WALTERS, GLORIA A., Ph.D. Women and Pre-Hospital Delays Associated with Myocardial Infarction. (2015)
Directed by Dr. Patricia Crane. 224 pp.

The purposes of this study were to: (a) describe the prodromal and acute symptoms of myocardial infarction (MI) in women and the relationship to delays in seeking treatment, (b) comprehensively examine other factors associated with delays, and (c) explore novel concepts in relation to delay, such as temporal orientation, time duration estimation, and impulsivity. The theory of unpleasant symptoms served as the framework for this investigation.

A cross-sectional, correlational, non-experimental research design was used. Fifty-six women (85% White, 11% Black, and 5% Native American) were recruited who had been discharged with an MI from a hospital in the southeastern United States. The women were interviewed either in person or by telephone using the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS), a demographic data tool, the Time Orientation Scale, and the Barrett Impulsivity Scale 11 (BIS-11). The mean age was 70.2 ($SD\pm11$), with a range from37-92. The majority of the sample were currently unmarried (70%), unemployed (79%), and experiencing their first MI (79%).

The median delay was 60 minutes, but delays ranged from 10 -20,160 minutes. Age was negatively correlated with symptom scores, with older women reporting lower scores. There was no correlation between symptom scores and delay. Similarly, there was no correlation between the symptom scores and impulsivity. There was no difference in the symptom scores between women who

were present oriented and those who were future oriented. The patient's reported delay in seeking treatment was positively correlated with the duration recorded in the medical record, except for those women who perceived their symptoms life-threating. Thus, perceived threat affected time duration estimation retrospectively. Women who perceived their symptoms as life-threatening delayed longer than those who did not and also underestimated their delays when compared with the delays recorded in the medical record. Age was the only predictor of all symptom score (prodromal, acute and total). None of the regression models were statistically significant for symptom scores predicting delay in this study. Age, race, first-degree relative with MI, modifiable risk factors, temporal orientation, or impulsivity were also not predictors of delay. Future research should investigate factors related to delay in men and women in rural and urban settings.

WOMEN AND PRE-HOSPITAL DELAYS ASSOCIATED WITH MYOCARDIAL INFARCTION

by

Gloria A. Walters

A Dissertation Submitted to
the Faculty of The Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2015

Approved by

_____
Committee Chair

You don't really understand human nature unless you know why a child on a merry-go-round will wave at his parents every time around – and why his parents will always wave back.
William D. Tammeus

I was blessed with wonderful parents and also blessed with wonderful children.

APPROVAL PAGE

This dissertation written by GLORIA A. WALTERS has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair _____
Patricia Crane

Committee Members _____
Susan Letvak

_____
Debra Wallace

_____
Paul Davis

_____
Date of Acceptance by Committee

_____
Date of Final Oral Examination

ACKNOWLEDGEMENTS

I would like to acknowledge first and foremost my Savior Jesus Christ for giving me strength to persevere through any obstacles and for comfort when I was discouraged. Without His love and strength I would be unable to do anything.

I would like to thank my advisor and dissertation chair, Dr. Patricia Crane, for her support, encouragement, and shoulder to cry on. I am forever in her debt for her friendship and mentoring throughout this journey. I would also like to thank the others on my dissertation committee: Dr. Susan Letvak, Dr. Debra Wallace, and Dr. Paul Davis. They have provided sound advice, encouragement, and helped me to think in new ways. It has been my pleasure knowing and working with these extraordinary scholars. I would also like to thank my professors and other PhD students who have inspired and challenged me to work hard to achieve my goals.

I would like to thank my family and friends for your ongoing support and love. Your prayers and encouragement were invaluable. I would also like to give special thanks to my mother, Agatha Walters, and my father, Ellis Walters, who is now in heaven, for believing in me, instilling confidence in me, and encouraging me to always persevere. Thank you to my children, James, Rachel, and William Bradford for your loving support and understanding. To all the women who participated in my study, I offer my sincere gratitude for their willingness to share their experiences and participate in the research process.

I gratefully acknowledge FirstHealth of the Carolinas Foundation for providing financial support for my doctorate.

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CHAPTER I

BACKGROUND

Introduction

Deaths from cardiovascular disease (CVD), which include heart failure, stroke, and coronary events, account for almost one out of three deaths in the United States (U.S.) annually and is the leading cause of death for both sexes, with the overall mortality rate at 229.6 per 100,000 (Mozaffarian et al., 2015). Death rates are higher for Blacks: for White men the mortality rate was 271.9 per 100,000, for Black men 352.4 per 100,000, for White women 188.1 per 100,000, and Black women 248.6 per 100,000 (Mozaffarian et al., 2015). There are approximately 800,000 deaths per year, with nearly a quarter of these potentially avoidable (Centers for Disease Control and Prevention, 2013). Of these deaths from CVD, approximately one out of every six occurs from coronary heart disease (CHD) alone. In fact, almost every 34 seconds someone in the U.S. experiences a coronary event, and approximately every 1 minute 24 seconds someone will die (Mozaffarian et al., 2015). Each year an estimated 635,000 Americans have their first myocardial infarction (MI), and approximately 300,000 individuals experience a recurrent MI. Additionally, there are about 155,000 silent first MIs occurring each year (Mozaffarian et al., 2015). The problem is significant and efforts to prevent or halt CHD are comprised of myriad and extensive approaches. In fact, the American Heart

Association (AHA) goals for 2020 call for improving the cardiovascular health of Americans by 20% and reducing deaths by 20% (Sidney, Rosamond, Howard, & Luepker, 2013).

Cardiovascular disease not only results in considerable mortality, but also exerts a substantial financial toll on the healthcare system and society. In 2011, CHD and stroke resulted in costs of an estimated $320.1 billion, including direct and indirect costs (Mozaffarian et al., 2015). Direct costs include provider care cost, medications, and hospital services. Indirect costs include lost productivity from morbidity and premature mortality. In 2011 an estimated 34% of CVD deaths occurred before the age of 75 years, which is below the average life expectancy of 78.7 years (Mozaffarian et al., 2015). Premature deaths from CHD were more prevalent in non-Hispanic Blacks and residents of the South (Centers for Disease Control and Prevention, 2013). The high morbidity and mortality and related costs validate the importance of prevention.

Measures to address modifiable risk factors for CHD, such as tobacco use, physical activity, diet, and obesity have been coupled with efforts to control comorbidities such as diabetes mellitus (DM), hypertension (HTN), and hypercholesterolemia (Roger et al., 2012). Even after four decades of targeted interventions for tobacco use, almost 20.4% of men and 15.5% of women over age 18 continue to smoke (Mozaffarian et al., 2015). Reported physical activity indicates that 19.2% of girls and 11.2% of boys did not engage in moderate-to-vigorous physical activity in the previous week, although such activity is recommended every

day of the week for young people (Mozaffarian et al., 2015). Thirty-five percent of U.S. adults are obese (body mass index > 30 kg/m^2), affecting all racial and ethnic groups (Mozaffarian et al., 2015). The statistics indicate that a sizable proportion of individuals do not engage in recommended preventive measures for CHD, even after extensive public health education campaigns in recent years.

Risks for CHD are classified as either modifiable or those that are not modifiable. Race and sex are non-modifiable risk factors. Genetics is also classified as a non-modifiable risk factor. The presence of one or more first-degree relatives with CHD approximately doubles the risk of MI both men and women (Bertuzzi, Negri, Tavani, & La Vecchia, 2003). Despite this risk, current emphasis is on preventive measures. Only recently have family history and genetics become an area of interest in identifying opportunities for prevention (Mozaffarian et al., 2015). Individuals with an absence of traditional (classic) cardiac risk factors may have a substantial genetic risk for CHD (Myers, Kiely, Cupples, & Kannel, 1990). Moreover, MIs and deaths from MI exhibit familial clustering occurring in both close and distant relatives (Horne, Camp, Muhlestein, & Cannon-Albright, 2006). Sudden cardiac death in first-degree relatives, even when adjusting for other risk factors, is a stronger predictor of MI and premature cardiac death than other risk factors such as age, sex, race, education, HTN, DM, hypercholesterolemia, body mass index, tobacco use, and physical inactivity (Friedlander et al., 1998). Although, the interactions of risk factors may be important, they have yet to be fully explained; however, heredity14 has a major effect on CHD, especially early onset MI and

sudden cardiac death (Andresdottir, Sigurdsson, Sigvaldason, Gudnason, & Reykjavik Cohort, 2002; Bertuzzi et al., 2003; Ciruzzi et al., 1997; Friedlander, Arbogast, Marcovina, et al., 2001; Friedlander et al., 1998; Hawe, Talmud, Miller, & Humphries, 2003; Horne, Camp, Muhlestein, & Cannon-Albright, 2006; Kaikkonen, Kortelainen, Linna, & Huikuri, 2006; Li et al., 2009; Lloyd-Jones et al., 2010; Marenberg, Risch, Berkman, Floderus, & de Faire, 1994; Murabito et al., 2005; Nilsson, Nilsson, & Berglund, 2004). Clearly, family history is an important variable to assess when ascertaining risk for CHD.

While risk reduction is essential to prevention of MI, when MI does occur prompt recognition of symptoms and early access to definitive treatment are shown to improve outcomes and survival (Goldberg et al., 1998; Jollis et al., 2012; Moser et al., 2006). Unfortunately, almost 70% of deaths from MI occur before the patient even arrives at the hospital (Lloyd-Jones et al., 2010). Treatment for MI should begin within one hour of symptom onset (Moser et al., 2006). Early reperfusion is the definitive treatment for MI, and any delays increase mortality. For example, the 30-day mortality rate for patients that received coronary reperfusion through coronary angioplasty within 60 minutes or less was 1%; however, the 30-day mortality rate increased to 6.4% if the delay in reperfusion was 90 minutes or greater (Berger et al., 1999). Furthermore, delay was found to be a significant predictor of mortality, with the odds of death within 30 days increasing 1.6 times for every 15-minute increment in delay to reperfusion (Berger et al., 1999). Therefore, recognition of symptoms and early access to care are critical to decrease mortality.

Geographical, cultural, social, and economic characteristics often place individuals in rural settings at increased risks of certain diseases and health problems. Access to care in time-sensitive conditions, such as when experiencing an MI, present unique challenges due to geographical distances. The combination of distance to definitive treatment for MI and hesitation in decision-making about seeking care may lead to extended delays and place rural residents at increased risk for poorer outcomes (Baker, McCombe, Mercer-Grant, & Brumby, 2011).

In summary, CHD is the leading cause of death for Americans, leading to high direct and indirect costs for the healthcare system and society (Centers for Disease Control and Prevention, 2013; Go et al., 2013). Educational programs to reinforce preventive measures have had varying degrees of success, yet persons continue to smoke, are obese, and engage in little physical activity (Go et al., 2013). Further emphasis on modifiable and non-modifiable risks factors and early access to care are warranted to reduce the mortality and morbidity associated with CHD.

Significance

Although long believed to be predominantly a man's problem, women are as much at risk for developing CHD and experience disproportionate mortality and morbidity. In fact, 42% of women die within one year after MI as compared with 24% of men (Agency for Healthcare Research and Quality, 2012). Younger women, those less than 50 years old, are twice as likely to die as men within one year of their first MI (Vaccarino, Parsons, Every, Barron, & Krumholz, 1999). In a recent study, women with MI had an overall in-hospital mortality rate of 14.6% compared with

10.3% for men (Canto et al., 2012). This may be partly due to the fact that women usually develop CHD 10 years later in life than men and are more likely to have other comorbidities at the time of their MI (Agency for Healthcare Research and Quality, 2012).

Compulsory performance of gender roles may also be a factor in the higher mortality rate for women. Women view home activities as important to self-identity and tend to take more responsibility for housework and family caregiving than men (McCormick & Bunting, 2002). After MI, women are discharged back into their workplace (their homes) while men are encouraged to take time off from their work. Even though women may be employed outside of the home, women may draw much of their self-identity from their homemaker role. Thus, it may difficult for women to relinquish those duties, even after an MI, to recover (McCormick & Bunting, 2002). This role identification may affect mortality rates after MI independent of biological differences and are not taken to account in explaining the MI experience for women in previous research.

