”. Richmond has a particularly large population of people of Chinese ethnicity and Surrey has a large population of people of South Asian ethnicity. The three hospitals have very large emergency departments with approximately 2,000 to 6,000 annual visits, at each of the sites, of people with symptoms suggestive of myocardial ischemia.

The criteria for inclusion in the study are: (1) being 20 years of age or older; (2) presenting to the emergency department and being referred for immediate cardiology consultation or managed according to a standardized protocol for continued observation and referral for follow-up (whether ultimately admitted or not); (3) being hemodynamically stable and free of ischemic discomfort for at least one hour; (4) being able to speak English, Mandarin, Cantonese, or Punjabi; and (5) being cognitively able to provide informed consent. The only exclusion criterion employed in the ASCEND study is being cared for by a physician who is a co-investigator. The eligibility criteria for this sub-study are the same, and therefore all participants included in the ASCEND study have been included in this sub-study.

A power analysis was conducted for the ASCEND study to estimate the required sample size. Data sources used to inform the calculations for the power analysis for the ASCEND study were based on the main outcome variable of door-to-ECG time. Based on these data, it is expected that the investigators will need to recruit participants of Chinese, South Asian and “other” ethnicity at a rate of 1:2:3 respectively, given differences in heart disease prevalence and
ethnicity proportions within the population. It is estimated that a total sample size of 402 patients: 67 Chinese, 134 South Asian, and 201 “other” patients are required. A power analysis was also done for this sub-study to determine if the available sample from the ASCEND study would be adequate to detect a clinically important relationship between ethnicity and the treatment-seeking interval. The results of the power analysis showed that with about 400 patients, there would be statistical power of .99, at an alpha level of .05, to detect a difference of at least 7 minutes between the three ethnic groups. A clinically important difference in the treatment-seeking interval would be at least 10 to 15 minutes.

3.5 Procedures

Research assistants (RA) fluent in English and either Mandarin and Cantonese or Punjabi have been employed by the ASCEND study. Specific RAs have been placed at the hospital site where the languages they are fluent in are anticipated to be prevalent, based on the dominant ethnic population residing in the area. Access to interpreters (Mandarin, Cantonese and Punjabi) is available at each site for the languages that are not known by the RA assigned to the site (though have not been used to date). For patients that require interpreter services, the interpreters will obtain informed consent and administer the questionnaire that has been translated beforehand.

3.5.1 Recruitment. Recruitment of participants for the ASCEND study is being done by trained RAs. The RAs identify potential participants, seven days a week, from one of three sources: (1) a list, obtained daily from the emergency department charge nurse, of all patients admitted to the hospital since the RA’s last visit who were triaged with codes related to a possible ACS; (2) a direct report from the current charge nurse, who will identify any patient
currently in the emergency department who meets the study criteria as signified by an emergency department physician ordering at least one of the following: (i) a cardiology consultation, (ii) cardiac computational tomography, or (iii) 2- or 6-hour repeat cardiac biomarkers and ECG, followed by outpatient provocative stress testing; and (3) a list, obtained from the stress-testing laboratory, of all patients who have been referred from the emergency department for urgent (within 48 hours) outpatient stress testing (the Vancouver hospital only).

Recruitment occurs in the emergency departments, the cardiology units (coronary care unit or telemetry unit), and in the stress-testing laboratory. Potential participants are screened for general eligibility through discussion with the nurse or cardiology technologist. Those believed to be eligible are approached and invited to participate. For patients who speak a language other than that in which the RA is fluent, the RA ascertains possible interest (with the assistance of family or staff members), and if there is interest, is instructed to arrange for a professional interpreter to conduct the consent process and to administer the questionnaire, if consent is given. Patients discharged from the study-site prior to being approached by the RA, have not been included in the study, with the exception of those patients who were discharged from the Vancouver hospital and who returned for outpatient stress testing.

3.5.2 Data collection. The data for the ASCEND study are derived from multiple sources. Data related to the delivery of guideline-based care in the emergency department, as well as data regarding patient-, environment-, and system-related covariates are collected from the participants’ health records. Information is also collected about the participants’ initial symptoms, the onset and attribution of their symptoms, decisions about treatment seeking, and perceptions of the care received in the emergency department. Data collected for the ASCEND study were used for this sub-study and no additional data were collected. This sub-study used
some, but not all, of the primary data. Guided by the SRM, this sub-study focused specifically on data related to ethnicity and the time-to-treatment interval to determine whether a relationship exists.

The majority of data used for the sub-study were derived from the Emergency ACS Care Participant Interview Tool (see Appendix A), used in the ASCEND study. All eligible participants were asked to respond to the questionnaire, which was administered by a RA. The questionnaire included questions regarding the participants’ symptoms, their decisions to seek treatment, and their opinions about the care they received while in the emergency department. Ethnicity and other socio-demographic data were obtained at this time. The purpose was to conduct a semi-structured interview, rather than an in-depth qualitative exploration. In general, semi-structured interviews include a set of questions on a particular topic that are structured in a way that allows participants to add more information by talking freely about the phenomenon under study while ensuring that the researcher obtains all the information required (Polit & Beck, 2012).

The ASCEND study included a review of the emergency department staffing records to capture data about staffing levels at the time of the patient’s visit. Hospital admission records for the patients who were admitted to hospital, as well as discharge diagnoses and outpatient stress test results (if applicable) for those patients who are discharged from the emergency department, were also collected.

3.6 Measures

The prehospital interval between symptom onset and initiation of treatment can be divided into two intervals: patient-related and system-related. Overall, the prehospital interval
includes the time from symptom onset to arrival at a hospital or similar healthcare facility (Mackay et al., 2014). Mackay et al. (2014) conceptualized treatment seeking to include the portion within the prehospital interval that is specifically attributable to the patient’s decisions and actions, and does not include prehospital system delays (e.g., emergency medical systems). The patient’s time-to-treatment interval is the primary outcome of this study, and is defined as the time between the occurrences of symptom onset and appropriate treatment seeking. Based on the work of Mackay et al. (2014), these particular occurrences are essential in the accurate measurement of the interval. To measure this variable, we utilized the actual minutes elapsed between these two occurrences. We did this by analyzing the self-reported times captured on the questionnaire and included responses to the following two items:

What time did your first symptoms begin? and What time did you decide you needed help and begin trying to get some help?

The predictor variable, ethnicity, was measured with the self-reported data collected via the questionnaire and categorized as Chinese, South Asian, or “other” ethnic groups. The relevant items were derived from the Ethnic Diversity Survey (one of the items was included in the Census (long form) (Statistics Canada, 2003; 2011): I would now like to ask you about your ethnic ancestry, heritage or background. What were the ethnic or cultural origins of your ancestors? This question is followed by: Now I would like you to think about your own identity in ethnic or cultural terms. This identity may be the same as that of your parents, grandparents or ancestors, or it may be different. What is your ethnic or cultural identity? Both of these items have undergone testing and validation by Statistics Canada (2003) and are considered to be valid measures of ethnicity.
Self-reported data, derived from the interview, were used to measure the outcome, time-to-treatment interval, and potential confounders related to the patients’ perspectives, including the type of symptoms experienced, actions taken, and reasons for the timing of relevant events and actions. Delay is defined as seeking health care more than one hour after the onset of persistent symptoms (symptoms that are unimproved or worsening five minutes after onset (Antman et al., 2004)).

The questionnaire was translated into Chinese and Punjabi and reviewed by a second translator to ensure conceptual fidelity. The RAs received training regarding working with interpreters, the importance of ensuring that they use the translated tool exclusively, and not introducing alternative phrasing.

3.7 Data Analysis

The data were imported from Fluid Surveys™ (an online survey software program) into the Statistical Program for the Social Sciences (SPSS version 22) (IBM Corp., Armonk NY) for analysis. The data were examined for their distributional properties and presence of missing data.

Descriptive statistics are used to summarize the demographic and clinical characteristics of the sample. These data are summarized by ethnicity, and include the characteristics of age, sex, language, marital status, level of education, total household income, place of birth (Canada or other, and if other, years lived in Canada), clinical profile (e.g., chief complaint, Canadian Triage and Acuity Scale (CTAS) score, hospital admission) and (coronary anatomy, revascularization). Frequency distributions are used to describe the categorical variables, such as sex and ethnicity, reported as totals and percentages. Age, a continuous variable, is reported with mean and standard deviation to describe the variability.
3.7.1 Research question 1: Are there ethnicity-based differences in the time-to-treatment-seeking intervals of patients experiencing symptoms of ACS? The distribution of the time-to-treatment-seeking intervals was very positively skewed resulting in very different measures of central tendency. The median and interquartile range are reported because they are the appropriate measures of central tendency and variability for non-normal data. I also have reported the mean and standard deviation for the total sample to highlight the distribution of the data. A Kruskal-Wallis test was used to compare the time-to-treatment-seeking intervals across the ethnic groups. The null hypothesis was that there were no differences among the ethnic groups in their time-to-treatment-seeking interval.

3.7.2 Research question 2: Is the relationship between the time-to-treatment-seeking interval and ethnicity moderated by other clinical or sociodemographic variables? An alternative question and analysis was conducted for this question because of the results from research question 1. The alternative question is: do other relationships exist between selected sociodemographic and clinical variables and treatment-seeking delay? Treatment-seeking delay was defined as waiting to seek treatment for more than one hour from the time of symptom onset; the time-to-treatment-seeking interval was dichotomized into categories of equal to or less than one hour and greater than one hour to create a treatment-seeking delay variable. To test for a relationship between treatment-seeking delay and the selected variables, a $\chi^2$ analysis for each variable was performed, with the exception of age (a continuous variable), which was analyzed using an independent t-test.

3.7.3 Research question 3: Are there ethnicity-based differences in the actions people take when they decide that they need help for symptoms of ACS? Responses to this question were categorized and the total number and proportion for each stratified by ethnicity is reported.
To determine whether there were ethnicity-based differences in the actions the participants took in response to their symptoms, $\chi^2$ analyses were performed.

Categories were pre-specified in the interview tool, but, because this was an open-ended question, some responses were re-categorized. Similarly worded categories were collapsed and re-categorized to eliminate some expected cell frequencies of less than five. No more than 20% of the expected counts in a contingency table can equal less than five and all individual expected counts must be one or greater to appropriately conduct $\chi^2$ tests (Yates, Moore, & McCabe, 1999). By collapsing some categories, I obtained only two cells with expected counts of less than five, both of which were one or greater. The result was four mutually-exclusive categories for the responses related to the actions taken.

If there was a statistically significant association found in a contingency table, the standardized residuals were examined to determine where the difference occurred. A standardized residual is the difference between the observed and expected count for a cell, and the larger the residual value is, the more its contribution to the magnitude of the resulting chi-square value (Sharpe, 2015). The cells with large residuals demonstrate the greatest discrepancy in what would be expected if the variables were independent. Therefore, the cell or cells with the largest residual likely represent where the difference exists. The equation to determine the standardized residual is:

$$\text{Standardized residual} = \frac{\text{observed count} - \text{expected count}}{\sqrt{\text{expected count}}}$$

3.7.4 Research question 4: Are there ethnicity-based differences in patients’ reasons for choosing coping strategies or actions that lead to treatment-seeking delay when experiencing symptoms of ACS? Treatment-seeking delay was defined as delaying seeking treatment for
greater than one hour. Only those respondents who reported delaying seeking treatment greater than one hour were prompted to answer the question, *Why did you wait before getting help?* Categories were pre-specified in the interview tool, but categories with similar responses were collapsed to eliminate expected cell frequencies of less than five. The result was that all of the responses fell into one of four categories, and the total number and proportion for each category is reported by ethnicity.

Driven by the SRM, each category was classified further to highlight the type of response triggered; cognitive, emotional or cognitive/emotional. According to the SRM, an individual’s emotional response to (and therefore their labelling of) the health threat may affect coping in the next phase, and is influenced by the individual’s perceived control over the health threat and the level of anxiety experienced (Leventhal et al., 2003). Responses as to why the individual delayed seeking immediate treatment were categorized according to the type of coping response used (e.g., emotional, cognitive), a scheme previously used by Dracup et al. (2006). I then used the $\chi^2$ test to test for relationships between the type of response and ethnicity.

### 3.8 Ethical Considerations

The ethical considerations taken by the ASCEND study team included not seeking patients’ consent before at least one hour in the emergency department had elapsed, and after clinical stability and freedom from ischemic discomfort had been verified by a registered nurse, for patient safety reasons. The time taken to achieve this varied from participant to participant. A critical potential threat to the study’s internal validity is the Hawthorne effect if emergency department staff members were to become aware of the interest in differential treatment based on ethnicity/racialized identity. For this reason, the specific research objectives of the larger ASCEND study were not disclosed to the emergency department staff or the RAs. A related but
different (and plausible) objective was created that did not draw attention to the staff’s central role in the research objectives. The research objectives were disclosed to the study participants and were included in the consent process.

3.8.1 Confidentiality. To maintain the confidentiality of the study participants and to protect them from harm, the following measures were taken. The completed consent forms were kept in a locked and secure area. All of the data collected were entered directly into the Fluid Survey tool, which ensured confidentiality through password protection as well as encryption. All of the data in Fluid Surveys were associated with only a study ID. The study ID was connected to the participant’s name in the consent forms only, that were kept in a locked drawer in a locked office.

3.8.2 Study Risks and Benefits. There was no direct benefit to participants of this study, and by extension, the sub-study. However, the results from this sub-study may improve the future care of patients with symptoms of ACS by adding to our understanding of how ethnicity-based factors affect patients’ treatment seeking. This research may also lead to the development of more effective interventions to address this problem. The only risk anticipated with participating in this sub-study was the possibility (though likely small) of experiencing discomfort when relaying information about the onset of symptoms or in discussing one’s ethnic background.
Chapter Four: Findings

This chapter presents the study’s findings. I set out to explore if there were differences, based on the participants’ self-reported ethnicity, in their seeking treatment for symptoms of acute coronary syndrome (ACS). The aims and objectives of this research were to: determine if there were ethnic differences in the time-to-treatment-seeking intervals of patients experiencing symptoms of ACS; explore if this relationship was moderated by other clinical or sociodemographic variables; identify any ethnic differences in the actions taken when deciding they needed help and in their reasons for choosing the coping strategies or actions that led to delay; and determine if there was a relationship between the actions the patients took and the reasons they gave.

To answer the research questions, data obtained from a larger study, Ethnicity-based differences in Emergency Department Care of Patients with Acute Coronary Syndromes (“ASCEND”) were analyzed. Data for the ASCEND study were obtained from three sites in Metro Vancouver, BC and included self-reported data obtained through an interview as well as information from the participants’ health records, all of which pertained to care during emergency department visits for symptoms suggestive of ACS. This chapter outlines the sociodemographic and clinical profile of the participants; their time-to-treatment-seeking intervals; the participants’ actions to obtain help in response to their symptoms, and, where applicable, the participants’ reasons for waiting to seek help, which resulted in delayed assessment and treatment.
4.1 Sociodemographic Characteristics

Four hundred and seven participants were recruited for the main study at the time these analyses were undertaken; six were excluded because of missing ethnicity data, which resulted in a final sample of 401 participants.

A summary of the sample’s sociodemographic characteristics is presented in Table 3 for the whole sample and for each of the ethnic groups: Chinese, South Asian, and “Other”. Of the total sample, 30 participants self-identified as Chinese, 102 participants self-identified as South Asian, and 269 participants self-identified as belonging to any other ethnic group, and are represented as “Other”.

Table 1.

*Sociodemographic Characteristics, by Ethnicity*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All (N = 401)</th>
<th>Chinese (n = 30)</th>
<th>South Asian (n = 102)</th>
<th>Other (n = 269)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean (SD)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>61 (14.2)</td>
<td>58 (13.1)</td>
<td>60 (14.0)</td>
<td>61 (14.4)</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>236 (61.9)</td>
<td>21 (70.0)</td>
<td>54 (62.8)</td>
<td>158 (61.0)</td>
</tr>
<tr>
<td>Language Spoken at Home</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>251 (62.8)</td>
<td>8 (26.7)</td>
<td>17 (16.8)</td>
<td>226 (84.0)</td>
</tr>
<tr>
<td>Other</td>
<td>149 (37.2)</td>
<td>22 (73.3)</td>
<td>84 (83.2)</td>
<td>43 (16.0)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/Common Law</td>
<td>262 (65.3)</td>
<td>20 (66.7)</td>
<td>87 (85.3)</td>
<td>155 (57.6)</td>
</tr>
<tr>
<td>Divorced/Separated/Widowed</td>
<td>91 (22.7)</td>
<td>4 (13.3)</td>
<td>11 (10.8)</td>
<td>76 (28.3)</td>
</tr>
<tr>
<td>Never married/Single</td>
<td>48 (12.0)</td>
<td>6 (20.0)</td>
<td>4 (3.9)</td>
<td>38 (14.1)</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>182 (45.4)</td>
<td>12 (40.0)</td>
<td>58 (56.9)</td>
<td>112 (41.6)</td>
</tr>
<tr>
<td>Any postsecondary</td>
<td>219 (54.6)</td>
<td>18 (60.0)</td>
<td>44 (43.1)</td>
<td>157 (58.4)</td>
</tr>
<tr>
<td>Characteristic</td>
<td>Ethnicity</td>
<td>All (N = 401)</td>
<td>Chinese (n = 30)</td>
<td>South Asian (n = 102)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-----------</td>
<td>---------------</td>
<td>------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td></td>
<td>f (%)</td>
<td>f (%)</td>
<td>f (%)</td>
<td>f (%)</td>
</tr>
<tr>
<td>Total household income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less or equal to $50,000</td>
<td>116 (28.9)</td>
<td>9 (30.0)</td>
<td>18 (17.6)</td>
<td>89 (33.1)</td>
</tr>
<tr>
<td>More than $50,000</td>
<td>162 (40.4)</td>
<td>18 (60.0)</td>
<td>34 (33.3)</td>
<td>110 (40.9)</td>
</tr>
<tr>
<td>Don’t know/refused</td>
<td>123 (30.6)</td>
<td>3 (10.0)</td>
<td>50 (49.0)</td>
<td>70 (26.0)</td>
</tr>
<tr>
<td>Place of birth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>184 (45.9)</td>
<td>0 (0.0)</td>
<td>7 (6.9)</td>
<td>177 (65.8)</td>
</tr>
<tr>
<td>Outside Canada</td>
<td>219 (54.1)</td>
<td>30 (100.0)</td>
<td>95 (93.1)</td>
<td>92 (34.2)</td>
</tr>
<tr>
<td>Years lived in Canada (if not born in Canada)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than or equal to 10</td>
<td>41 (19.7)</td>
<td>3 (10.3)</td>
<td>21 (24.1)</td>
<td>17 (18.5)</td>
</tr>
<tr>
<td>More than 10</td>
<td>167 (80.3)</td>
<td>26 (89.7)</td>
<td>66 (75.9)</td>
<td>75 (81.5)</td>
</tr>
</tbody>
</table>

Note. The majority of the participants in the “other” ethnic group were of European ancestry.

Of the total sample, 61.9% were men, and within the ethnic groups, men represented 70.0%, 62.8%, and 61.0% of the Chinese, South Asian and “Other” sub-groups, respectively.