Lack of awareness of how CHD affects women may also contribute to the higher mortality rates. Only 30% of women in 1997 were aware that CHD was the leading cause of death for women. By 2009 women's awareness had almost doubled to 54%. While a significant increase, this is only slightly more than half of women that are aware of their risks. Of further concern is that Black and Hispanic women remain significantly less aware of their risks than White women, with only 36% of minority women currently aware that CHD is the number one killer of women

(Mosca, Mochari-Greenberger, Dolor, Newby, & Robb, 2010). Despite current public campaigns to educate women about their risks, such as the "Go Red for Women" campaign launched by the American Heart Association in recent years, women's lack of awareness persists (American Heart Association, 2014; Carey & Gray, 2012). Hence, mass public education and campaigns may not be the most effective and efficient methods for increasing women's awareness (Moser et al., 2006). Regardless of the method, awareness of susceptibility is important in decision-making.

Women's lack of awareness of susceptibility may lead to delays in accessing care or seeking treatment with symptoms of MI. In fact, women delayed longer, 28 minutes to 3.5 hours, after symptom onset than men before seeking treatment (DeVon, Hogan, Ochs, & Shapiro, 2010; Ting et al., 2008). The median time from symptom onset to presentation to the Emergency Department (ED) ranged from 3-9.5 hours for women and 2.8-6 hours for men (DeVon et al., 2010; Diercks et al., 2010). Delay may further contribute to the poorer outcomes noted with women.

When individuals recognize symptoms as cardiac in origin, they are more likely to seek prompt treatment (Fukuoka et al., 2007). Severe left or central chest pressure or pain is the classic symptom associated with MI. Women's symptoms often differ from the classic symptoms. In an early study, McSweeney found that less than a third of women experienced severe pain, while 25% experienced little or no chest pain (McSweeney, 1998). In fact, 64% of the women who died suddenly with MI had reported no symptoms at all (Roger et al., 2012). It is estimated that 21% of

all new and recurrent MIs are silent (Mozaffarian et al., 2015). Perhaps many had symptoms, but did not recognize them as cardiac in origin or healthcare providers did not recognize them as cardiac. Consequently, this was validated in a study. Women who presented for treatment with classic cardiac symptoms were diagnosed more rapidly, while those with more symptoms not matching the classic male symptoms reported more difficulty with diagnosis (McSweeney, Lefler, & Crowder, 2005). Up to 96% of women experienced prodromal symptoms before their MI, such as fatigue, diaphoresis, chest discomfort (late sign), shortness of breath, anxiety, sleep disturbances and gastrointestinal symptoms (McSweeney, O'Sullivan, et al., 2010; McSweeney, O'Sullivan, Cody, & Crane, 2004). Using the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS), one study found that pre- and peri-menopausal women reported more prodromal symptoms, when compared with men and menopausal women (Norris, Hegadoren, Patterson, & Pilote, 2008). It is important to note that many of the prodromal symptoms experienced by those who had an MI are also similar to symptoms experienced in peri-menopause or with subclinical depression. These similarities may also contribute to delays in seeking treatment and confuse healthcare providers' diagnosis once women seek treatment. Public health campaigns have done little to reduce delays in seeking treatment for symptoms of MI (Mooney et al., 2012). Thus, other factors may be involved with delay and must be explored. Three novel factors that may be associated with delay and women's

experiences with symptoms of an MI are time duration estimation, temporal orientation, and impulsivity.

Estimation of time duration is essential in navigating everyday life, such as estimating how long it will take to cross the street in traffic and how long an activity will take versus how much time is available to complete the activity (Block & Zakay, 1997). Time duration estimation is measured both prospectively and retrospectively; however, prospective time duration judgments are a function of cognitive processes, while retrospective time duration judgments are memory-based (Block, 1989; Block & Zakay, 1997). These time perceptions are affected by stimuli. A heightened sense of arousal or increased external stimuli, such as contextual changes, interruptions, mood changes, and environmental changes create shorter perceived time duration when queried prospectively ("time flew"). Conversely, in retrospective time durations estimations, if there are more external stimuli, then the retrospective perceived time duration estimation will be longer, or retrospectively time may be perceived as passing more slowly ("took forever") (Block & Zakay, 1997). In summary, increased stimuli during an interval will be estimated prospectively as passing quickly, but retrospectively time duration will seem longer. For example, in very high stress situations, like motor vehicle accidents, victims often remember "time standing still." Time duration perception may be further altered when multiple symptoms are experienced. This may have implications for women in that they may perceive they have plenty of time to access care for symptoms of MI.

Cognitive load also affects time duration judgments in the prospective and retrospective time estimation paradigms. Cognitive load has been described as the load imposed on an individual's cognitive system by performing a particular task or tasks (Paas, Tuovinen, Tabbers, & Van Gerven, 2003). Increased cognitive load in the prospective paradigm decreased the subjective time estimation, while increased cognitive load in the retrospective paradigm increased the subjective time estimation (Block, Hancock, & Zakay, 2010). Thus, a heightened sense of arousal affects time estimation duration. Those experiencing symptoms of MI may have altered time estimations, and as such, perceive time as passing quickly prospectively, but more slowly retrospectively. Of note, studies have shown that time duration estimations are fairly consistent across cultures and races; yet, significant differences in time duration estimations with aging and between genders occur (Block, Hancock, & Zakay, 2000; Block, Zakay, & Hancock, 1998). Because there are significant gender differences in time estimation, women may experience an altered sense of time in threatening situations, and therefore may delay longer than men. Further exploration of time duration estimation in women experiencing stressful situations, an MI, is needed.

Temporal orientation has a powerful influence on behaviors and reflects an individual's propensity to behave and think according to either immediate or future consequences (Graham, 1981). Temporal orientation is strongly affected by culture, socio-economic status, and education (Brown & Segal, 1996). Individuals with a future temporal orientation are more likely to be proactive and engage in healthy

activities such as accessing health care when experiencing symptoms of MI to avoid future negative consequences (Brown & Segal, 1997). Little is known about how temporal orientation influences proactive behaviors in threatening situations, as an MI. Yet, there is evidence that in high threat situations individuals become more reactive (Alberts & Dunton, 2008). Experiencing symptoms of MI may be perceived as a life-threatening situation. Further examination of the symptom experience and evaluation of temporal orientation may provide additional information about treatment seeking delays in women.

Impulsivity is closely related to time duration estimation and temporal orientation. Impulsivity is defined as predisposition to rapid or unplanned reactions to stimuli, both internal and external, without regard for potential negative consequences (Moeller, Barratt, Dougherty, Schmitz, & Swann, 2001). Highly impulsive individuals prefer immediate rewards and discount potential long-term negative consequences (Martin & Potts, 2009). Consequently, time perception is an important factor in weighing consequences as rewards. Positive consequences, perceived as occurring sooner, are valued over those that are delayed (Wittmann & Paulus, 2008). Conversely, for those individuals who are more impulsive, negative consequences that occur later are perceived as less threatening than those occurring sooner. This potential for negative consequences (as perceived in the present time) has a limited influence in planning (Wittmann & Paulus, 2008). There is evidence that impulsive individuals may have an increased cognitive processing speed, which may be conceptualized as a faster cognitive pacemaker (Barratt, 1983).

Interestingly, there is a positive correlation between impulsivity and overestimation of time duration. Impulsive individuals perceive that something takes longer than it really does (Berlin & Rolls, 2004; Berlin, Rolls, & Kischka, 2004; Reynolds & Schiffbauer, 2004; Wittmann & Paulus, 2008). In summary, the more impulsive an individual is, the longer the time interval is perceived. Consequently, impulsive individuals experiencing symptoms of MI may perceive time is passing more slowly and thus delay, thinking they have plenty of time.

Poorer outcomes for women after MI are concerning and have been attributed to a number of reasons, including delays in seeking treatment (McSweeney, Lefler, Fischer, Naylor, & Evans, 2007; O'Donnell, McKee, O'Brien, Mooney, & Moser, 2012). The symptom experience for women is often different than the classical cardiac symptoms experienced by men; therefore, presentation may be confusing for both the women and healthcare providers (McSweeney, Pettey, Souder, & Rhoads, 2011). Further research to understand delays using a novel lens is important to understand delay times in women with MI.

Purpose of Study

The purposes of this study were to: (a) describe prodromal and acute symptoms of MI in women and the relationship to delays in seeking treatment; (b) examine temporal orientation, and impulsivity related to delays in seeking treatment in women with MI; and (c) comprehensively examine factors associated with symptoms (prodromal and acute) and delay.

Conceptual Framework

A paradigmatic shift has occurred in the area of symptom management research within the last 20 years (Barsevick, Whitmer, Nail, Beck, & Dudley, 2006). "Conceptual models are used by researchers as a framework to organize and visualize conceptual relationships within a given phenomenon"(Brant, Beck, & Miaskowski, 2010, p. 229). The middle-range theory of unpleasant symptoms serves as a framework to conceptualize symptoms experienced in a variety of settings (Lenz, Suppe, Gift, Pugh, & Milligan, 1995).

Initial work on the theory of unpleasant symptoms was focused on the concepts of dyspnea and fatigue during childbirth, while further work was done with patients having chemotherapy, those having bariatric surgery, and those with symptoms of CHD (Eckhardt, Devon, Piano, Ryan, & Zerwic, 2014; Lenz et al., 1995; Myers, 2009; Tyler & Pugh, 2009). The theory has demonstrated value in its parsimony, yet holistically describes the symptom experience in multiple settings with multiple symptoms, with symptoms often occurring in clusters (Lenz, Pugh, Milligan, Gift, & Suppe, 1997). The theory of unpleasant symptoms is comprised of three major components: the symptom experience, influencing factors that affect the symptom experience, and the performance or outcome (Lenz et al., 1997).

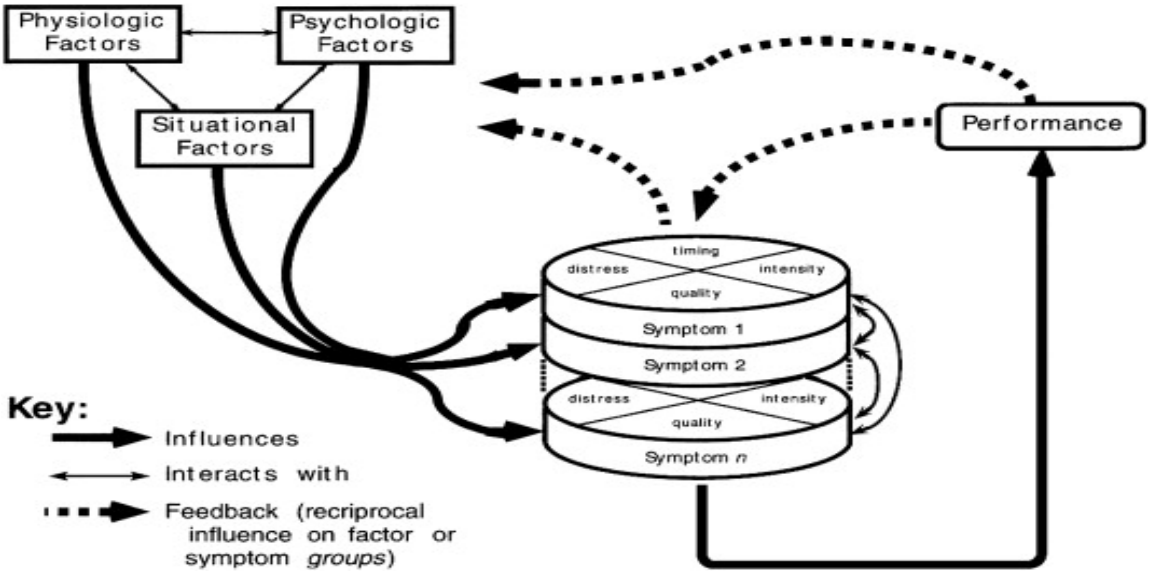

Figure 1. The Theory of Unpleasant Symptoms. (Lenz et al., 1997).

Symptom Experience

The symptom experience can be described according to its duration, intensity, quality, and distress (Lenz et al., 1995). Additionally, more than one symptom may be present, such as chest discomfort and nausea. These symptoms interact and may synergistically influence performance (Lenz et al., 1997). Women may try to link their symptoms together to create a pattern, noting differences and similarities with past experiences and reflecting on what the symptoms mean and assigning a cause (Davis et al., 2013). "The first step in the process of forming a symptom pattern is recognition of bodily cues signaling that something in the body has changed" (Davis et al., 2013, p. 431). The duration of the symptoms may include prodromal and acute phases. The prodromal phase may include fatigue, sleep disorders, anxiety, discomfort in the chest or shoulder blades, shortness of breath,

gastrointestinal symptoms, such as nausea and indigestion, and neurological symptoms, such as dizziness, headache, or visual changes (McSweeney, & Crane, 2000; McSweeney, Cody, & Crane, 2001). Over 90% of women experience prodromal symptoms before the acute symptoms of MI (McSweeney &. Crane, 2000; McSweeney et al., 2005; McSweeney, O'Sullivan, et al., 2010). These vague symptoms, which are not the classic symptoms of MI, may generate uncertainty. These women often continue with activities of daily living, while continuing to monitor the symptoms (Davis et al., 2013). Conversely, those that immediately recognized they were having an MI described their symptoms as having a sudden onset and becoming steadily worse or having an acute onset (Davis et al., 2013). Also, those that described their pain as severe were more likely to recognize their symptoms as cardiac in origin. Those with classical cardiac symptoms (most likely as described by males) also recognized symptoms as cardiac more readily. Finally, those that found their symptoms disabling to the point of inability to continue activities of daily living were more likely to attribute their symptoms to MI and seek more immediate treatment (Davis et al., 2013). Thus, each symptom experience and the cumulative effect of several symptoms are unique for each individual. All are conceptualized to act individually or synergistically to affect the symptom experience.

Influencing factors. Influencing factors, antecedents for the symptom experience, include physiologic, psychological, and situational factors (Brant et al., 2010; Lenz et al., 1997). The symptom affects performance, including self-care and

treatment-seeking behaviors. A feedback loop provides a means of how performance can affect symptoms as well as the influencing factors (Brant et al., 2010) (See Figure 1).

Physiologic, psychological, and situational factors affect the symptom experience. Physiologic factors include the disease state or physical condition (Lenz et al., 1997). In this study, physiologic factors will include age, race, first-degree relative with CHD, and modifiable risk factors (tobacco use, physical inactivity, DM, HTN, hypercholesterolemia, and body mass index). Psychological factors include mental state, mood, and affective reaction (Lenz et al., 1997). In this study, psychological factors will include time duration estimation, impulsivity and temporal orientation, as these factors are associated with accurate timing of responses, reactions to threats, and planning for future events (Block & Zakay, 1997; Graham, 1981; Moeller et al., 2001). Situational factors include marital status, social support, care-giving responsibilities, employment, access to healthcare, and lifestyle behaviors (Lenz et al., 1997). In this study situational factors will include distance to the hospital.

Outcomes

Outcomes include patient performance: functional status (role performance), cognitive functioning (problem solving), and physical performance (activity level). Performance in this study would include seeking treatment for symptoms.

In summary, physiologic factors combined with psychological factors and situational factors affect the symptom experience and may influence performance.

Multiple symptoms may have a synergistic response and affect both performance and physiologic, psychological, and situational factors (Lenz et al., 1997). This model provides a framework to comprehensively examine factors associated with MI and delay in seeking treatment.

Definitions

1. Demographic characteristics: Demographic characteristics are the characteristics of the sample population operationalized as age and race.
    a. Age: Age is defined by length of existence extending from the beginning of life to any given time (Merriam-Webster, 2014). Age was operationally defined as the stated age of the participant at the time of their MI.
    b. Race: A category of humankind that shares certain distinctive physical traits, such as Black, White, or Hispanic (Merriam-Webster, 2014). It was operationally defined as the self-reported race of the participant.
2. First-degree relative: First-degree relatives are those that share 50 percent of their genes with another particular family member and may include parents, offspring, and siblings (National Library of Medicine, 2014). First-degree relatives with CHD were self-reported, as this information is often not included in the medical record.
3. Modifiable risk factors: Several risk factors for developing CHD have been identified and can be categorized into either factors that are modifiable or those that are immutable, such as age, race, and family history (Nilsson et al.,

2004). Modifiable risk factors for CHD include hypercholesterolemia, hypertension (HTN), diabetes mellitus (DM), tobacco use, physical inactivity, and obesity. They were operationalized as a summative score of risk factors.

a. Hypercholesterolemia is defined as having higher than the desirable level of total cholesterol in the blood. Usually a total cholesterol level over 200 mg/dl is considered high (National Library of Medicine, 2014). The participants self-reported whether they had been told by a healthcare provider in the past that they have hypercholesterolemia and/or reported being prescribed medications for hypercholesterolemia.
b. Hypertension is defined as having a blood pressure of >150/90 for patients over 60 years old that do not have diabetes or chronic kidney disease, and a blood pressure of >140/90 for patients 18-59 years old without major comorbidities, and for those over 60 years old with diabetes, chronic kidney disease, or both A (Page, 2014). The participants self-reported whether they have been told by a healthcare provider in the past that they had hypertension and/or self-reported being prescribed antihypertensive medication.
c. Diabetes mellitus (DM) is defined as a disease which blood glucose levels are higher than normal, either resulting from inadequate production of insulin by the pancreas or the inability of the body to use insulin (Centers for Disease Control and Prevention, 2014). The

participants self-reported whether they have been told by a healthcare provider in the past that they had diabetes mellitus and/or self-reported being prescribed medication for diabetes.

d. Tobacco use is defined as the use of tobacco products at the time of the MI, including cigarettes and cigars, and was obtained from self-report.

e. Physical activity involves movement and burning calories, such as walking, biking, swimming, or running. Physical inactivity is not meeting the recommended 150 minutes of moderate physical activity per week or 74 minutes of vigorous activity weekly (American Heart Association, 2013). Physical inactivity was ascertained through self-report.

f. Body mass index: Body mass index is defined as a measure of body fat that is the ratio of the weight of the body in kilograms to the square of its height in meters, calculated as weight in kilograms divided by height in meters, expressed as weight (kg)/[height (m)]^2 (Merriam-Webster, 2013). An individual with a BMI of below 18.5 is considered underweight, 18.5-24.9 is considered normal, 25.0-29.9 is considered overweight, and above 30 is considered obese (Centers for Disease Control and Prevention, 2011). The BMI was calculated based on height and weight first recorded in the medical record and recorded as a continuous variable.

4. Distance: Distance is the degree or amount of separation between two points (Merriam-Webster, 2014). The geographic measurement of miles where the person decided to seek treatment for symptoms of MI to the Emergency Department was operationalized as the distance travelled to seek care. The participant reported their location of origin, and the distance to the ED was calculated through the use of navigation software.
5. Temporal orientation: Temporal orientation is defined as an individual's propensity to behave and think according to immediate or future consequences (Graham, 1981). Temporal orientation was operationalized as either present, future, or mixed by scores on the Time Orientation Scale (Lukwago, Kreuter, Bucholtz, Holt, & Clark, 2001).
6. Time duration estimation: Time duration estimation is defined as a cognitive process involving attention and memory and may be conceptualized as an internal clock or a pacemaker that judges when a time interval has passed in the prospective paradigm and how long an interval lasted in the retrospective paradigm (Block et al., 2000). Based on our knowledge about time estimation, emotional state, cognitive load, and changes occurring with aging, time duration estimation was operationally measured as the answer to the following question: "How long did you have the symptoms before you had contact with a healthcare provider, either with emergency medical services or at the hospital?"

7. Impulsivity: Impulsivity is defined as an individual's tendency to have rapid, unplanned reactions to stimuli (either internal or external), without regard for consequences (Moeller et al., 2001). Impulsivity was operationally defined as the total score on the 30-item Barratt Impulsivity Scale (Stanford et al., 2009).
8. Symptoms: Symptoms are patients' perceived indicators of changes in normal functioning. Symptoms may occur in isolation or more than one may be experienced simultaneously (Lenz et al., 1997). They can further be categorized as prodromal or acute. The symptom experience was operationalized as the prodromal, acute, and total scores on the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS) (McSweeney et al., 2004).
    a. Prodromal symptoms: Prodromal symptoms appear intermittently prior to an MI, either as new symptoms or commonly experienced symptoms that increased in intensity or frequency prior to the MI. These symptoms either revert back to previous intensity and frequency or disappear altogether after the MI (McSweeney et al., 2004). The prodromal symptoms were operationalized as the prodromal score on the MAPMISS.
    b. Acute symptoms: Acute symptoms are the onset of unrelenting symptoms leading to up to the diagnosis of MI. These often include chest pain/discomfort or shortness of breath (McSweeney, Cleves,

Zhao, Lefler, & Yang, 2010). The acute symptoms were operationalized as the acute score on the MAPMISS.

c. Total symptoms: The total symptoms were operationalized as the total score on the MAPMISS.

9. Prehospital delay: Three phases of delay have been identified: a) symptom onset to decision to seek treatment; b) decision to seek treatment to first medical contact (emergency medical services or direct presentation to the hospital); c) first medical contact to arrival at the hospital (Moser et al., 2006). The onset of acute symptoms until the first medical contact was the focus of interest for the proposed study and was operationalized as the self-reported time of acute symptom onset to first in-person medical contact, either with emergency medical services or the hospital.

Specific Aims and Research Questions

The specific aims and research questions to address the study purpose were:

1. Describe prodromal and acute symptoms of MI in women and the relationship to delays in seeking treatment.

   Q1: What was the mean prodromal score on the MAPMISS?

   Q2: What was the mean acute score on the MAPMISS?

   Q3: What was the mean total symptom score on the MAPMISS?

   Q4: What was the mean delay time for women with MI?

   Q5: Was there a correlation between the symptom scores (prodromal, acute, and total) on the MAPMISS and delay in seeking treatment?

2. Examine time duration estimation, temporal orientation, and impulsivity related to delays in seeking treatment in women with MI.

   Q1: What was the average score on the 30-item Barratt Impulsivity Score (BIS-11)?

   Q2: What was the proportion of women with a present temporal orientation?

   Q3: What was the proportion of women with a future temporal orientation?

   Q4: Was there an association between time delay, impulsivity, temporal orientation, and symptom scores (prodromal, acute, and total)?

   Q5: Was there a relationship in time delay, impulsivity, and temporal orientation?

   Q6: Did time duration estimation (delay) remembered by the participant correlate with time delay recorded in the medical record?

3. Comprehensively examined the influence of physiologic, psychological factors, and situational factors on symptoms and delays in seeking treatment in women who have experienced an MI.

   Q1: Were physiologic (age, ethnicity, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation, time delay, and impulsivity), and situational factors (distance to ED) related to the symptom experience (acute, prodromal, and total scores)?

   Q2: Did physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity), and situational factors (distance to ED) explain delay in seeking treatment?

Q3: When controlling for physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity), and situational factors (distance to ED), did symptoms (acute, prodromal, and total) explain delay in seeking treatment?

Assumptions

There were basic assumptions that formed the underpinnings of this study. The first assumption was that concepts such as symptom experiences, time duration estimation, temporal orientation, and impulsivity can be quantified. Secondly, the answers provided to questions on the instruments, tools, and scales by the participants were accurate and truthful. Finally, there was the assumption that the medical record accurately represented the truth.

Summary

The purposes of this study were to describe the symptom experience of women having an MI, explore the factors that influence the symptom experience, and determine how these factors influence or predict performance or outcome (treatment seeking). The theory of unpleasant symptoms was the framework used to guide this study. Results of this study may assist researchers and clinicians to identify other explanations for treatment delays in women with MI and design interventions to reduce delays and disparities in the care and health outcomes of women with MI.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

Reasons for women's delays in seeking treatment with symptoms of myocardial infarction (MI) have been studied extensively with a myriad of factors identified in the literature. These include the symptoms experienced by women with MI, severity of the symptoms (mild or vague symptoms), other chronic illnesses that contribute to the uncertainty about the meaning of the symptoms, perceptions of the severity of threat, lack of knowledge about risk for coronary heart disease (CHD) for women, self-management of symptoms, taking care of personal matters before seeking treatment, seeking the advice of others, lack of insurance, perceived indifference by healthcare providers or fear that there is nothing wrong, and they will be perceived as "nervous" (Davis et al., 2013; Lefler & Bondy, 2004; McCormick & Bunting, 2002; McSweeney et al., 2005). Important determinants of behavior include impulsivity and temporal orientation; however, these factors have not been studied in relation to their influence on behavior in potentially life-threatening situations. Also, time duration estimation is another factor that may affect treatment seeking delays in threatening situations, but also has not been studied in the previous research of the MI experience. The theory of unpleasant symptoms will be used as a theoretical framework for the study of factors that influence treatment

seeking in women with MI. The physiological (age, race, and first-degree relative with MI), psychological (temporal orientation, time duration estimation, and impulsivity), and situational factors (distance to the emergency department and modifiable risk factors), influencing the symptom experience will be examined to determine effects on treatment seeking delays.

The purpose of this literature review was to describe what is known currently about delays, women's experiences with symptoms of MI, women's risks for CHD, and provide a conceptual view of the constructs of time duration estimation, temporal orientation, and impulsivity and their possible relationship with treatment delays in women with MI.