The mean age of the overall sample was 61 years (SD = 14.2) and the majority of the participants were married or in a common-law relationship (65.3%). About one half (54.6%) of the total sample had completed some post-secondary education. When compared with the Chinese and “Other” participants, the South Asian participants were less likely to report their total household income (49.0% did not respond to the question). Of those who provided income data, the “Other” group was somewhat less likely to report a total household income of more than $50,000 (55.3% vs. 66.7% of the Chinese participants and 65.4% of the South Asian participants with income data). The South Asian participants reported having attained less education, relative to the Chinese and “Other” participants.

Approximately one half of the participants in the sample were born outside of Canada (54.1%); stratified by group, 100.0% of the Chinese participants were born outside of Canada, whereas 93.1% of the South Asian and 34.2% of the “Other” participants were born outside
Canada. Of those participants who were born outside of Canada, most had lived in Canada for more than 10 years (80.3%); however, when compared with the other groups, the South Asian participants had immigrated to Canada most recently (24.1% ≤ 10 years). Of the total sample, 62.8% spoke English at home; 26.7% of the Chinese and 16.8% of the South Asian participants reported speaking English at home compared with 84.0% of the “Others”.

4.2 Clinical Characteristics

The clinical profile of the sample is presented in Table 4. The chief complaint of the participants was categorized as chest pain or other, which included pain in the jaw, lung, arm, abdomen, back or other non-localised symptoms. The most frequently reported main symptom was chest pain (76.6%), and there were no differences in chief complaint by ethnicity. Across the total sample, those who reported the severity of their chest pain characterized it as mostly “low/none” (56.4%) or “medium” (23.9%) in severity. The South Asian participants were most likely to report their chest pain severity as “high”; 32.1% provided this response (of those who provided responses) compared with 11.1% of the Chinese participants and 11.2% of the “Other” participants.

Table 2.

Clinical Characteristics, by Ethnicity

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All (N = 401) f (%)</th>
<th>Chinese (n = 30) f (%)</th>
<th>South Asian (n = 102) f (%)</th>
<th>Other (n = 269) f (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chief complaint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest pain</td>
<td>307 (76.6)</td>
<td>21 (70.0)</td>
<td>83 (81.4)</td>
<td>203 (75.5)</td>
</tr>
<tr>
<td>Other</td>
<td>94 (23.4)</td>
<td>9 (30.0)</td>
<td>19 (18.6)</td>
<td>66 (24.5)</td>
</tr>
<tr>
<td>Severity of Chest Pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Characteristic

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>All (N = 401)</th>
<th>Chinese (n = 30)</th>
<th>South Asian (n = 102)</th>
<th>Other (n = 269)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f(%)</td>
<td>f(%)</td>
<td>f(%)</td>
<td>f(%)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>(n = 30)</td>
<td></td>
<td>(n = 102)</td>
<td>(n = 269)</td>
</tr>
<tr>
<td>South Asian</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Characteristic</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None/low</td>
<td>318 (83.9)</td>
<td>26 (86.7)</td>
<td>69 (81.2)</td>
<td>219 (84.9)</td>
</tr>
<tr>
<td>Medium</td>
<td>61 (16.1)</td>
<td>4 (13.3)</td>
<td>16 (18.8)</td>
<td>39 (15.1)</td>
</tr>
<tr>
<td>High</td>
<td>142 (35.4)</td>
<td>16 (53.3)</td>
<td>30 (29.4)</td>
<td>96 (35.6)</td>
</tr>
<tr>
<td>Canadian Triage and Acuity Scale score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 or 2</td>
<td>318 (83.9)</td>
<td>26 (86.7)</td>
<td>69 (81.2)</td>
<td>219 (84.9)</td>
</tr>
<tr>
<td>3 or 4</td>
<td>61 (16.1)</td>
<td>4 (13.3)</td>
<td>16 (18.8)</td>
<td>39 (15.1)</td>
</tr>
</tbody>
</table>

*a* Refers to symptoms such as pain in the jaw, arm, lung, abdomen, back or other non-localised symptoms

*b* Missing data (n = 146) not included in analysis

*c* Pain score 0 – 3

*d* Pain score 4 – 7

*e* Pain score 8 – 10

The majority of the sample (83.9%) had been assigned a score of 1 or 2 on the Canadian Triage and Acuity Scale (CTAS), upon arrival to the emergency department. CTAS scores of 1 and 2 are the highest acuity categories and reflect the urgency of the situation. This finding was consistent for the ethnic groups; Chinese (86.7%), South Asian (81.2%), and “Other” (84.9%).

Of the sample, 35.4% were admitted to the hospital. Admission included the coronary care, intensive care, telemetry, and medical units; if the patient was not admitted, he or she was taken directly to a cardiac catheterization laboratory or operating room. More of the Chinese participants (53.3%) were admitted to the hospital from the emergency department, compared with 29.4% of the South Asian and 35.6% of the “Other” participants. The clinical characteristics of the participants who were admitted to the hospital (n = 142; 35.4%) are presented in Table 5.
### Investigations and Treatments Received by Participants Admitted to Hospital, by Ethnicity

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>All (N = 142)</th>
<th>Chinese (n = 16)</th>
<th>South Asian (n = 30)</th>
<th>Other (n = 96)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f (%)</td>
<td>f (%)</td>
<td>f (%)</td>
<td>f (%)</td>
</tr>
<tr>
<td>Angiogram received</td>
<td>69 (48.5)</td>
<td>8 (50.0)</td>
<td>12 (40.0)</td>
<td>49 (51.0)</td>
</tr>
<tr>
<td>Coronary anatomy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No significant disease</td>
<td>18 (32.7)</td>
<td>1 (12.5)</td>
<td>1 (14.3)</td>
<td>16 (40.0)</td>
</tr>
<tr>
<td>At least one vessel &gt; 70% stenosis</td>
<td>37 (67.3)</td>
<td>7 (87.5)</td>
<td>6 (85.7)</td>
<td>24 (60.0)</td>
</tr>
<tr>
<td>Revascularization* (PCI(^a) or CABG(^b))</td>
<td>36 (97.2)</td>
<td>6 (85.7)</td>
<td>7 (116.7)</td>
<td>23 (95.8)</td>
</tr>
<tr>
<td>PCI</td>
<td>25 (67.5)</td>
<td>4 (57.1)</td>
<td>4 (66.7)</td>
<td>17 (70.8)</td>
</tr>
<tr>
<td>CABG +/- valve surgery</td>
<td>11 (29.7)</td>
<td>2 (28.6)</td>
<td>3 (50.0)</td>
<td>6 (25.0)</td>
</tr>
</tbody>
</table>

* For this analysis, only those with a stenosis of >70% in at least one vessel were considered eligible for revascularization.

\(^a\) PCI, percutaneous coronary intervention

\(^b\) CABG, coronary artery bypass graft

Of the participants that were admitted, 48.5% received an angiogram (50.0% of the Chinese participants, 40.0% of the South Asian participants, and 51.0% of the “Other” participants). Of those who received an angiogram, 67.3% had evidence of coronary artery disease involving at least one vessel with greater than 70% stenosis. Of those who had an angiogram, more “Others” (40.0%) were found to have no coronary artery disease or disease not considered significant, compared with the Chinese (12.5%) and South Asian (14.3%) participants, which may reflect a lower threshold for angiography among “Others”.

Approximately 97% of the participants were re-vascularized with either percutaneous coronary intervention (PCI) or surgery involving a coronary artery bypass graft (CABG). The analysis by ethnic group revealed that a greater percentage of South Asian participants with at least one vessel with more than 70% stenosis received either PCI or CABG (116.7%), and were more
likely than the other ethnic groups to receive CABG with or without valve surgery. Not all of the South Asian participants had significant coronary artery disease and so it is likely that the indication for surgery for some of these participants was valvular disease, not coronary artery disease.

4.3 Time-to-Treatment-Seeking Interval

The time-to-treatment-seeking interval was defined as the time from symptom onset to the time a decision was made to seek medical help. Of the 401 participants, 78 were excluded because they had missing data related to their time-to-treatment-seeking interval. This resulted in a sample of 323 participants for this analysis, including 20 Chinese, 94 South Asian, and 209 “Other” participants.

The mean time-to-treatment-seeking interval for the sample was 2,633 minutes or 43.9 hours ($SD = 10,489$ minutes; 174.8 hours). The median for the total sample was 180 minutes (IQR = 1,170 minutes). The median time-to-treatment-seeking interval was 120 minutes (IQR = 622.5 minutes) for the Chinese participants, 120 minutes (IQR = 633.75 minutes) for the South Asian participants, and 210 minutes (IQR = 1,455 minutes) for the “Other” participants.

To determine if there were ethnicity-based differences in the time-to-treatment-seeking interval, the Kruskal-Wallis test was performed. This showed that there were no statistically significant differences in the time-to-treatment-seeking intervals of the ethnic groups (see Table 6).
Table 4.

**Kruskal-Wallis Test Results for Time-to-treatment-seeking Interval by Ethnicity**

<table>
<thead>
<tr>
<th>Kruskal-Wallis</th>
<th>Time-to-treatment-seeking Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All (N = 323)</td>
</tr>
<tr>
<td>$\chi^2$</td>
<td>4.155</td>
</tr>
<tr>
<td>$p$</td>
<td>.125</td>
</tr>
<tr>
<td>Mean Rank</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>159.58</td>
</tr>
<tr>
<td>South Asian</td>
<td>145.90</td>
</tr>
<tr>
<td>Other</td>
<td>169.47</td>
</tr>
</tbody>
</table>

### 4.4 Other Potential Factors Influencing Treatment-seeking Intervals

No association was found between the time-to-treatment-seeking interval and ethnicity, and therefore an analysis to determine whether the relationship between the time-to-treatment-seeking intervals and ethnicity was mediated by other sociodemographic or clinical variables was not required. However, we investigated whether other relationships existed between selected variables and treatment-seeking delay.

Of the 322 participants with reported time-to-treatment-seeking intervals, 195 (60.5%) reported seeking treatment more than one hour (delay) after symptom onset, and 127 (39.5%) reported seeking treatment within one hour or less (no delay) of symptom onset.

The following variables were examined to determine whether there was a relationship with treatment-seeking delay: age, sex, language spoken at home, level of education, marital status, total household income, place of birth, years in Canada (if not born in Canada), chief complaint, severity of chest pain and angiographic findings (see Table 7). Of all the
sociodemographic and clinical variables explored, none reached statistical significance ($p < .05$), indicating no statistically significant relationships between these variables and treatment-seeking delay.

Table 5.

_Treatment-Seeking Delay by Selected Demographic and Clinical Factors_

<table>
<thead>
<tr>
<th>Variable</th>
<th>Delay (n = 195)</th>
<th>No delay (n = 127)</th>
<th>$\chi^2$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male sex</td>
<td>108 (57.4)</td>
<td>71 (65.1)</td>
<td>1.704</td>
<td>.192</td>
</tr>
<tr>
<td>Language Spoken at Home</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>121 (62.4)</td>
<td>77 (60.6)</td>
<td>0.098</td>
<td>.754</td>
</tr>
<tr>
<td>Other</td>
<td>73 (37.6)</td>
<td>50 (39.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/Common Law</td>
<td>133 (68.2)</td>
<td>86 (67.7)</td>
<td>0.783</td>
<td>.676</td>
</tr>
<tr>
<td>Divorced/Separated/Widowed</td>
<td>43 (22.1)</td>
<td>35 (19.7)</td>
<td>1.45</td>
<td>.695</td>
</tr>
<tr>
<td>Never married/Single</td>
<td>19 (9.7)</td>
<td>16 (12.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school or less</td>
<td>91 (46.7)</td>
<td>58 (45.7)</td>
<td>0.031</td>
<td>.861</td>
</tr>
<tr>
<td>Any postsecondary</td>
<td>104 (53.3)</td>
<td>69 (54.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Household Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less or equal to $50,000</td>
<td>56 (28.7)</td>
<td>29 (22.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than $50,000</td>
<td>73 (37.4)</td>
<td>52 (40.9)</td>
<td>1.45</td>
<td>.695</td>
</tr>
<tr>
<td>Don’t know/Refused</td>
<td>66 (33.9)</td>
<td>46 (36.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Place of Birth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canada</td>
<td>88 (45.1)</td>
<td>56 (44.1)</td>
<td>0.033</td>
<td>.855</td>
</tr>
<tr>
<td>Other</td>
<td>107 (54.9)</td>
<td>71 (55.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years in Canada (if not born in Canada)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less or equal to 10</td>
<td>18 (17.6)</td>
<td>18 (26.9)</td>
<td>2.05</td>
<td>.152</td>
</tr>
<tr>
<td>More than 10</td>
<td>84 (82.4)</td>
<td>49 (73.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chief Complaint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chest pain</td>
<td>150 (76.9)</td>
<td>99 (78.0)</td>
<td>1.09</td>
<td>.578</td>
</tr>
<tr>
<td>Other $^a$</td>
<td>45 (23.1)</td>
<td>28 (22.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity of Chest Pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None/low</td>
<td>41 (39.0)</td>
<td>28 (47.5)</td>
<td>4.846</td>
<td>.089</td>
</tr>
<tr>
<td>Medium</td>
<td>53 (50.5)</td>
<td>20 (33.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>11 (10.5)</td>
<td>11 (18.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variable</td>
<td>Treatment-seeking Delay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Delay (n = 195)</td>
<td>No delay (n = 127)</td>
<td>$\chi^2$</td>
<td>$p$</td>
</tr>
<tr>
<td>Angiographic Findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No significant disease</td>
<td>10 (40.0)</td>
<td>5 (31.3)</td>
<td>0.322</td>
<td>.570</td>
</tr>
<tr>
<td>At least one vessel &gt; 70%</td>
<td>15 (60.0)</td>
<td>11 (68.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stenosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age, years, mean (SD)</td>
<td>60.5 (14.8)</td>
<td>60.3 (13.5)</td>
<td>0.777</td>
<td>.379</td>
</tr>
</tbody>
</table>

$^a$Refers to symptoms such as pain in the jaw, arm, lung, abdomen, back or other non-localised symptoms

### 4.5 Actions Taken to Seek Help

The study participants answered the question: “What was the first thing you did to get help?” These responses were re-categorized into the following: 1) called for help of family member, co-worker or stranger nearby/telephoned a family member, 2) telephoned a healthcare professional, 3) called 9-1-1, and 4) other. Of the 401 participants in the sample, there were 40 cases with missing data, resulting in a sample of 361 cases for this particular analysis.

Sixty-four percent of the Chinese and South Asian participants reported that they called for the help of a family member, co-worker or stranger nearby/telephoned a family member, compared with 42.4% of the “Others”. Five percent of the South Asian participants reported that they telephoned a healthcare professional, while three percent reported that they called 9-1-1. Only a small proportion of the Chinese participants and “Other” participants reported calling 9-1-1 (8.0% and 8.5%, respectively).

The majority of the responses in the category “Other” included “someone came to assist without my asking because I was so sick” or “woke up from sleep”. Of the sample, 40.3% of the
“Others”, 24% of the Chinese, and 28% of the South Asian participants reported responses that were placed in the other category.

Table 6.

**Actions Taken to Seek Help, by Ethnicity**

<table>
<thead>
<tr>
<th>Action</th>
<th>Ethnicity</th>
<th>Chinese (n = 25)</th>
<th>South Asian (n = 100)</th>
<th>Other (n = 236)</th>
<th>χ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Called for help of family member/non-relative/telephoned family</td>
<td></td>
<td>16 (64.0)</td>
<td>64 (64.0)</td>
<td>100 (42.4)</td>
<td></td>
</tr>
<tr>
<td>Telephoned a healthcare professional</td>
<td></td>
<td>1 (4.0)</td>
<td>5 (5.0)</td>
<td>21 (8.9)</td>
<td>16.599</td>
</tr>
<tr>
<td>Called 9-1-1</td>
<td></td>
<td>2 (8.0)</td>
<td>3 (3.0)</td>
<td>20 (8.5)</td>
<td>p = .011*</td>
</tr>
<tr>
<td>Othera</td>
<td></td>
<td>6 (24.0)</td>
<td>28 (28.0)</td>
<td>95 (40.3)</td>
<td></td>
</tr>
</tbody>
</table>

*a* Refers to responses such as “someone came to assist without my asking because I was so sick” and “woke up from sleep”

* p < .05

To determine whether there were ethnic differences in the actions the participants took when they determined they needed help, χ² analyses were performed. These analyses showed that there was a statistically significant difference among the groups in the actions the participants took when they decided they needed help (see Table 8). To identify where these differences occurred, the standardized residuals for each response and stratified by ethnic group were determined.

These calculations revealed that there was one cell in the contingency table with a large standardized residual value (1.99): the South Asian participants who called for the help of a family member, co-worker or stranger nearby or telephoned a family member (calculation below).
A cell-by-cell comparison showed that no other residuals were as large and therefore the difference likely exists here. Therefore, it is likely that the significant difference between what was observed and what was expected for this action response arose among the South Asian participants.

4.6 Reasons for Delayed Treatment Seeking

The participants who delayed seeking help for more than one hour were asked, “Why did you wait before getting help?” Their responses have been categorized into the following: 1) did not think the problem was heart-related, 2) followed the advice or waited for advice from a healthcare professional or family member prior to seeking treatment, 3) minimized the symptoms, and 4) concerned about troubling others or felt afraid or embarrassed. The response option, “minimized the symptoms” included the following responses: “symptoms did not interfere with my activity” and “I thought the symptoms would resolve on their own.” Guided by the Self-regulation of Health and Illness Model (SRM), these four response categories were further categorized to describe how these responses were triggered and included the categories, cognitive, emotional or cognitive/emotional.
Of the sample, 195 participants delayed seeking treatment for more than one hour. Some of the participants (n = 33), who had missing data about their time-to-treatment-seeking interval, were also asked this question, resulting in a final sample of 228 cases. The participants who did not delay seeking treatment for more than an hour were excluded from this analysis.

“Minimized the symptoms” was the most frequently reported reason for waiting to seek treatment for each ethnic group (Chinese (57.9%), South Asian (60.0%), and “Others” (63.5%))
participants). “Did not think the problem was heart-related” was the second most frequently reported response representing 31.6%, 26.0% and 33.3% of the Chinese, South Asian, and “Other” participants, respectively.

χ² analyses were performed to determine if there were ethnicity-based differences in the participants’ reasons for employing the coping strategies or actions that led to treatment-seeking delay. The analyses showed that there were no statistically significant ethnicity-based differences in the participants’ reasons.

Further analyses were conducted on the types of triggers (e.g., cognitive, emotional, or cognitive/emotional) that led to delay, which were guided by the SRM. Dracup et al. (2006) performed a similar analysis using the SRM to categorize factors related to internal stimuli, coping/action plans, and appraisal. In that study, the SRM provided an interpretation of these factors, whether cognitive, emotional or cognitive/emotional, and how they related to delay. For this research, the model has been used in a similar fashion to interpret how ethnicity interacts with the response-trigger types that lead to delayed treatment seeking.

Table 8.