Delays in Treatment

Pre-hospital delays in seeking treatment with symptoms of MI lead to increased mortality and morbidity. Since the severity of the MI is related to the length of time the myocardium is deprived of blood due to a partial or complete blockage of a coronary artery, early treatment is essential in reducing mortality and morbidity. Thus, any delay in treatment is concerning because it may affect outcomes. Timely intervention for MI is essential in preventing premature death and disability (Mooney et al., 2012). These interventions include reperfusion therapies, such as thrombolysis and angioplasty (Brady, Perron, & Riviello, 2001). In fact, the American Heart Association (AHA) recommends activation of emergency medical services within 5 minutes after symptom onset (American Heart Association, 2014); yet, this rarely occurs. A study found that less than 25% of

patients with MI called 911, yet women < 65 years old were twice as likely to call 911 as men (Newman et al., 2013). There were no differences in 911 activation between women > 65 years old and men of any age. Perhaps the older women attributed their symptoms to age or other co-morbidities. Another study found that women, those with diabetes mellitus, and those with no history of CHD waited longer to call 911 (Sullivan et al., 2014). Thus, age is important to measure in delay in seeking treatment with symptoms of MI in women.

Delays in decision-making often accounts for up to 75% of pre-hospital delay time in patients with MI (Rasmussen, Munck, Kragstrup, & Haghfelt, 2003). "Decision delay is described as the lapse of time from symptom onset to the initial decision to seek help and is considered to be the main component of pre-hospital delay" (O'Donnell & Moser, 2012, p. 334). Although decision delays are concerning for both men and women, women tend to delay longer. Median delays range from 3-9.5 hours for women compared with 2.8-6 hours for men (DeVon et al., 2010; Ting et al., 2008). Delays can even extend for days for both sexes in some cases (Reilly, Dracup, & Dattolo, 1994). Decision delay has 2 components: appraisal delay and illness delay. Appraisal delay is the period of time from symptom onset to the time when the individual became concerned about the symptoms. Illness delay is the time from when the individual became concerned about the symptoms until they sought treatment. It was found that women reported significantly longer appraisal times, but did not differ significantly in illness delays from men (Farquharson, Johnston, & Bugge, 2012).

Older individuals, women, Blacks, and those experiencing intermittent symptoms experience longer pre-hospital delays (DeVon et al., 2010; Gibler et al., 2001). In a synthesis of the literature of the reasons for delays in women with symptoms of MI, three categories explaining delays were noted: clinical, socio-demographic, and psychosocial factors (Lefler & Bondy, 2004). Clinical factors found to be most significantly associated with delays included atypical (or non-classical) symptoms and severity of symptoms. Slow and fast-onset MIs have been described in the literature (O'Donnell & Moser, 2012). Most MIs have a slow gradual onset and do not present with the classical acute symptoms. For this reason, symptoms may be attributed to other causes; because the experience of the MI does not match the expectations of what an MI would be like for the individual. The patients with slow-onset MI typically have longer treatment seeking delays than those with fast-onset MI (O'Donnell & Moser, 2012). Furthermore, patients with slow and fast-onset MI differ in behaviors during the symptom experience that contribute to delays. Those with slow-onset MI tend to telephone or visit their primary care provider for advice and are less likely to call an ambulance (McKee et al., 2013; O'Donnell, McKee, Mooney, O'Brien, & Moser, 2014). They are also more likely to try a "wait-and-see" approach after self-medicating at home, while those with fast-onset MI will abandon attempts at self-medication sooner when the symptoms do not improve. This substantially reduces delays (McKee et al., 2013; O'Donnell et al., 2014).

Socio-demographic factors have been identified that increased delays included: female gender, older individuals, minority status, lower income, lower

educational level, those living alone, lack of insurance, and symptoms occurring after office hours (Goldberg, Yarzebski, Lessard, & Gore, 2000; Leslie, Urie, Hooper, & Morrison, 2000; Sheifer et al., 2000). Psychosocial factors included correctly attributing the symptom as cardiac in origin, perceived seriousness of symptoms, low perceived risk for CHD, self-management of symptoms, seeking advice from others, employing other coping strategies, awareness of risks for MI, symptoms not matching perceived expectations of MI, and uncertainty of meaning of symptoms (Richards, Reid, & Watt, 2002). Hence, a variety of factors may influence decision-making in women experiencing symptoms of MI.

Patients' interpretations of symptoms of MI influence delays in seeking treatment. Women, those with lower educational status, a migration background, and current smokers were more likely to misinterpret symptoms, and those who misinterpret symptoms were more likely to have a delay time of > 2 hours (Kirchberger, Heier, Wende, von Scheidt, & Meisinger, 2012). In addition to misinterpretation of symptoms, patients often experience a wide range of emotions that influence treatment seeking and contribute to delays. These feelings include fear of having a serious illness and powerlessness about making decisions about the "correct" way to access the healthcare system (Nymark, Mattiasson, Henriksson, & Kiessling, 2014). Further, many feel hesitant to cross a boundary and wonder how sick they should feel before seeking treatment or worry about having an ambulance show up with lights and sirens, and it turn out to be nothing. They may also have feelings of failure for not living up to expectation of themselves as a healthy person

and fear being a burden to others. Consequently, they may label their symptoms with less threatening explanations or seek to protect others by not bothering or frightening family or friends with their symptoms (Nymark et al., 2014).

Low perceived risk also contributes to symptom misinterpretation and delays (Dracup & Moser, 1997; Johnson & King, 1995; Lefler & Bondy, 2004; Nymark et al., 2014). Many women are not aware that CHD is the leading cause of death for women, and thus may minimize their risk for CHD (Meischke, Sellers, et al., 2000). Women, regardless of race or ethnicity, perceive that men who are obese, stressed, or who smoke are those primarily at risk for CHD (Arslanian-Engoren, 2007). Women often do not perceive themselves at risk for CHD unless they have a family history of CHD or are obese. Additionally, those with a history of hypertension and hyperlipidemia were more likely to interpret their MI symptoms as cardiac in origin (Kirchberger et al., 2012). Both men and women tend to be overly optimistic when queried about their own risk for CHD (Avis, Smith, & McKinlay, 1989). Unfortunately, many women continue to believe that they are at greater risk of dying from breast cancer than CHD (Collins, Dantico, Shearer, & Mossman, 2004; Mosca et al., 2000; Muñoz Lr, 2010).

Public health campaigns to raise awareness of symptoms of MI and the importance of early treatment have had limited success in reducing the decision-making phase of pre-hospital delay (Mooney et al., 2012). Numerous interventions to raise awareness of the importance of seeking early treatment for symptoms of MI and reducing delays have been reported in the literature. Most have involved mass

media public campaigns (Bett, Aroney, & Thompson, 1993; Blohm, Hartford, Karlson, Karlsson, & Herlitz, 1994; Dracup et al., 2009; Gaspoz et al., 1996; Ho, Eisenberg, Litwin, Schaeffer, & Damon, 1989; Luepker et al., 2000; Meischke et al., 1997; Moses et al., 1991). In a review of several studies involving mass media campaigns to reduce delay, only 2 of the 7 studies showed statistically significant reductions after the interventions (Mooney et al., 2012). One large study involved individualized education and included an intervention and a control group. Unfortunately, there were no significant reductions in delays between the 2 groups (Dracup et al., 2009). A more recent large randomized controlled trial in Europe found that in patients with known CHD, pre-hospital delays times were significantly reduced in the group that received a 40-minute educational session about seeking treatment early with symptoms, as compared with the control group, who did not get the additional educational session (Mooney et al., 2014). This was the first intervention study to report a reduction in pre-hospital delay in individuals with symptoms of MI.

Women's Disparities in Cardiovascular Disease

Physiologic differences between the sexes affect diagnostic and treatment options for women. Anatomically women have smaller coronary arteries, thus being more difficult to stent; have more breast tissue, leading to difficulty with interpretation of some diagnostic tests; and have increased frequency of mitral valve prolapse and left ventricular hypertrophy, leading to more complicated recoveries (Jacobs, 2009; McSweeney et al., 2011). Biological differences also

include lower hematocrit levels, which affect oxygen-carrying capability of the blood; variable estrogen levels, which have been linked to endothelial changes in blood vessels; electrophysiology differences affecting action potentials and prolonging depolarization; and differences in the autonomic nervous system, which affects orthostatic tolerance and resting heart rates (Barantke et al., 2008; McSweeney et al., 2011). All of these factors lead to more complications from coronary stenting and coronary artery bypass grafting (CABG). However, there is difficulty attributing the increased complications associated with stenting and CABG to any one cause, since women are typically 7-20 years older than men at the onset of disease and also have more co-morbidities due to their more advanced age at onset of CHD (Hawthorne, 1994; Lloyd-Jones et al., 2009). In fact, the average age for first MI in women is 71.8 years, while for men is 65 years (Mozaffarian et al., 2015). In the 20th century lifespans increased, and women started living long enough to develop CHD (McCormick & Bunting, 2002). Early in the last century, many in the medical establishment questioned whether CHD was actually a disease or just a part of the normal aging process. However, when it occurred in younger men, it was very concerning. Apparently it was viewed as a disease process instead of normal aging only when it affected younger individuals.

Historically, women have either been underrepresented in medical research, or when women were included in clinical trials, sex of the participants were not noted in study findings. Thus, it cannot be determined whether research outcomes were affected by other unidentified confounding variables, such as sex (Gochfield,

2010; Nieuwenhoven & Klinge, 2010). Women of childbearing age were almost always completely excluded from clinical trials due to fear of pregnancy and fetal injury. Also concerns about fluctuating hormone levels were believed to make women unpredictable research subjects. Researchers presumed that findings obtained in studies with men could be generalized to women without taking into account differences in body size, proportion and distribution of body fat, and hormonal variations (Merkatz, 1998). "The end result has been generations of medications, tested only on men, being prescribed for and used by women with little more than anecdotal knowledge of their safe use in this patient population" (McCormick & Bunting, 2002, p. 822). One example of this is treatment of hypertension, a known risk factor for CHD. Hypertension is serious problem for both sexes, but research for anti-hypertensive medications for post-menopausal women was conducted on castrated male rats (Perry, 1994). Other large studies for hypertensive medications, including beta blockers and diuretics, excluded women participants altogether (Wikstrand et al., 1988; Wilhelmsen et al., 1987).

Women presenting with non-classical cardiac symptoms are more likely to have their symptoms attributed to psychological issues by healthcare providers (Nieuwenhoven & Klinge, 2010). Surprisingly, a study found that more than 80% of physicians were unaware that CHD was the leading cause of death in women (Mosca et al., 2005). This lack of awareness resulted in women being labeled as "nervous" or having "cardiac neurosis" (McCormick & Bunting, 2002). Physicians also typically take longer to evaluate women presenting with atypical symptoms (Moser et al.,

2007). In fact, the healthcare system in general is not consistently responsive to women with symptoms of MI, and this may delay workup, diagnosis, and further treatment (Lichtman et al., 2015). Women who present with cardiac symptoms typically receive less aggressive care than men. For example, women receive fewer referrals for coronary angiography, which is more commonly known as cardiac catheterization and diagnostic for CHD, and revascularization procedures, such as CABG and percutaneous coronary interventions (Ayanian & Epstein, 1991; Cameron, Song, Manheim, & Dunlop, 2010; Diercks & Miller, 2008; Hess et al., 2010; Steingart et al., 1991). Race also affects physicians' decisions about referral for angiography, with non-White women being referred less (LaVeist, 2002). Women also are prescribed fewer medications that are shown to be beneficial after MI, such as beta blockers, aspirin, or glycoprotein IIb/IIIa inhibitor therapy (Gochfield, 2010; Hoekstra et al., 2005). There appears to be no accounting for the differences between the sexes in disease management strategies.

Outcomes for women following MI are worse. Forty-two percent of women who experience MI die within one year, as compared with 24% of men (Agency for Healthcare Research and Quality, 2012). Additionally, women have higher inpatient mortality rates after experiencing an MI (Agency for Healthcare Research and Quality, 2012; Kanamasa et al., 2004). Younger women (<65 years) also have higher rates of readmission following MI (Dreyer, et al., 2015). When compared with men, women also had a lower level of physical functioning and quality of life, and a higher prevalence of angina one month after MI (Garavalia et al., 2007). Furthermore, one

study showed that women had lower health status scores measuring symptoms, functioning, and quality of life than men from baseline hospitalization up to one year following MI (Dreyer, et al., 2015). Younger women also (18-55 years old) had lower pre-MI health status scores, including worse disease-specific function (more angina), worse physical function, and poorer quality of life than men (Dreyer, et al., 2015). They also had more co-morbidities than men.