<table>
<thead>
<tr>
<th>Type of Response Trigger</th>
<th>Ethnicity</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chinese (n = 19)</td>
<td>South Asian (n = 50)</td>
<td>Other (n = 159)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>f(%)</td>
<td>f(%)</td>
<td>f(%)</td>
<td>f(%)</td>
<td></td>
</tr>
<tr>
<td>Cognitive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6 (31.6)</td>
<td>13 (26.0)</td>
<td>53 (33.3)</td>
<td></td>
<td>0.947</td>
</tr>
<tr>
<td>No</td>
<td>13 (68.4)</td>
<td>37 (74.0)</td>
<td>106 (66.7)</td>
<td></td>
<td>p = .623</td>
</tr>
<tr>
<td>Emotional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2 (10.5)</td>
<td>7 (14.0)</td>
<td>12 (7.5)</td>
<td></td>
<td>1.937</td>
</tr>
<tr>
<td>No</td>
<td>17 (89.5)</td>
<td>43 (86.0)</td>
<td>147 (92.5)</td>
<td></td>
<td>p = .380</td>
</tr>
<tr>
<td>Cognitive/emotional</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>15 (39.5)</td>
<td>38 (38.0)</td>
<td>127 (39.9)</td>
<td></td>
<td>0.119</td>
</tr>
</tbody>
</table>
The categories “minimized the symptoms” and “followed prior advice or waited for advice from a healthcare professional or family member” are both considered to be triggered by both a cognitive and emotional response to the symptoms and therefore these categories were collapsed for this analysis. \( \chi^2 \) analyses were performed to determine if the different ethnic groups responded differently to their symptoms based on how their responses were triggered, whether cognitive, emotional or a combination of both cognitive and emotional (see Table 10). The analyses demonstrated that there were no statistically significant ethnicity-based differences in how the responses were triggered.
Chapter Five: Discussion

In this study there was no statistically significant difference in the time-to-treatment-seeking intervals of the study ethnic groups (Chinese, South Asian and “Others”). No ethnic differences were found in the participants’ reasons for employing the coping strategies or actions that led to treatment-seeking delay, but a relationship was found between ethnicity and the reported actions taken by the participants in response to their symptoms of acute coronary syndrome (ACS). No other relationships were found between other selected sociodemographic or clinical variables and treatment-seeking delay.

5.1 The Time-to-Treatment-Seeking Interval

Despite having the required sample size for this analysis, there was extensive missing data in the time-to-treatment-seeking variable. As a result, the sample may not have provided sufficient statistical power to detect a difference in the time-to-treatment-seeking interval by ethnicity. There appears to be a trend towards ethnic differences in time-to-treatment seeking, but because of the limited statistical power, we cannot conclude, with certainty, that there is not a difference.

Of interest, the trend in the time-to-treatment-seeking intervals suggests that participants who identified as being either Chinese (median = 120 minutes) or South Asian (median = 120 minutes) did not wait as long to seek treatment as those participants represented in the ethnic group, “Others” (median = 210 minutes), who were predominantly of European ancestry. This trend differs from findings observed by others. The published literature suggests that people from ethno-cultural backgrounds that are different from the cultural and linguistic majority group are more likely to delay seeking treatment for symptoms of ACS (Ratner et al., 2006). Specifically,
studies conducted in Canada and the United Kingdom have found that people of Chinese and South Asian ethnicity delay seeking treatment for ACS longer than do people who are of European descent (Chaturvedi et al., 1997; King et al., 2009; Ratner et al., 2006).

It is possible that there was some response bias amongst our participants, particularly if the Chinese and South Asian participants were accompanied by a relative to the emergency department. They may not have wanted to disclose the actual time of the onset of their symptoms to their relative out of concern that they would disapprove of their delay, cause stress for the family member, or instigate a change in the family dynamic. People from ethnic groups that are more collectivist may be less willing to share bad news with their social group, especially if they believe that they will inconvenience others or disrupt the harmony of the group (McLaughlin & Braun, 1998). Participants may also be reluctant to share their symptom experience with a relative out of concern for feeling embarrassed about their lack of knowledge or about the actions that they took. Feeling fearful or embarrassed about incorrectly identifying symptoms of a heart attack is acknowledged in the literature as a reason patients delay seeking treatment and is thought to influence patients’ decisions about whether they want to share their symptom experiences with another person (Dracup & Moser, 1997; Moser et al., 2006; Pattenden, Watt, Lewin, & Stanford, 2002). Additionally, it is possible that recall bias occurred. Study participants in all the ethnic groups may have experienced some recall bias; however, research demonstrates that people who are of Chinese or South Asian ethnic groups may be more likely than “Others” to experience symptoms that are subtle or atypical and their onset may have occurred hours, days or even weeks before, making the time of onset more difficult for members of these groups to pinpoint (Clark, 2001; Galdas, Johnson, Percy, & Ratner, 2010). King et al. (2009) also found that people who identify as Chinese are least likely among the ethnic groups to be able to
pinpoint a distinct time of symptom onset. However, this would probably not fully explain the lack of difference found.

Some sociodemographic and clinical characteristics may be related to treatment-seeking delay. Research has demonstrated that patients’ concerns regarding potential language barriers influence their decision to seek care for symptoms of ACS (King-Shier et al., 2015) and language barriers have been found to be a hindrance to the receipt of care in the emergency department (Heron, Stettner, & Haley, 2006). Additional research has found that people of Chinese or South Asian ethnicity born outside of Canada are less likely than those born in Canada to speak English at home and are less likely to be able to identify classic heart attack symptoms (Ratner et al., 2006), and therefore may be at greater risk of delay in treatment seeking. In our study, far fewer Chinese and South Asian participants reported speaking English at home when compared with the “Others”, and all of the Chinese participants and 93.1% of the South Asian participants were born outside of Canada, compared with 34.2% of the “Others”. Based on these findings, we would expect that the Chinese and South Asian participants in our study would have been more likely to delay treatment seeking for their symptoms; however, we did not find this to be the case. These results might be explained by the fact that, although significantly more of the Chinese and South Asian participants were born outside of Canada, most had lived in Canada for more than ten years and therefore may have had acquired knowledge of the Canadian healthcare system and subscribed to the prevalent cultural norms. Furthermore, the majority of the Chinese and South Asian participants reported calling for the help of a family member, non-relative, or stranger nearby, or telephoning a family member as their first action to seek help. In so doing, these participants may have been enlisting the help of someone who spoke English and who could assist with their treatment seeking and therefore
language may not have posed a barrier to treatment seeking for these patients. This study was conducted at sites within two health regions in Vancouver, which is an ethnically diverse area. Indeed, Vancouver’s cultural and ethnic diversity is at least partially represented in the study hospitals’ staff and so participants may have reasonably expected to encounter hospital staff of the same ethnic and linguistic background as themselves. Lastly, we may not have observed a difference due to our small sample size and corresponding lack of statistical power.

5.2 Actions Taken in Response to ACS Symptoms

A statistically significant ethnic difference was found in the actions the participants took in response to their symptoms of ACS. The South Asian participants were more likely to respond that they called for the help of a family member, non-relative or stranger nearby or telephoned a family member. These findings are consistent with other literature in which it has been reported that people who are South Asian are more likely to consult other family members and lay social networks in response to ACS symptoms (Ben-Shlomo, Naqvi, & Baker, 2008). A relatively small proportion (16.8%) of the South Asian participants in our sample reported speaking English at home (as compared with 26.7% of the Chinese and 84.0% of the “Other” participants) and therefore these participants may have faced substantial linguistic barriers. It is not surprising that the first action taken by these South Asian participants was to contact a family member or someone from their social network for help. A central concern for some patients of South Asian ethnicity has been negative experiences with healthcare service because of communication difficulties and stereotyping (Chauhan et al., 2010). Such a concern may also exist for Chinese and non-English speaking patients who have experiences with, or who require contact with, the healthcare system. As a result, access to appropriate care is often facilitated through social networks and family, and South Asian children are often required to interpret for their parents.
during interactions with healthcare professionals (Astin et al., 2008). By contacting a family member or someone from their social network, South Asian participants may have been attempting to overcome the communication barriers that they may face in an emergency department.

Although not statistically significant, the South Asian participants were the least likely of the ethnic groups to call 9-1-1 as their first action to seek help for their symptoms; however, this action was also infrequently reported by the participants in the Chinese and “Other” ethnic groups. This is consistent with prior research that has demonstrated that people who self-identified as Chinese or South Asian were about one half times as likely to recommend calling emergency services when compared with other ethnic groups (Ratner et al., 2006). The unlikeliness of enlisting emergency services might be related to South Asian and Chinese people experiencing more atypical symptoms (King et al., 2009), not appreciating the seriousness of their ACS symptoms (King-Shier et al., 2015), and cultural and linguistic barriers. This may have been a factor in the low rate of engaging appropriate medical services observed in this study. In fact, calling emergency medical services is largely underutilized by many patients, regardless of ethnicity, and it has been suggested that patients not having the basic health information and knowledge of when emergency medical services should be accessed is a reason for this (Moser et al., 2006). Fear and embarrassment of being wrong about the nature of one’s symptoms are also associated with delay in seeking treatment (Moser et al., 2006) and may influence patients’ decisions about whether they enlist 9-1-1 services.
5.3 Reasons Given that Lead to Treatment Delay

We found no ethnic differences in the participants’ reasons for waiting to seek help. However, because of the extent of missing data, there was insufficient statistical power to demonstrate a modestly- or moderately-sized difference, if one existed.

The most frequently reported reason for waiting to seek treatment, for all three ethnic groups, was that the participants “minimized the symptoms”, followed by “did not think the problem was heart-related”. These findings are consistent with the findings of others who suggest that longer delays in care seeking are associated with patients assessing their symptoms as intermittent or relatively benign (Dracup & Moser, 1997; Johansson et al., 2004; O'Donnell et al., 2014). Researchers have suggested that these findings might be explained by the fact that most patients expect their symptoms to mimic a typical “Hollywood heart attack” and not the spectrum of possible, and potentially more subtle, symptoms that can occur (Goff et al., 1999). Although chest pain was the most commonly reported main symptom, regardless of ethnicity, the participants may have experienced other symptoms simultaneously, which would have made the event difficult to interpret; however, these data were not analyzed for this work. Information was captured about the severity of the participants’ chest pain. There did not appear to be a relationship between chest pain severity and treatment-seeking delay. In this study, most participants, in both the “delay” and “no delay” groups, rated the severity of their chest pain as being “none/low” or “medium”; however, the duration and constancy of the chest pain was not reported. It is possible that the chest pain experienced by the participants who reported delaying treatment because they minimized their symptoms may have experienced pain that was intermittent in nature.
Guided by the Self-regulation of Health and Illness Model (SRM), responses related to why the participants delayed were further categorized into the type of trigger that led to the reason for delay and stratified by ethnicity. The type of responses included cognitive, emotional, and cognitive/emotional; again, no ethnicity-based differences were found when the analyses were performed.

We anticipated that the type of response reported by the participants would provide us with further insight and knowledge about whether participants of different ethnicities have different treatment-seeking behaviour and the reasons for that behaviour. With such evidence, information and interventions could be targeted to groups, based on the type of responses they have to their symptoms. Dracup et al. (2006) performed a similar analysis and suggested that information regarding possible symptoms of ACS could be given to facilitate the cognitive representation of a health threat, and patients who report emotionally-based responses could benefit from interventions aimed at appropriate planning and action, and the possible emotional reactions to the health threat. However, no clear patterns emerged from this study and therefore we do not have conclusive evidence to support such interventions. Despite efforts by scores of researchers in trialing many interventions aimed at reducing treatment-seeking delay, over the decades, few have achieved long-term success. In this study, the SRM did not provide further guidance surrounding the types of triggers exhibited in response to symptoms related to ACS, and it is possible that the SRM, utilized in this fashion, is not a good fit for this purpose.
5.4 Strengths and Limitations

5.4.1 Strengths

Treatment-seeking delay for symptoms of ACS is a significant concern, resulting in poor patient outcomes. The focus of this study was to gain new information about ethnicity-based differences in treatment seeking, an issue that is largely underexplored. Ethnic diversity within Canada is significant, yet only a few Canadian-based studies exploring treatment-seeking delay have examined the effects of ethnicity. Literature from other countries does not always reflect the behaviour of the predominant Canadian ethnic groups; consequently, a benefit of this research was that it was conducted in Canada.

Another strength is that, to my knowledge, there has been no published literature about ethnicity-based differences and the actions taken, or the reasons given, as reported by patients. Another advantage of the study is its prospective design. Interviewing participants at the time of their symptom experience reduced the chance of recall bias and improved data accuracy related to patients’ symptoms and treatment-seeking decisions. Also, questionnaires were administered in person, offering an opportunity for clarification of respondents’ responses. In addition, and perhaps the greatest benefit, obtaining ethnicity data through self-report. Lastly, I believe the data collected about treatment seeking allowed us to accurately define the time of symptom onset and therefore report a discrete time interval (the time from symptom onset to the occurrence of appropriate treatment seeking), which is the recommended format for reporting (Mackay et al., 2014; Moser et al., 2006).
5.4.2 Limitations

Several study limitations have been identified. First, the interview tool has not been validated; however, some items have been used by Statistics Canada, as described above. Another limitation is that during the interview, if a participant reported seeking treatment within one hour of the onset of persistent symptoms, the Research Assistants (RAs) did not proceed to questions related to actions taken and reasons for delaying. In retrospect, it would have been preferable for the RAs to have continued with this questioning for any participants who reported delaying more than five minutes after the onset of persistent symptoms (the American College of Cardiology/American Health Association suggests that patients should contact 9-1-1 if pain persists more than five minutes (Antman et al., 2004).

Patients who were not fluent in any of the languages covered (English, Mandarin, Cantonese and Punjabi) were not recruited for the study. As a result, the diversity of the sample may have been compromised. Another limitation is related to the re-categorization of ethnicity-related responses into the following three ethnic groups: Chinese, South Asian and “Other”. Limiting ethnicity to these particular subgroups was made in acknowledgement of the second and third most frequently self-reported ethnic groups in Canada (Chinese and South Asian) so that power analysis could be undertaken. Thus, regardless of the diversity of ethnicities participants reported, we had to categorize them as belonging to one of those three groups. To mitigate this limitation somewhat, we also collected data related to “immigration status” (e.g., born in Canada, in Canada less than 10 years, in Canada more than 10 years), which helped to further characterize the sample.

Lastly, a significant limitation of this study was the lack of power, despite having achieved the required study sample size. The extensive amount of missing data, particularly
related to the variable “time-to-treatment-seeking”, resulted in the study being underpowered. Therefore, we were unable to determine if there were ethnicity-based differences in treatment-seeking delay even if a difference did exist.

5.5 Implications for Practice

In this study, South Asian participants were more likely to call for the help of a family member or non-relative when they decided that they needed help for their ACS symptoms. This may also be true for Chinese or other non-English speaking patients who may consider language a barrier to accessing health care. Metro Vancouver, the Sunshine Coast and the Whistler/Howe Sound regions offer a 24-hour service that provides interpretive services in more than 170 languages for the public when calling 9-1-1 emergency service. Improving public awareness of the availability of interpreting services when calling 9-1-1 or in an emergency department could help alleviate the notion of language barriers and could facilitate patients presenting to the hospital in a timely fashion. This study has shown that family involvement in decision making about what to do in the event of ACS symptoms may be important for particular groups. This underscores the importance of healthcare organizations adopting or continuing to promote family-centred approaches to their models of care by involving families in education and decision making about when and how to access health services.

Only a small number of participants, across all the ethnic groups, indicated that they called 9-1-1 in response to their symptoms. This finding has been reported in other literature, suggesting that people are either unaware or feel uncertain as to when to enlist this service. This highlights the need for interventions aimed at improving patients’ knowledge of the benefit of calling 9-1-1 if symptoms of ACS are experienced. Consistent with our findings, others have
reported that patients are concerned about being embarrassed about the possibility of being incorrect in their assessment of their symptoms and fearful of what may happen if treatment is unnecessarily sought. This may contribute to patients’ hesitation in calling 9-1-1 and thus interventions aimed at reducing the perceived stigma associated with the use of 9-1-1 and the emergency department must be explored.

In this study, most participants reported their main symptom as chest pain; however, it is possible that they experienced other symptoms simultaneously or their symptom experience did not mimic the typical “Hollywood heart attack”. The overall median delay time for treatment seeking in this study was 180 minutes, or three hours, which is unacceptably long and suggests that the participants were unsure of the nature of the symptoms they experienced or the appropriate response. This finding points to the importance of improving public awareness about the manifold types of ACS symptoms and the appropriate response. Further public education could help to address this need; however, because education campaigns to date have been largely unsuccessful, innovative approaches are needed.

Nurses are well-situated to influence these implications through health promotion activities. Health promotion by nurses can lead to many positive outcomes which include improved knowledge of their illness, self-management skills, and how to access health care services. With their diverse/broadly-based knowledge and experience, nurses are pivotal in the assessment, development and delivery of health education. This research suggests that there continues to be a need for further education surrounding the signs and symptoms of ACS and of how and when to enlist 9-1-1 services. Although to date, public education campaigns have been largely unsuccessful, this does not mean that nurses should abandon the practice of providing education of this kind in their roles, whether in the acute care setting or in the community, until
such time as specific, more effective interventions can be tested. Nurses should also encourage and support the inclusion of families and friends in their health promotion activities and advocate for organizational support for this to occur. Nurses should promote an atmosphere that acknowledges and addresses (supports) cultural and ethnic diversity when providing care and education. Nurses should advocate for adequate resources to address ethnic diversity. This includes enlisting interpreter services when required, to facilitate communication, and exploring patient’s values and beliefs about treatment seeking and accessing health care, and enlisting in cultural advisors when creating education materials and health care programs.

5.6 Conclusion

Although we did not find evidence of ethnicity-based differences in treatment seeking for symptoms of ACS, there was a trend indicating that Chinese and South Asian patients may not delay longer than the ethnic majority group, “Others”. This is promising, considering that over the decades other researchers have found that people who are different from the cultural and linguistic majority group often delay seeking treatment. It is possible that Canadian Chinese and South Asian patients are more aware of the potential signs and symptoms of ACS or feel more confident to access healthcare services than their American counterparts, with whom much of the previous research has been conducted.

Although this study did not find any ethnicity-based differences in the reasons why people delayed seeking treatment or in the triggered response to their symptoms, there was a statistically significant ethnicity-based difference found in the actions taken by the participants. This difference was notable among the South Asian participants who reported that they typically called upon a family member or non-relative, or telephoned a family member, rather than
telephoning a healthcare professional or calling 9-1-1. This finding highlights the importance of social networks in the decision-making process of how and when to access healthcare services and suggests that including family in health education and decision making may be beneficial in helping to promote faster treatment seeking. Interventions aimed not only at patients, but their family members, should be explored.
References


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doi:10.1177/0300060513488511


Appendix A: Emergency ACS Care – Participant Interview Tool

Study ID #

Date of Enrollment
___/___/___ (YYYY/MM/DD)

RA: Please complete the next 2 questions (A & B) BEFORE starting the interview.

Considering the participant’s appearance and your interaction with him/her, how would you describe his/her racial background? Is s/he White, Asian, South Asian, Black, Southeast Asian, or Aboriginal, or perhaps several of these, or perhaps something else, or too hard to tell?