Women of lower socioeconomic status are especially vulnerable to worse outcomes. The negative impact of age, gender, race and/or ethnicity, and economic location contribute to older women suffering the effects of poverty more than men (Pearsall, 1997). Those of lower socioeconomic status are at higher risk of cardiac events and require more intensive resources for symptom management; for example, significantly higher drug and hospitalization costs (Shaw et al., 2008). In addition, lower income women report greater functional disability and demonstrate lower survival rates at the 5-year point post-MI than those in higher income groups (Shaw et al., 2008). Women's poorer outcomes after MI can be attributed to complex interactions between anatomical and biological differences, women's treatment delays, women's lack of involvement in CHD research, less aggressive care for women with MI, and socioeconomic issues (Gochfield, 2010; Hoekstra et al., 2005; Jacobs, 2009; McSweeney et al., 2011).

Other sociocultural factors may also be a factor in poorer survival outcomes for women after MI. Living alone has been associated with higher mortality rates in both sexes; however, the proportion of women living alone increases with age, while

the proportion of men living alone decreases with age (Vujcic et al., 2014). This is not fully understood, but may be partially because many women are younger than their husbands, may outlive their husbands, remarry less, and continue to live alone after the departure of their children from the home. Also, women view home activities as important to self-identity (McCormick & Bunting, 2002). Women often take more responsibility for housework and family caregiving than men. After MI, women are discharged back into their workplace (their homes), while men are encouraged to take time off from their work (McCormick & Bunting, 2002). Even though women may be employed outside of the home, many women draw much of their self-identity from their homemaker role. It may be difficult for women to relinquish those duties even after an MI in order to recover. This phenomenon may be even more pronounced in women of lower socioeconomic status who lack resources for assistance in managing the home.

The Symptom Experience for Women

The American Heart Association (AHA) describes typical symptoms of MI to include chest discomfort, discomfort in the arms, back, neck, or jaw, shortness of breath, diaphoresis, nausea, or lightheadedness (American Heart Association, 2014). Reportedly these "classic" symptoms were described by the AHA based on research studies that did not include women (McSweeney, 1998). Only 31% of those participating in one study were able to describe five symptoms of MI: discomfort in the jaw, neck, or back; feeling weak or lightheaded; chest pain or discomfort; discomfort in the arms or shoulder; and shortness of breath (Centers for Disease

Control and Prevention, 2008). Awareness of all five warning signs of MI and the need to call 911 immediately were highest in non-Hispanic Whites, women, and those with a college degree or more. Interestingly, these symptoms listed are the "classic" cardiac symptoms reported by men and often not descriptive of women's experiences with MI. Therefore, more women than men know the classic symptoms of MI, but these symptoms may not be representative of women's actual symptom experience with MI, and thus, women do not recognize other women's symptoms of MI, or women may experience other symptoms "typical" for them.

In early studies with women, it was found that 25% of women reported little or no chest pain in their experiences. Some described the sensations as aches, tingling, or heat with varying degrees of radiation to the shoulders, back, and left arm (McSweeney, 1998). Many of the women experienced diaphoresis, fatigue, generalized chest discomfort, dyspnea, and gastrointestinal symptoms. Furthermore, women used certain descriptors for their pain twice as often as men. These descriptors include the words: discomfort, crushing, pressing, and bad aching (Kreatsoulas, Shannon, Giacomini, Velianou, & Anand, 2013). Studies found that over 90% of women had prodromal symptoms that occurred for a period of time before the onset of acute symptoms of MI (McSweeney &. Crane, 2000; McSweeney, et al., 2005; McSweeney, et al., 2010). These included fatigue, sleep disorders, anxiety, discomfort in the chest and between the shoulder blades, shortness of breath with exertion, indigestion, and neurological symptoms, such as dizziness, headache or migraine, and visual changes. In fact, fatigue was the most prevalent

prodromal symptom reported and occurred in 55 to 67.5% of women, beginning 2-4 weeks prior to their MI, and then resolved after the MI (McSweeney & Crane, 2000; McSweeney et al., 2001). Most women experience some chest discomfort during the acute phase of their MI (90%); however, this is a later symptom (McSweeney et al., 2001). Women also reported that unusual fatigue and shortness of breath occurred during the acute phase of their symptoms.

Often despite having severe, evident symptoms of MI, women still do not perceive themselves at risk for MI. They often wait at home thinking that the symptoms will subside, until they become unable to continue with activities of daily living (Sjostrom-Strand & Fridlund, 2008). Many also self-medicate or use other attempts to reduce discomfort, such as taking a warm bath or going to bed to rest (Higginson, 2008). One study found that women who were at home when they experienced their initial symptoms delayed longer than those who were at work or in other public places (Mussi et al., 2014).

In 1991, Healy compared the symptom experiences of women with CHD to the tale of Yentyl, the heroine of a short story (Singer, 1971). This was termed the "Yentyl Syndrome," in which "being just like a man has historically been a price women had to pay for equality" (Healy, 1991, p. 274). It was argued that healthcare providers and the general public must be convinced that CHD is a women's disease too, not just "a man's disease in disguise" (Healy, 1991, p. 275). Experiences of women with symptoms of MI must be accepted for what women say they are, not in comparison to the male experience, which may be assumed to be the "correct" or

classic way of experiencing symptoms. Furthermore, the voices of older women experiencing symptoms of CHD are viewed as less compelling or less important, perhaps due to ageism, sexism, and often racism, reminiscent of earlier beliefs that CHD is not a disease, but merely part of aging (McCormick & Bunting, 2002).

Researchers have found that women experiencing symptoms of MI typically go through phases of recognition and interpreting symptoms. For example, initial phases include recognition of bodily cues (noticing something different), forming a symptom pattern, using frame of reference (reflecting on one's own experiences or those of others), noticing that there was a reduction in daily activities as a clue that something was wrong, seeking relief from symptoms, and determining causality (Davis et al., 2013). Typically women tend to deny initial symptoms, but as they notice something is wrong they seek the advice of others (McSweeney et al., 2005). Others may be also consulted as symptoms do not resolve, and women seek affirmation of their experiences (Davis et al., 2013; McSweeney et al., 2005). If women are unable to interpret the symptoms, or they are not very severe or consistent with perceptions of MI, then they may continue with activities (Davis et al., 2013). If they are convinced of seriousness of symptoms and/or others convince them to seek care they will often take care of other personal matters, duties, or family members before going to the hospital (Davis et al., 2013). Once women decide to seek treatment, many report that healthcare providers have difficulty with the diagnosis, often feeling that they are not being taken seriously, and are often treated for other illnesses, such as indigestion or depression (McSweeney et al.,

2005). The responses of the healthcare providers may contribute to delays. Women may feel hesitation in seeking treatment with symptoms due to not being taken seriously in the past or perceiving that the healthcare provider is not concerned with the seriousness of their symptoms (McSweeney et al., 2005).

Five themes were described for women's diagnostic experiences during the prodromal and acute phases of the symptom experience: awareness, seeking treatment, frustration, treatment decisions, and anger (McSweeney et al., 2005). The first three themes occurred during the prodromal phase, while the fourth theme, treatment decisions occurred during the acute phase. Anger was noted as a theme in both prodromal and acute phases of the symptom experience and was directed at healthcare providers' inability to diagnose the problem sooner or the perception that they were not taken seriously (McSweeney et al., 2005).

In summary, because women were often excluded from cardiac research until the late 1980s, the clinical picture of "so-called" normal cardiac symptoms was derived from the experiences of men, which may not be the typical symptoms experience by women (Fahs & Kalman, 2008). The symptom experience for women may include prodromal and acute symptoms, which are monitored, often reported to others for validation or advice, and activities of daily living are continued for as long as possible. This often involves caring for others.

Modifiable Risk Factors

Hypertension, hypercholesterolemia, and tobacco abuse are key modifiable risk factors for developing CHD (Centers for Disease Control and Prevention, 2014).

In fact, it is estimated that 49.7% of adults over the age of 20 have at least one of these three risk factors (Centers for Disease Control and Prevention, 2011). Additionally, diabetes mellitus (DM) and physical inactivity position individuals at risk for CHD. Because the World Health Organization estimates that these modifiable factors contribute to approximately 80% of cases, advisement about lifestyle changes and self-management strategies to reduce the cumulative and synergistic effects of multiple risk factors is essential (Hippisley-Cox et al., 2007). Even those with a strong positive family history may substantially reduce their risks by modification of those risk factors within their control (Myers et al., 1990). It seems likely that awareness of risk for CHD may influence women's behaviors. However, a study of women with premature CHD noted that the daughters of these women had a higher prevalence of risk factors but continued negative health behaviors. Of more concern was the daughters' low risk perceptions for CHD, even though they were recruited due to the early onset of CHD in their mothers (Allen & Blumenthal, 1998). It seems that even when individuals are aware of their genetic predisposition to CHD, they do not modify their behavior to ameliorate modifiable risk factors (Imes & Lewis, 2014). Younger women, women of Asian ethnicity, and those with lower education levels were less motivated to modify cardiac risk factors, while those over the age of 45 who were worried and knowledgeable about CHD were more likely to modify risk factors (Galbraith, Mehta, Veledar, Vaccarino, & Wenger, 2011).

Hypertension (HTN) is a leading risk factor for CHD. One third of all adults have hypertension, 33.6% of males and 32.2% of females. Approximately a third of White and Mexican American males and females have HTN. This rate is significantly lower in Hispanics/Latinos and Asians, with rates of 20.0 and 21.27% respectively (Go et al., 2013). However, it is much higher in the Black population, with 44.9% of Black men and 46.1% of Black women affected (Mozaffarian et al., 2015). Among those with HTN, 82.7% are aware of their illness, with 76.5% using medication to control HTN. However, only 54.1% of those on medications for HTN have their blood pressure controlled to the targeted range (Mozaffarian et al., 2015). The silent nature of the disease may be a factor in the lack of control; however even slight elevations in blood pressure may lead to increase risks of adverse events and mortality (Centers for Disease Control and Prevention, 2012).

Health insurance plays an important factor in diagnosis of HTN in adults < 65 years old. Hypertension remained undiagnosed in 40% of nonelderly adults without health insurance, which is twice the rate for those with insurance (Schober, Makuc, Zhang, Kennedy-Stephenson, & Burt, 2011). This can partially be explained in that those with insurance are more likely to have had a blood pressure screening or preventive care. Of those adults that have been diagnosed with uncontrolled HTN, 90% have a usual source of healthcare, had health insurance coverage, and had received care in the previous year (Centers for Disease Control and Prevention, 2012). With access to care, a regular provider, and health insurance, it remains puzzling that HTN control remains elusive for so many. Studies have found that

there are missed opportunities to address risk factors, including HTN, especially in women and minority patients both before and after an initial MI (Leifheit-Limson et al., 2013; Yawn, Wollan, Jacobsen, Fryer, & Roger, 2004).

Hypercholesterolemia (total cholesterol >200mg/dl) affects 43.3% of Americans, 44.9% of women and 41.3% of men (Go et al., 2013). Similar to HTN, 50% of the adults less than 65 years old that have undiagnosed hypercholesterolemia are more likely to be uninsured, compared with 25% of those with insurance (Schober et al., 2011). Cholesterol levels are affected by diet, weight, physical activity and exposure to tobacco smoke (American Heart Association, 2014). When changes to diet and lifestyle are not effective in lowering cholesterol to an acceptable level, medications may be necessary. Statins are the only medications to lower cholesterol that have been associated with reduced risk for MI (American Heart Association, 2014).

Tobacco smokers' risks for developing CHD are 2-4 times that of those that do not smoke (American Heart Association, 2012). Costs of smoking in the United States (US) may exceed $289 billion, including direct medical cost and loss of productivity related to tobacco abuse (Mozaffarian et al., 2015). Among Americans ≥ 18 years old 20.5% of men and 15.9% of women continue to smoke (Go et al., 2014). Of further concern is the rise in use of e-tobacco products, because they may be a potential gateway to smoking traditional cigarettes. Over 250 e-cigarette products were available in 2014 (Mozaffarian et al., 2015). Sadly, 18.1% of students in high school report current smoking, and more than half of children age 3 to 11 (53.6%)

and almost half of those 12-19 years old (46.5%) are exposed to secondhand smoke. Additionally, over a third (36.7%) of adults over 20 years old are exposed to secondhand smoke (Go et al., 2014). Exposure to secondary smoke increases risk for CHD, even for nonsmokers (American Heart Association, 2012).

Diabetes mellitus (DM) increases the risk of developing CHD, especially when blood sugar is not well controlled (American Heart Association, 2012). In fact, at least 65% of those with DM die from heart or vascular disease (American Heart Association, 2012). Men with DM live an average of 7.5 years less than those without DM, and women with DM live 8.2 years less than those without the disease (Mozaffarian et al., 2015). Diabetes affects 29.1 million or 9.3% of the adult population in America, 13.6% of men and 11.2% of women. In fact, almost 26% of Americans age 65 and over have diabetes (Centers for Disease Control and Prevention, 2014). Prediabetes is a precursor condition characterized by increased fasting blood glucose levels and affects 38.2% of the population. The prevalence of DM and prediabetes is increasing parallel with population increases in obesity and affects a disproportionate number of ethnic minorities, including Blacks, Mexican Americans, and Hispanic/Latinos (Go et al., 2014). Additionally, metabolic syndrome, a condition that includes obesity, dyslipidemia, HTN, and glucose metabolism, plays an important role in risk for MI and is more prevalent in post-menopausal women (Meirelles, 2014). It appears that these risk factors may act synergistically to increase the risk for CHD.

Physical inactivity is a risk factor for CHD (American Heart Association, 2012). The AHA recommends 150 minutes per week of moderate intensity exercise and 75 minutes per week of vigorous exercise (American Heart Association, 2014). However, only half of American adults meet the current physical activity recommendations by self-report. The actual number of individuals meeting the recommendations for physical activity may be lower than is self-reported. Studies using actual methods of measuring activity, such as with pedometers, show that individuals overestimate their levels of activity. Women overestimated considerably more than men (by 138% for women and by 44% for men) (Mozaffarian et al., 2015). Approximately 40% of adults older than 55 years reported no leisure-time physical activity (American Heart Association, 2013). Further, since 1950 sedentary jobs have increased 83%, and with technological advances and improved transportation, people generally have less active lifestyles (American Heart Association, 2013). For high school age adolescents, 19.2% of girls and 11.2% of boys reported that they had not engaged in an hour or more of physical activity in the past week (Mozaffarian et al., 2015). Physical activity may help in controlling hypercholesterolemia, DM, and HTN (American Heart Association, 2012).

Nearly 70% of adults are obese or overweight (American Heart Association, 2014). Obesity affects almost 35% of adults in the United States and is commonly used to describe individuals who are significantly above their ideal body weight or have a body mass index (BMI) of 30 or above (American Heart Association, 2014). Those that have a BMI of 25 or above are considered to be overweight (Centers for

Disease Control and Prevention, 2014). Obesity is a leading cause of death and disability in the U.S. and is more prevalent in those of lower socioeconomic status and is increasing among youth, especially adolescent males (Mozaffarian et al., 2015). Obesity contributes to increase blood cholesterol and triglyceride levels, hypertension, and diabetes. For this reason, these individuals need treatment and should participate in a medically supervised weight loss program (American Heart Association, 2014).

Genetic Predisposition

Genetic predisposition to CHD is a non-modifiable risk factor for CHD. The assumption of a familial predisposition towards premature MI, one of the most significant manifestations of CHD, occurs when a male first-degree relative has an MI before age 55 and when a female first-degree relative has an MI before age 65. Approximately a third of patients with MI or CHD have a family history of CHD (Mayer, 2007). The number of affected relatives and their ages at onset of CHD is an important predictor of early onset CHD, especially in siblings (Murabito et al., 2005). Yet, it should be noted that assessing risks based on the number of first-degree relatives affected must take into consideration the size of the family involved. For example, families with few siblings may indicate a deceptively low risk of CHD, which may only be a result of fewer siblings available to exhibit risk. Despite the number of siblings, those persons having an MI were more likely to have had CHD at a younger age than controls**.** Odds of an MI occurring in females are 52% higher for each first-degree relative that experienced an MI, even after adjusting for other risk

factors (Friedlander, Arbogast, Schwartz, et al., 2001). Interestingly, this effect was more pronounced in sibling first-degree relatives than in parent first-degree relatives. This increased risk may be due to: (a) the increased risk of CHD occurring earlier in life, and (b) a manifestation of the synergistic effects of genes and environment in developing and enhancing the progression of CHD. Both genetic and environmental effects must be considered due to the potential familial aggregation of lifestyle choices and common socioeconomic and social commonalities that exist in families (Hawe et al., 2003).

Genes associated with human diseases can be classified as either susceptibility genes or disease-causing genes. Susceptibility genes increase or decrease disease risks, and disease-causing genes are those directly responsible for manifestation of the disease and are usually due to genetic mutations (Mayer, 2007). It is theorized that CHD occurs when there are several susceptibility genes interacting or combined with environmental factors. Thus, pathogenesis of CHD and subsequent MI is a complex and multifactorial process (Mayer, 2007).

With the mapping of the human genome, it is possible to locate regions where genes associated with a certain disease have a high probability of being located (Mayer, 2007). Specific genetic mutations have been identified that increase the risk of familial CHD (Bank et al., 2005; Botto et al., 2011; Friedlander, Arbogast, Schwartz, et al., 2001; Pulla et al., 2010; Wessel, Topol, Ji, Meyer, & McCarthy, 2004). For example, polymorphisms of specific genes for clotting, including Factor V, prothrombin, and platelet glycoprotein IIb were noted to be higher in MI patients

than in controls (Friedlander, Arbogast, Schwartz, et al., 2001). Elevated levels of coagulation factor VIII:C (FVIII:C) is partially genetically determined, and almost half of those individuals with first-degree relatives with elevated FVIII:C, venous thromboembolism, or premature atherosclerosis also had elevated FVIII:C levels; thus, placing them at risk for developing venous thromboembolism, MI, or atherosclerosis (Bank et al., 2005). The effects of a variant polymorphism on the thrombospondin-4 P allele, from a family of calcium-binding proteins which affects platelet adhesion through heparin binding, has been shown to be a risk factor for MI in all ages (Lawler, McHenry, Duquette, & Derick, 1995; Wessel et al., 2004). Hereditary prothrombotic mutations, such as in the factor Leiden gene or other polymorphisms have shown to be a risk factor in developing thrombosis and leading to cardiovascular events (Botto et al., 2011). Therefore, familial or hereditary mutations may be significant risk factors.

The influence of genes in certain diseases was identified and coined the Carter Effect (Carter, 1961). First described in pyloric stenosis, this genetic effect has been also associated with multiple sclerosis and MI (Banerjee et al., 2009; Carter, 1961; Kantarci et al., 2006). The Carter Effect may be observed in diseases that primarily affect one sex more than the other. According to the Carter Effect, the sex that is less likely to develop the disease, such as women and MI, would require a greater number of susceptibility genes for the disease to manifest. Therefore, it follows that women would, in turn, transmit more susceptibility genes to their children. This increase in susceptibility would manifest in female offspring more

than males, resulting in increased risks of MI in the offspring (Banerjee et al., 2009). In fact, in one large study (N = 1790), the relative risk for female first-degree relatives was consistently higher than for male relatives (Hunt, Blickenstaff, Hopkins, & Williams, 1986). Thus, the familial aggregation of CHD may be more pronounced among women. Yet, the literature shows little consensus.

A large South American study (N = 2131) also found that the association between family history and MI was stronger in women; however, the association was stronger for paternal history than maternal history (Ciruzzi et al., 1997). Conversely, another large study (N = 2302), involving the offspring of the original Framingham study participants, found that the presence of CVD in at least one parent was associated with a greater risk for men than for women (Lloyd-Jones et al., 2004). Research to date is inconclusive; therefore, further studies are needed to obtain greater understanding of the interaction between genetics, sex, and environment.

Hypertension, a major risk factor for CHD, is also genetically linked (Go et al., 2014; Pulla et al., 2010). Elevated angiotensin-converting enzyme levels contribute to hypertension and have been identified as a risk factor for MI. Both patients having had an MI and their first-degree relatives with insertion/ deletion (ID) and deletion/deletion (DD) genotype polymorphisms were more likely to have higher levels of angiotensin converting enzyme, resulting in hypertension (Pulla et al., 2010). While advances in genetic science have made possible identification of those at highest risk, having this data in the ED are not feasible. However, the familial

influence is a common factor in genetics and should be assessed in the ED to ascertain risks.

Despite the strong association between family history of CHD there is little emphasis on screening for family history. This is especially true in first-degree relatives. Only 13.9% of patients hospitalized with an acute cardiac event were advised to have their families screened for risk factors, although the prevalence of CHD in their families was 73% (Swanson & Pearson, 2001). Sadly, only 2% of the patients had screening advised by their healthcare provider prior to their cardiac event. Older individuals and Blacks were more likely to receive family screening. Conversely, divorced, separated, or never married individuals were less likely to receive screening, as were those less educated and smokers (Swanson & Pearson, 2001). Due to the high familial propensity for developing CHD and MI, identification of those at increased risk of CHD is paramount. There is little known about how awareness of risk affects delays in seeking treatment with symptoms of MI in women.

Rural Setting

Counties with fewer than 50,000 inhabitants are considered rural (United States Department of Health and Human Services, 2012). Nearly a fourth of all Americans live in rural areas, with only 10 % of physicians serving rural populations (National Rural Health Association, 2014; Texas A & M Health Science Center, 2014). In fact, while rural areas have fewer physicians and dentists per capita than urban areas, they also may lack certain specialists altogether (United States Department of

Health and Human Services, 2013). Only 47.8% of those individuals living in rural areas have access to a facility capable of percutaneous coronary interventions (PCI) within 60 minutes, compared with 98.1% of those living in urban areas (Nallamothu, Bates, Wang, Bradley, & Krumholz, 2006). Additionally, rural residents tend to be poorer than those in urban areas, and even greater disparities in incomes are noted in ethnic minorities (National Rural Health Association, 2014). Rural residents live farther from health care resources, have higher poverty levels, and tend to be less educated than their urban counterparts (United States Department of Health and Human Services, 2013). Rural residents also tend to have higher smoking rates, are more physically inactive, are less insured, and have higher mortality rates than those living in urban areas (United States Department of Health and Human Services, 2012). Also, HTN rates are higher in rural areas than in urban areas, and Medicare patients with MI treated in rural hospitals were less likely than patients treated in an urban hospital to receive recommended treatments. Consequently, rural patients had significantly higher adjusted 30-day mortality rates after MI from all causes than patients in urban hospitals (National Rural Health Association, 2014).

Lower populations and resulting diminished tax bases impact the ability of rural communities to provide certain services, including emergency medical services (EMS). In fact, a large majority of first responders in rural areas are volunteers (Gamm, Hutchison, Dabney, & Dorsey, 2003). Despite the distances and limited resources, a study of rural farmers revealed that the further people lived

from healthcare facilities, the longer they waited at home before seeking emergency care when experiencing chest pain (Baker et al., 2011). Although they verbalized an understanding of the need to seek care immediately with chest pain, they were more likely to wait and see if the pain would subside and not proceed earlier to the hospital to compensate for distance and time for travel. Other studies concur that there are longer pre-hospital delays in rural residents with MI. However, they found that the decision delay did not differ between rural and urban patients (Angerud, Brulin, Naslund, & Eliasson, 2013; Vavouranakis et al., 2010). The longer pre-hospital delay was the result of longer transport times to receive care. Many also felt that it was reasonable to drive to the hospital rather than call an ambulance, further delaying treatment since paramedics have equipment and medications to offer the patient sooner. Many rural residents do not call 911 because they feel that an ambulance would take too long to arrive, want to maintain their privacy, and do not want to bother others (Jackson & McCulloch, 2014). There is little consensus about rural residents' help-seeking behaviors when experiencing symptoms of MI. The distance that must be travelled to receive treatment may affect decisions about when and how to seek care. As previously mentioned, any delays may adversely affect outcomes (Mooney et al., 2012).

Some of the geographic, cultural, social, and economic characteristics of rural populations place them at increased risks of certain diseases and health problems. Due to the distances involved in rural settings, significant challenges emerge in time-sensitive conditions, such as MI. It has been observed that some health issues

in rural settings are contextual and some are compositional (Probst, Moore, Glover, & Samuels, 2004). Contextual issues are those that exist as a function of living in that setting, such as distances to obtain care. Compositional issues are related to the characteristics of the inhabitants; for example, ethnic minority, socioeconomic status, gender, age, and others. Some issues are related to an interaction between contextual and compositional issues. For example, in addition to distance from care, many rural Latinos are also challenged with language barriers, cultural differences, and lack of insurance (Sherrill et al., 2005). Therefore, the influences on health in rural settings are complex and multifactorial.