Considering the participant’s surname only, how would you describe his/her racial background? Is s/he White, Asian, South Asian, Black, Southeast Asian, or Aboriginal, or perhaps several of these, or perhaps something else, or too hard to tell?

RA to read out: I’d like to start with a few questions about you and your background.

B1: What age did you turn at your last birthday?

☐ Refused
B2: What is your marital status?
- Married
- Common-law
- Separated
- Divorced
- Widow/Widower
- Single, never married
- Refused

B3: What is the highest education you have completed?
(RA, read list if necessary)
- No Schooling
- Elementary school
- Junior/High School incmpl
- High school incmpl
- High school or equiv cmpl (Gr 12)
- Registered apprenticeship, or trade certificate/diploma (incmpl)
- Registered apprenticeship, or trade certificate/diploma (cmpl)
- College, CGEP, non-university certificate or diploma (incmpl)
- College, CGEP, non-university certificate or diploma (cmpl)
- University incmpl
- University certificate or diploma
- University degree - Bachelor's
- University degree - Master's
- University degree - Professional degree (law, medicine)
- University degree- Doctorate
- Don’t know
- Not applicable
- Refused
B4: What is the highest education completed by any member of your household?
(RA, read list if necessary)
- No Schooling
- Elementary school
- Junior/High School incmpl
- High school incmpl
- High school or equiv cmpl (Gr 12)
- Registered apprenticeship, or trade certificate/diploma (incmpl)
- Registered apprenticeship, or trade certificate/diploma (cmpl)
- College, CGEP, non-university certificate or diploma (incmpl)
- College, CGEP, non-university certificate or diploma (cmpl)
- University incmpl
- University certificate or diploma
- University degree - Bachelor’s
- University degree - Master’s
- University degree - Professional degree (law, medicine)
- University degree- Doctorate
- Don’t know
- Not applicable
- Refused

B5: What is your occupation, that is, the work that you do (or did), including work that you may do in your home?

Refused

B6. Where were you born?
- In Canada
- Outside Canada (specify): ________________
B7. How many years have you lived in Canada?

☐ Refused

B8. Where were your parents born?

☐ In Canada

☐ Outside Canada (specify): ________________

☐ Refused

B9. Now I’d like to ask you about the languages you speak. What language did you first learn at home in childhood and still understand?

☐ Refused

B10. What language do you speak most often at home?

☐ Refused

B11. What was the total income of your household, before taxes, for the last tax year?

☐ Under 20,000

☐ 20,001 – 50,000

☐ 50,001 – 75,000

☐ 75,001 – 100,000

☐ More than 100,000

☐ Don’t know

☐ Refused
RA reads out: Now I’d like to switch and talk about what happened that brought you to the hospital.

C. What time did your first symptom(s) begin? (Include date of first symptoms onset)
Complete ALL fields in this item and do not complete next two items ("C1" and "C2"). If difficulty remembering time, RA prompt with, "Do you remember if it was morning, afternoon, or evening? Do you remember what you were doing? Do you remember if it was before or after xx (appropriate meal)?

____/__/__ (YYYY/MM/DD) __:__:__ (HH/MM/SS)

☐ Don’t know
☐ Refused

C1. What time did your first symptom(s) begin?
If difficulty remembering time, RA prompt with, “Do you remember if it was morning, afternoon, or evening? Do you remember what you were doing? Do you remember if it was before or after xx (appropriate meal)? Time 1 (HHHH)


☐ Don’t know
☐ Refused

C2. Date of first symptoms onset
____/__/__ (YYYY/MM/DD)

☐ Don’t know
☐ Refused

Comments
RA: Record any comments on item C here

D. Did you have to stop or change your activity because of your symptoms?
RA: If participant answers no, continue to probe until they report the symptom episode that DID cause them to change their activity. In other words, the answer to this question must ALWAYS be yes. NOTE: change in activity can include waking from sleep, going home, calling friend/relative or following advice of friend/relative etc., as well as resting/stopping actual physical activity.

○ Yes
○ No
○ Refused

E. What time was that? (include date)
Complete ALL fields in this item and do not complete next item ("E1").

__/__/__ (YYYY/MM/DD) __:__:__ (HH/MM/SS)

☐ Don’t know
☐ Refused

E1. What time was that?
(use prompts as above)Time 2 (HHHH)

☐ Don’t know
☐ Refused

F. (If yes to D) How did you change your activity?
(RA do not read; e.g. sat down, stopped running, etc.)

☐ Refused

G. What time did you decide you needed help and begin trying to get some help? (include date sought help)
Complete ALL fields in this item and do not complete next two items ("G1" and "G2").

__/__/__ (YYYY/MM/DD) __:__:__ (HH/MM/SS)
G1. What time did you decide you needed help and begin trying to get some help?
Time 3 (HHHH)

Don’t know

G2. Date sought help
___/__/__ (YYYY/MM/DD)

Don’t know

Comments
RA: Record any comments/extra information on item G here

H. What was the first thing you did to get help?
(RA, do not read) If participant gives you more than one answer, say, “I can only accept one answer. What was the very FIRST/NEXT thing you did?”

Called for help of family member who was in the house/building with me
Called for help of co-worker who was in the building with me
Asked stranger on street/in public place for help
Telephoned a family member
Telephoned my family doctor
Telephoned a nurse or other health professional
Telephoned my specialist doctor
Called 9-1-1
Some came to assist without my asking because I was so sick (e.g. collapse, unconscious, unable to speak)

Other (specify) ______________________

Refused

I. Then what did you do?

If participant gives you more than one answer, say, "I can only accept one answer. What was the very FIRST / NEXT thing you did?":

Called for help of family member who was in the house/building with me

Called for help of co-worker who was in the building with me

Asked stranger on street/in public place for help

Telephoned a family member

Telephoned my family doctor

Telephoned a nurse or other health professional

Telephoned my specialist doctor

Called 9-1-1

Someone came to assist without my asking because I was so sick (e.g. collapse, unconscious, unable to speak)

Family/co-worker/stranger called family for me

Family/co-worker/stranger called my doctor for me

Family/co-worker/stranger called a nurse or other health professional

Family/co-worker/stranger called my specialist

Family/co-worker/stranger called 9-1-1

Family/co-worker/stranger took me to the hospital

Did nothing further (i.e. if answer to H was definitive (e.g., calling 911, driving to hospital))

Other (specify) _________________

Refused

RA to complete this item (do not read out)

Is T2-T3 (or T1-T3 if participant denies changing activity) less than one hour, or 1 hour or more?

Less than 1 hour (go to K)

1 hour or more
J. Why did you wait before getting help?
(RA, do NOT read list; check all that apply)
- Did not think problem was heart-related
- Symptoms did not interfere with activity
- Thought symptom(s) would resolve on its own
- Waited for family member/friend/co-worker to help/take to hospital
- Telephoned/visited family doctor first
- Had to arrange care for other family members (spouse, parent, child, grandchild)
- Worried problem was heart-related
- Worried about bothering others
- Worried about embarrassment if nothing was wrong
- Afraid of hospital
- Other (specify): _______________
- Refused

K. How did you get to the hospital?
(RA may read list)
- Called 911
- Another person called 911
- Drove self
- Friend/family member/co-worker drove
- Took taxi/public transit
- Walked
- Other (specify): _______________
- Refused

L. Please tell me about the MAIN symptom you had that made you decide to come to the hospital:
(RA: do not read list):  
- Chest
- Arm
- Jaw/throat/neck
- Shoulder
- Epigastrium
- Abdomen
- Non-Localised Symptoms
- Refused
- N/A (E.g. Didn't have any pain)
- Back
- Lung

**RA:** For each symptom given, probe for location if applicable (e.g., “Where exactly in your chest?”) and other descriptors (“What did it feel like?”). May offer prompts from list below if necessary.

**Chest**

<table>
<thead>
<tr>
<th>Location</th>
<th>Descriptor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centre</td>
<td>Painful</td>
</tr>
<tr>
<td>Left</td>
<td>Discomfort</td>
</tr>
<tr>
<td>Right</td>
<td>Pressure</td>
</tr>
<tr>
<td>All Over</td>
<td>Tightness</td>
</tr>
<tr>
<td>Refused</td>
<td>Squeezing</td>
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<td></td>
<td>Burning</td>
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<td></td>
<td>Stabbing</td>
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<td>Sharp</td>
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<td></td>
<td>Crushing</td>
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<td>Heavy Weight</td>
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<td>Constriction</td>
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<td>Tingling</td>
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<td>Dull Ache</td>
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<td></td>
<td>Other (specify):</td>
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<tr>
<td></td>
<td>Refused</td>
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</table>
### Arm

<table>
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### Jaw/Throat/Neck

<table>
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<th>Descriptor</th>
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<tbody>
<tr>
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</table>
- Numbness
- Constriction
- Tingling
- Dull Ache
- Other (specify):
- Refused

### Shoulder

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### Epigastrium

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<tbody>
<tr>
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<tr>
<td>Pressure</td>
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</tbody>
</table>
Tightness
Squeezing
Burning
Stabbing
Sharp
Crushing
Heavy Weight
Numbness
Constriction
Tingling
Dull Ache
Other (specify):
Refused

Abdomen
Descriptor
Painful
Discomfort
Pressure
Tightness
Squeezing
Burning
Stabbing
Sharp
Crushing
Heavy Weight
Numbness
Constriction
Tingling
Dull Ache
Other (specify):
Non-Localised Symptoms

Descriptor

- Shortness of breath
- Nausea
- Vomiting
- Dizziness/lightheadedness
- Indigestion/heartburn
- Rapid/pounding heart
- Sweating/clamminess
- Anxiety/fear/restlessness
- Fatigue/weakness
- Other (specify):
- Refused
- Flushing