Women with health insurance, a regular physician, and poorer perceived health visited physicians more frequently; yet, women who were divorced, separated, or widowed used the emergency department more often (Fan, Shah, Veazie, & Friedman, 2011; Simmons, Anderson, & Braun, 2008). Approximately 20% of the community-living rural elderly visited the ED at least once in a year; however, this varies geographically, since rural elderly in the South and West had the fewest ED visits (Fan et al., 2011). The use of the ED for primary care needs may reflect the lack of primary care physicians in rural areas (Fan et al., 2011). Rural women are also more prone to move through different types of employment, both into and out of the formal and informal economy due to seasonal agricultural type work (Lortie, 2012). This may lead to lack of insurance or lapses in insurance, which has been shown to affect healthcare utilization (Simmons et al., 2008).

Helping others and volunteerism were identified as expectations of rural life (Winters, Cudney, Sullivan, & Thuesen, 2006). Although rural women acknowledge difficulties associated with distance to care and limited choices, they also described connections with the community and with the land that made these challenges worth it (Pierce, 2001). Most preferred local healthcare providers that they knew personally, but were also aware of resources available in nearby areas. They used this information to make decisions about where and when to seek care for themselves and their families. There was also a schism noted between long-time rural dwellers and the newcomers, who were perceived to enjoy living in a beautiful setting but avoided becoming involved in the community (Pierce, 2001).

The top priority identified in Rural Healthy People 2020 was access to quality healthcare, with heart disease and stroke care ranked together as the fifth highest priority (Texas A & M Health Science Center, 2014). The influence of distance on recognition and management of symptoms, funding and implementing treatments, preventing healthcare crises, adjusting to changes during the illness, adjusting to a new normal, and coping with emotions were described in a study of women in a rural setting. Four major themes were evident in the findings: physical setting, socio/cultural/economic environment, nature of work, and accessibility of quality healthcare (Winters et al., 2006). Another study found that concerns of older rural adults included managing prescription costs, transportation concerns, insufficient access to both primary and specialty care, inadequate social infrastructure and coordination of care, poor access to assisted living, and other

barriers related to language, culture, and economics (Averill, 2012). It is evident that healthcare issues are on the forefront of the concerns of rural Americans.

Time Duration Estimation

An attention-gate model of cognition was proposed to describe how prospective time duration is perceived based on an individuals divided attention between external events and time (Block & Zakay, 1997). Prospective time duration estimations are a function of attentional cognitive processes. Increased stimuli during an interval will cause time duration to be perceived as shorter prospectively. Unfortunately, although prospective time duration estimation would be interesting and potentially beneficial to obtain, is not possible in the current study. Therefore, retrospective time duration estimation will be examined to determine whether there is a correlation between delays in seeking treatment and time estimation duration.

Retrospective time estimation is a function of memory, and if there are more external stimuli during an interval, such as contextual changes, interruptions, mood changes, or environmental stimuli, then the perceived time estimation will be longer (Block & Zakay, 1997). Studies have shown that time duration estimations are consistent across cultures and races; however, there were significant differences in time duration estimations with aging and between genders (Block, Buggie, & Matsui, 1996; Block et al., 2000; Block et al., 1998; Block, Zakay, & Hancock, 1999; Hill, Block, & Buggie, 2000). Furthermore, cognitive load affects duration judgments similarly. Increased cognitive load in the prospective paradigm made the perceived

time pass faster, while increased cognitive load in the retrospective paradigm made time seem to pass more slowly (Block et al., 2010).

Highly emotional states may also affect time duration estimation the same as increased external stimuli. In response to stress, the adrenal cortex releases glucocorticoids, and the adrenal medulla releases catecholamines (Rodrigues, LeDoux, & Sapolsky, 2009). These stress hormones provide feedback to the brain, thus influencing structures that control emotion and cognition (Rodrigues et al., 2009). There is evidence that stress and the endocrine mediators of the stress response influence memory processes (McEwen, 1999). Dopamine is the main neurotransmitter involved in time processing, and dopamine agonists speed up perceptions of time passage prospectively (Gozlan, 2013). There is evidence that catecholamines impact working memory; however, little is known about how increased catecholamines affect time duration estimation retrospectively (McAllister, Flashman, Sparling, & Saykin, 2004; Soderqvist et al., 2012). Thus, the adrenal release of catecholamines during stressful situations may affect time perception, as retrospective time estimation is a function of memory (Block & Zakay, 1997). Interleukin-6 (IL-6) is proinflammatory cytokine released during MI and may remain elevated for a period of time after MI (Ikeda et al., 1992; Miyao et al., 1993). There is evidence that increased IL-6 levels negatively affect cognition and memory; therefore, as time duration estimation is a function of cognition and memory, it may be altered following MI (Block & Zakay, 1997; Elderkin-Thompson, Irwin, Hellemann, & Kumar, 2012). Although studies show time duration estimation

differences in women, there is very little research addressing time duration estimation from the patient's perspective during a potentially life-threatening situation, such as an MI (Block et al., 2000). One study did find that severity of symptoms affected time duration estimation retrospectively. Time duration in the medical record was shorter than the time duration remembered by the patients, and this difference was more marked in those with severe symptoms (Fukuoka, Dracup, Ohno, Kobayashi, & Hirayama, 2005). Investigation of time duration estimation during an MI may reveal important information about cognition and memory during stressful situations, such as when women experience symptoms of MI due to increased catecholamine-release and higher levels of IL-6.

Temporal Orientation

Temporal orientation reflects the tendency for a person to act or think according to consequences that are either perceived as immediate or future (Graham, 1981; Lukwago et al., 2001). Three models of temporal orientation were identified: the linear-separable, the circular traditional, and the procedural-traditional (Graham, 1981). The linear-separable model is highly future oriented, but with a distinct past, present, and future, with the past seen as irrevocable. It has been observed that most western industrial societies, such as the United States, are very future oriented, which is consistent with the linear-separable model (Gonzalez & Zimbardo, 1985; Graham, 1981). The circular-traditional model is heavily present oriented and is conceptualized as a circular system in which the same events repeat themselves in a cyclical order. There is a sense of fatalism in that the future will be

no different from the past. This view is very prevalent in Latino cultures. The procedural-traditional time model is also present oriented. Things are said to occur when "the time is right" (Brown & Segal, 1996, p. 42). Also, temporal orientation may change depending on the context; for example, individuals may be future oriented professionally and present oriented in personal matters, such as illness management (Goodenough, 1981). Future oriented individuals were noted to seek opportunities to improve themselves, whereas present oriented individuals were more reactive to situations (Bergadaa, 1990). One study found that consideration of immediate consequences has a greater influence on health related behaviors than consideration of future consequences (Adams, 2012). In other words, individuals are more likely to act in such a way to avoid immediate harm than prevent future consequences.

Temporal orientation is also an important factor in determining whether a more reactive or proactive approach to illness management is taken (Alberts & Dunton, 2008). In a study of hypertensive patients, it was found that present-oriented individuals perceived less susceptibility to the negative consequences of their illness and believed more in the value of home remedies and less in the benefits of prescription medications. Furthermore, they found that Blacks tended to be more present-oriented than Whites (Brown & Segal, 1996). Additionally, other studies have found that persons of lower socioeconomic status, those with less education, and older individuals tend to be more present-oriented (Bergadaa, 1990; Edwards et al., 2008). Temporal orientation differences noted between cultures,

those of different ages, and those of various socioeconomic and education levels may give further insight into women's delays in seeking treatment with MI. No studies were found examining temporal orientation and delays in seeking treatment for MI.

Impulsivity

Impulsivity is a behavioral/personality construct that is characterized by quick, unplanned reactions to stimuli without regard to consequences (Moeller et al., 2001). Impulsive individuals tend to overestimate time durations and will discount delayed rewards to obtain immediate gratification (Whittmann & Paulus, 2007). Similarly, impulsive individuals will choose smaller, immediate rewards over delayed, more significant rewards. This is termed impulse choice, attentional or non-planning impulsivity (Lage, Albuquerque, Fuentes, Correa, & Malloy-Diniz, 2013; Weafer & de Wit, 2013). Also, impulsive individuals not only value immediate rewards, they tend to be less sensitive to potentially negative consequences in the future that may result from their decision to seek immediate gratification (Martin & Potts, 2009). They perceive that the delay in gratification is too high of a cost. It is hypothesized that the duration of the delay is perceived as subjectively longer for impulsive individuals than for those that are less impulsive (Whittmann & Paulus, 2007). Therefore, the wait for gratification is unacceptable. Those with difficulty inhibiting an impulsive action are termed action or motor impulsive (Lage et al., 2013; Weafer & de Wit, 2013). Studies have found that men tend to be more action or motor impulsive (Lage et al., 2013; Weafer & de Wit, 2013). In some studies,

women make more impulsive choices, but in others there are no differences (Lage et al., 2013; Weafer & de Wit, 2013). A study found that about one fifth of individuals over 60 years old had some sort of impulsivity control disorder during their lifetime, manifesting as such diverse behaviors as addictions, gambling, or kleptomania, affecting 34.1% of men compared with 8.6% of women (Tamam, Bican, & Keskin, 2014).

Barratt conceptualized impulsivity as a multi-dimensional construct (Barratt, 1965). The 3 subtraits of impulsivity are: attentional, motor, and non-planning. Attentional impulsivity implies impaired ability to focus attention or concentrate and involves discounting of long-term rewards when there are delays in gratification; motor impulsivity involves perseverance to task and refers to the ability to suppress responses; and non-planning impulsivity involves self-control and making choices without sufficient information (Grant & Kim, 2014; Reise, Moore, Sabb, Brown, & London, 2013; Stanford et al., 2009). Interestingly, neurotransmitters have been found to modulate some of these subtraits of impulsivity; for example, norepinephrine modulates motor impulsivity, and both dopamine and serotonin modulate attentional impulsivity (Grant & Kim, 2014). Conversely, cognitive restraint is often conceptualized as the opposite of impulsivity and is also associated with higher levels of education (Lyke & Spinella, 2004).

There is considerable research on emotional states, altered time perceptions in emotional distress, and decision-making, with those individuals that are highly impulsive discounting future rewards for immediate gratification (Wittmann &

Paulus, 2007). In some studies women are found to be more likely to make impulsive choices in order to obtain more immediate gratification (Weafer & de Wit, 2013). There is nothing in the literature associating health-related behaviors and impulsivity, especially impulsivity in individuals experiencing threatening health situations, such as when experiencing symptoms of acute MI. Further examination of this construct in the setting of women experiencing symptoms of MI may yield valuable information about treatment seeking delays.

Summary

Treatment seeking delays lead to increased mortality and morbidity in women with MI. Numerous factors lead to increased delays in women, and a myriad of interventions have addressed this issue, with little success in reducing delays. This study sought to identify other factors that may have influenced treatment seeking delays, such as temporal orientation, impulsivity, and the actual symptom experience.

CHAPTER III

METHODS

Introduction

The methodology of this study of the symptom experience of women having a myocardial infarction (MI) and the effects of physiologic, psychological, and situational factors on symptoms and performance during a MI are described in this chapter. Included are descriptions of the research design, sample, setting, protection of human subjects, procedures, instruments, and planned data analyses. Also, the limitations of the study are discussed.

Design

In this non-experimental research study a cross-sectional, correlational design was used. In non-experimental research, manipulation of the independent variable is not possible. This type of research is also called observational (Polit & Beck, 2012). Cross-sectional studies are appropriate for describing a phenomena or relationships between phenomena at a fixed point in time, such as during an MI (Polit & Beck, 2012). A correlational design is used to describe relationships or associations between variables.

This study was designed to examine the relationships between the symptom experiences in women having an MI with physiologic, psychological, and situational factors and the length of time women delayed in seeking treatment for symptoms of

MI. Because none of the independent variables could ethically be manipulated, a correlational design was acceptable for this study.