- Shortness of breath
- Nausea
- Vomiting
- Dizziness/lightheadedness
- Indigestion/heartburn
- Rapid/pounding heart
- Sweating/clamminess
- Anxiety/fear/restlessness
- Fatigue/weakness
- Other (specify):
- Refused
- Flushing

- Shortness of breath
- Nausea
- Vomiting
○ Dizziness/lightheadedness
○ Indigestion/heartburn
○ Rapid/pounding heart
○ Sweating/clamminess
○ Anxiety/fear/restlessness
○ Fatigue/weakness
○ Other (specify):
○ Refused
○ Flushing
○ Shortness of breath
○ Nausea
○ Vomiting
○ Dizziness/lightheadedness
○ Indigestion/heartburn
○ Rapid/pounding heart
○ Sweating/clamminess
○ Anxiety/fear/restlessness
○ Fatigue/weakness
○ Other (specify):
○ Refused
○ Flushing
○ Shortness of breath
○ Nausea
○ Vomiting
○ Dizziness/lightheadedness
○ Indigestion/heartburn
○ Rapid/pounding heart
○ Sweating/clamminess
○ Anxiety/fear/restlessness
○ Fatigue/weakness
○ Other (specify):
- Refused
- Flushing

**Back**

Descriptor
- Painful
- Discomfort
- Pressure
- Tightness
- Squeezing
- Burning
- Stabbing
- Sharp
- Crushing
- Heavy Weight
- Numbness
- Constriction
- Tingling
- Dull Ache
- Other (specify):
- Refused

**Lung**

Descriptor
- Painful
- Discomfort
- Pressure
- Tightness
- Squeezing
- Burning
- Stabbing
o Sharp
o Crushing
o Heavy Weight
o Numbness
o Constriction
o Tingling
o Dull Ache
o Other (specify):
o Refused

M. Please tell me about any other symptoms you had.
(RA, do NOT read list)
☐ Chest
☐ Arm
☐ Jaw/throat/neck
☐ Shoulder
☐ Epigastrium
☐ Abdomen
☐ Non-Localised Symptoms
☐ Not applicable
☐ Refused
☐ Back
☐ Lung

RA: Probe for location and other descriptors as for main symptom.

Chest

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</table>
Refused ✗ Squeezing
Refused ✗ Burning
Refused ✗ Stabbing
Refused ✗ Sharp
Refused ✗ Crushing
Refused ✗ Heavy Weight
Refused ✗ Numbness
Refused ✗ Constriction
Refused ✗ Tingling
Refused ✗ Dull Ache
Refused ✗ Other (specify):
Refused ✗ Refused

### Arm

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</table>
Jaw/Throat/Neck

Descriptor
- Painful
- Discomfort
- Pressure
- Tightness
- Squeezing
- Burning
- Stabbing
- Sharp
- Crushing
- Heavy Weight
- Numbness
- Constriction
- Tingling
- Dull Ache
- Other (specify):
- Refused

Shoulder

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</tbody>
</table>
- Numbness
- Constriction
- Tingling
- Dull Ache
- Other (specify): Refused

**Epigastrium**
Descriptor
- Painful
- Discomfort
- Pressure
- Tightness
- Squeezing
- Burning
- Stabbing
- Sharp
- Crushing
- Heavy Weight
- Numbness
- Constriction
- Tingling
- Dull Ache
- Other (specify): Refused

**Abdomen**
Descriptor
- Painful
- Discomfort
- Pressure
<table>
<thead>
<tr>
<th>Symptom/Descriptor</th>
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<tr>
<td>Tightness</td>
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<tr>
<td>Dull Ache</td>
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<td>Other (specify):</td>
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<tr>
<td>Refused</td>
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**Non-Localised Symptoms**

Descriptor

<table>
<thead>
<tr>
<th>Symptom/Descriptor</th>
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<tbody>
<tr>
<td>Shortness of breath</td>
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<tr>
<td>Nausea</td>
</tr>
<tr>
<td>Vomiting</td>
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<tr>
<td>Dizziness/lightheadedness</td>
</tr>
<tr>
<td>Indigestion/heartburn</td>
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<tr>
<td>Rapid/pounding heart</td>
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<td>Anxiety/fear/restlessness</td>
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o Dizziness/lightheadedness
o Indigestion/heartburn
o Rapid/pounding heart
o Sweating/clamminess
o Anxiety/fear/restlessness
o Fatigue/weakness
o Other (specify):
  o Refused
  o Flushing
  o Shortness of breath
  o Nausea
  o Vomiting
  o Dizziness/lightheadedness
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  o Anxiety/fear/restlessness
  o Fatigue/weakness
  o Other (specify):
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    o Flushing
    o Shortness of breath
    o Nausea
    o Vomiting
    o Dizziness/lightheadedness
    o Indigestion/heartburn
    o Rapid/pounding heart
    o Sweating/clamminess
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    o Fatigue/weakness
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- Indigestion/heartburn
- Rapid/pounding heart
- Sweating/clamminess
- Anxiety/fear/restlessness
- Fatigue/weakness
- Other (specify):
  - Refused
  - Flushing

**Back**

**Descriptor**

- Painful
- Discomfort
- Pressure
- Tightness
- Squeezing
- Burning
- Stabbing
- Sharp
- Crushing
- Heavy Weight
- Numbness
- Constriction
- Tingling
- Dull Ache
B12. I’d now like to ask you about your ethnic ancestry, heritage or background.

What were the ethnic or cultural origins of your ancestors?

RA: Do NOT provide examples. You may accept up to 8 responses. If necessary, you may also READ this further explanation to the participant: “This question refers to the ethnic or cultural origins of your ancestors, including ancestors from both sides of your family. An ancestor is someone from whom you have descended and is usually more distant than a grandparent. Ethnic or cultural ancestry refers to your "roots" or cultural background and should not be confused with citizenship or nationality. Other than Aboriginal persons, most people can trace their origins to their ancestors on first coming to this continent”
B13. Now I’d like you to think about your own identity in ethnic or cultural terms. This identity may be the same as that of your parents, grandparents or ancestors, or it may be different. What is your ethnic or cultural identity?

*RA: Specify up to 6 responses. DO NOT provide examples. If necessary, you may also READ this further explanation to the participant:* “Your ethnic or cultural identity is the ethnic or cultural group or groups to which you feel you belong.”
B14. Now I’d like to ask you about your racial background. How would you describe your racial background? For example, are you White, Asian, South Asian, Black, Southeast Asian, or Aboriginal, or perhaps something else I haven’t mentioned? Please feel free to provide more than one answer if you have several backgrounds. (Use this response for B16, B17, B18)

☐ Refused

B15. And what about other people whom you meet, what racial background do other people tend to think you are? Do they think that you’re White, Asian, South Asian, Black, Southeast Asian, or Aboriginal, or perhaps some combination of these, or maybe something else I haven’t mentioned?

☐ Refused

B16. You’ve mentioned that you consider yourself to be '------ (response from B14)'. Was the nurse behind the desk when you first arrived in Emergency, also '------', or was he/she something else, do you think?

☐ Different racial background
☐ Same racial background
☐ Don’t know/Not sure
☐ Refused
☐ N/A (E.g. Admitted through ambulance and did not interact with triage nurse)

B16a. And what was his/her racial background, do you think?

☐ Don’t know/Not sure
☐ Refused
B17. What about the very first nurse that was taking care of you? Was s/he also ‘\(\text{------(response from B14)\text{'}}\), or was he/she something else do you think?

- Different racial background
- Same racial background
- Don’t know/Not sure
- Refused
- Other, please specify.. ______________

B17a. And what was his/her racial background, do you think?


- Don’t know/Not sure
- Refused

B18. What about the first doctor that came to see you here in Emergency? Was s/he also ‘\(\text{------(response from B14)\text{'}}\), or was he/she something else do you think?

- Different racial background
- Same racial background
- Don’t know/Not sure
- Refused
- N/A (E.g. Haven't seen a doctor yet)

B18a. And what was his/her racial background, do you think?


- Don’t know/Not sure
- Refused
- N/A
Now I have a few questions about your care in the Emergency Department. Please rate the following:

**N. How helpful was the person at registration desk?**
- Extremely unhelpful
- Unhelpful
- Somewhat helpful
- Helpful
- Very helpful
- Refused
- N/A (E.g. Didn't go through registration desk)
- Not sure

**O. How well were you kept informed about delays you experienced in the Emergency Department?**
- Very poorly
- Poorly
- Fairly well
- Well
- Very well
- Refused
- Not sure
- N/A (E.g. There was no delay)

**P. How well was your pain controlled?**
- Very poorly
- Poorly
- Fairly well
- Well
- Very well
- Refused
Q. How much did the staff care about you as a person?
- Not at all
- Very little
- A fair amount
- Quite a lot
- A great deal
- Refused
- Not sure

R. How concerned were the nurses about keeping you informed about your treatment?
- Not at all
- Very little
- A fair amount
- Quite a lot
- Very
- Refused
- Not sure
- N/A (E.g. Nurses are still waiting for tests and thus are unable to decide on the treatments)

S. How concerned was the doctor about explaining your tests and treatments?
- Not at all
- Very little
- A fair amount
- Quite a lot
- Very
- Refused
- Not sure
N/A (E.g. Haven’t seen a doctor yet)

T. Overall, how would you rate your care in the Emergency Department?
○ Very poor
○ Poor
○ Fair
○ Good
○ Very good
○ Refused
○ Not sure

U. What’s the likelihood that you would recommend this Emergency Department to others?
○ Very unlikely
○ Somewhat unlikely
○ Somewhat likely
○ Likely
○ Very likely
○ Refused
○ Not sure

That ends our questions, and there is nothing further we need from you for this study. Thank you very much for your time. We greatly appreciate it.

RA: Offer honorarium to participant and thank again.

General comment