Setting

FirstHealth of the Carolinas is a private, nongovernmental, not-for-profit healthcare network serving a six-county primary service area, approximately 313,176 people, in the mid-Carolinas. The secondary service area includes 15 counties and serves almost one million people, many of them residing in rural counties, with populations less than 50,000 people in the entire county (United States Census Bureau, 2014). It is licensed for four hospitals, with a total of 582 beds, including the Reid Heart Center, a rehabilitation center, 3 sleep disorders clinics, 12 family medicine practices, 5 fitness centers, 3 dental clinics, Hospice, home health services, and emergency medical services. The FirstHealth System consists of Moore Regional Hospital (the flagship facility) and 3 other community hospitals located in adjacent counties. FirstHealth Moore Regional Hospital is located in Pinehurst, North Carolina and is licensed for 365 beds. It offers all major medical and surgical specialties, including numerous subspecialties, such as interventional cardiology, open-heart and valve surgery, electrophysiology studies, bariatric weight-loss surgery, neurosurgery, and neonatology. For fiscal year 2013, there were 688 patients discharged from FirstHealth Moore Regional Hospital with ICD-9 codes of 410.1-410.91 (MI), with 258 of these being women (38%).

FirstHealth Richmond Memorial Hospital is located approximately 45 minutes south of Moore Regional Hospital and is approximately 10 miles from the

South Carolina border. It offers a full range of emergency, medical, and surgical specialties, including general and orthopedic surgery, pediatrics, and cardiology. However, although a mobile cardiac catheterization laboratory is on site several days of the week, it is a diagnostic laboratory and does not perform coronary interventions. FirstHealth Hoke Community Hospital opened in October, 2013 with 8 emergency room beds, 8 inpatient beds, and outpatient surgery services. It is located approximately 45 minutes east of Pinehurst. FirstHealth Montgomery Memorial Hospital is located approximately 45 minutes west of Pinehurst and is a critical access hospital. To qualify for critical access hospital status a facility must be located in a rural area, have 24-hour emergency care services, and have an average patient stay of 96 hours or less (Coyne, Fry, Murphy, Smith, & Short, 2012). Reimbursement by Medicare differs for critical access hospitals. FirstHealth Montgomery Memorial Hospital offers emergency services, and some medical and surgical services, with limited inpatient beds.

FirstHealth Moore Regional Hospital is the regional referral center for cardiovascular disease for Moore County and the surrounding counties. The closest percutaneous coronary intervention (PCI) center to FirstHealth Moore Regional Hospital is approximately 1 hour east of Pinehurst located in Fayetteville, NC. Others centers that perform coronary interventions to the north of Pinehurst are at least an hour away, and centers located west and south are almost 2 hours away from Pinehurst. FirstHealth Moore Regional Hospital has a cardiac catheterization laboratory available 24 hours a day/7 days a week for PCI for acute MI. The

catheterization laboratory performed 3176 heart catheterizations in fiscal year 2013, with 1039 percutaneous interventions to open narrow or occluded coronary arteries. Additionally, there were 324 pacemakers inserted, 485 electrophysiology studies, and 292 internal cardiac defibrillators inserted in fiscal year 2013 in the catheterization laboratory. Thus, the recruitment site was acceptable for the study.

Sample

A non-probability convenience sample of community-dwelling women was recruited for participation in the study. Inclusion criteria were: (a) age over 18 years, (b) admission to the hospital within the previous 3 years for symptoms of MI, with discharge diagnosis of MI, and (c) English speaking. Exclusion criteria included: (a) mental or physical impairment resulting in inability to answer questions accurately, and (b) less than 3 months past most recent MI. A list of women was obtained who were discharged with a diagnosis of MI from the participating institution, FirstHealth of the Carolinas Moore Regional Hospital (Moore Campus), using an ICD-9 code of 410.0-410.91 as discharge criteria. Although the list included women who had an MI within the past 3 years, those who had an MI more recently were contacted first to reduce maturation threat (Polit & Beck, 2012). However, in order for participants to recover, stabilize pharmacologically, and complete cardiac rehabilitation, participants were only contacted if at least 3 months had passed since their most recent hospitalization for MI.

Women were contacted by telephone initially by a FirstHealth employee. After three attempts to contact the primary number, secondary numbers were

contacted. Attempts to reach the potential participants occurred on different days of week and different times of the day. If someone other than the potential participant answered the telephone, then the FirstHealth employee asked for a convenient time to call back, without violating the confidentiality of the potential participant. Once contact was made, the recruiter identified herself as an employee of FirstHealth of the Carolinas. The FirstHealth employee explained that she was contacting them about an important study of women who have had heart attacks. The recruiter then verified with the individual that they have had an MI. If they denied they have had an MI, then they were not included in the study, because their remembered experiences may be influenced by their perceptions that what happened to them was not that serious. They were thanked for their time. Once the potential participant indicated interest in participating, the FirstHealth employee asked permission for the Principal Investigator (PI) to call them to schedule an interview. If permission was granted by the potential participant, the PI called to verify continued interest in the study. The study was fully explained to the potential participant, and any questions about participation and confidentiality were addressed. After indicating interest in participating in the study, informed consent was obtained. Data were collected in a private setting agreeable to the participant, which included their homes, other settings, and by telephone.

After explaining the study and providing answers to any of their questions, eligibility requirements were determined. Arrangements were made to obtain informed consent (see Appendix A) and complete the data collection tools.

An a priori power analysis was conducted to determine the sample size needed to answer the research questions for this proposed study. A sample of 56 women was needed to detect an R^2 of 0.25, with 9 predictors, with a 5% chance of a Type I error and a 20% chance of a Type II error (Polit & Beck, 2012).

Human Subjects Protection

Approval for the study was obtained both from The University of North Carolina at Greensboro Institutional Review Board (IRB) (Appendix B) and the FirstHealth of the Carolinas IRB (Appendix C). Informed consent was also obtained from the participants.

The purposes of the study were fully explained to the participants. The consent form was written at approximately a fifth grade level to avoid literacy issues and was also read to the participants. After all questions were answered, the consent form was signed indicating voluntary participation prior to any data collection or telephone consent was given. The participants received a copy of the consent form with a written and verbal statement of their right to withdraw from the study at any time without consequence. Those that choose to be interviewed over the telephone did not sign the consent form, but consent was understood by their participation in the interview. Also, if consent was obtained over the telephone, then a copy of the consent was mailed to the participants for their records.

Precautions were taken to eliminate risks to confidentiality on all data collection forms or computer files by using non-identifiable random number codes

to identify participants rather than names or other identifiable items. The master list of study participants, with their assigned random number code, was kept separately from the data collection forms and kept in a secure, locked file cabinet accessible only by the principle investigator and the faculty sponsor. The data collection forms were kept in a separate locked file cabinet at The University of North Carolina at Greensboro and transported from data collection sites in a locked box.

Instruments

Data were collected using self-report instruments or obtained from the medical record. The following instruments will be used: (a) McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey (MAPMISS), (b) the investigator-developed Demographic Health Tool, (c) Time Orientation Scale, and (d) Barratt Impulsivity Scale-11 (BIS-11).

McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey

The MAPMISS (See Appendix D) was developed to describe women's prodromal and acute symptoms of MI. "Validity is defined as the ability of the instrument to measure the attributes of the construct under study" (DeVon et al., 2007, p. 155). Content validity for the MAPMISS was evaluated by content experts, including cardiologists, cardiac nurses, and women who had experienced MIs (McSweeney et al., 2004). Test-retest reliability for the instrument was calculated. Pearson correlation of the acute scores on the tests indicated a strong relationship (r=0.84, p<0.01). Additionally, prodromal scores also had an acceptable correlation

(r=0.72, p=<0.01) (McSweeney et al., 2004). The symptom locations and descriptors, as verbalized by the subjects in the initial qualitative studies, were retained so that the quality and meaning could be transferred into this quantitative tool (McSweeney et al., 2004). Finally, the instrument was further refined so that it could be administered over the telephone in order to recruit a larger sample and to include women with marginal literacy (McSweeney et al., 2004). The MAPMISS contains 66 items, with the following categories: (a) symptoms during heart attack, (b) reasons for seeking treatment, (c) symptoms prior to heart attack, (d) frequency and severity of symptoms, (e) comorbidities, (f) risk factors, (g) medications, (h) family history, (i) employment, (j) caregiving responsibilities, (k) demographic characteristics, including age, race, marital status, education level, income, and any perceived changes in memory. The tool yields 3 scores, prodromal, acute, with the combined scores equaling the total symptom score. The possible scores ranged from 0-594 for the prodromal score, up to 114 for the acute score, and up to 708 for the total score. The More recently MAPMISS prodromal scores and number of prodromal symptoms were found to be significantly associated with cardiac events, independent of other risk factors, and may be developed into a predictive screening instrument to make decisions about disease management for women (McSweeney et al., 2013).

Demographic Data Tool

The Demographic Data Form (see Appendix E) was developed by the PI to collect information not addressed on the other instruments and provided important

information about the sample. This includes information such as having a first degree relative with coronary heart disease (CHD), distance travelled to the emergency department (ED), whether they viewed their symptoms as life-threatening, whether the participant had previously accessed healthcare with symptoms, and if so, what specific symptoms were reported. Finally, it was noted whether there was an event that may have resulted in hypoxia (respiratory or cardiac arrest), thus potentially affecting memory. The most frequently reported cognitive dysfunction after ischemic-induced brain injury is memory loss (Mateen et al., 2011; Torgersen et al., 2010; Wilson, 1996). If the participant did report experiencing a respiratory or cardiac arrest, then the information was still collected; however, the responses were flagged for possible comparison with those that did not report such an event. Because both the MAPMISS and the time duration estimation relied on memory, answers may not reflect the experience.

Time Orientation Scale

The Time Orientation Scale was developed to assess individuals' tendencies to think and act according to immediate or distal consequences (Graham, 1981; Lukwago et al., 2001) (See Appendix F). This scale is a 10-item questionnaire, with responses scored on a 4-point Likert scale (1=strongly disagree, 2=disagree, 3=agree, and 4=strongly agree). Potential items for the scale were developed through a review of published literature of existing scales appearing to measure the constructs of interest as determined by a multiethnic research team (Lukwago et al., 2001). Responses obtained from a convenience sample were used to modify the

measures to improve clarity. An advisory panel further reviewed the items. Test-retest reliability was conducted on the first convenience sample (N=44), with a 2-week interval between the tests. The present-time orientation subscale had moderate internal consistency (α=0.73) and test-retest reliability (*r*=0.52, *p*=<0.01). The future-time orientation scale was less internally consistent (α=0.54) and further modifications were required. A second convenience sample (N=25) showed improvements with an internal consistency of α=0.72, and test-retest reliability (*r*=0.54, *p*=<0.07). Final testing on a separate convenience sample (N=60) showed a satisfactory Cronbach's alpha (α=0.78) for the complete Time Orientation Scale, measuring both present and future orientation (Lukwago et al., 2001). Based on the participant scores (higher on the present-oriented scale or the future-oriented scale), each individual was either classified as present or future-oriented.

Barratt Impulsivity Scale Version 11 (BIS-11)

The early Impulse Scale developed by Barratt found that high scores on his impulsiveness scale were significantly related to emotional instability (Barratt, 1965). Variations of the Barratt Impulsivity Scale have been used for over 50 years. The current version, the BIS-11 is considered to be the most commonly administered instrument measuring impulsivity in both research and clinical settings (Stanford et al., 2009). Initially developed to relate the constructs of impulsiveness and anxiety to psychomotor efficiency in situations involving conflict, it has been through extensive revisions to arrive at the current version 11, which contains 30 items rated on a 4 point Likert scale (1=rarely/never, 2=occasionally,

3=often, and 4=almost always/always) (See Appendix G) (Barratt, 1959; Patton, Stanford, & Barratt, 1995; Stanford et al., 2009). More recent psychometric data on the BIS-11 indicate high internal consistency (α=0.83) and test-retest reliability (r=0.83, p<0.01) (N=1577) (Stanford et al., 2009). Although the validity of the subscales on the Barratt Impulsivity Scale version 11 (BIS-11) is recognized by most researchers, the majority of studies only report the total score (Stanford et al., 2009). A total score of 72 or above on the scale classifies an individual as highly impulsive (Stanford et al., 2009).

The BIS-11 has been used extensively to study normal populations for employment screening and developmental studies, Additionally, substance abusers, those with mood disorders and attention deficit hyperactivity disorder (ADHD), those who attempt suicide, gamblers, forensic populations (especially violent offenders), psychopathic individuals, and overeaters tend to score higher on the BIS-11 (Jackson, Neumann, & Vitacco, 2007; Lyke & Spinella, 2004; Stanford et al., 2009; Steinberg, Sharp, Stanford, & Tharp, 2013). The total score on the BIS-11 is a continuous independent variable.

Procedures

A list of female patients discharged from the hospital within the past 3 years, with the coded ICD-9 of 410.0 to 410.91 was obtained from the Business Development Department, with their telephone numbers. Potential participants were contacted by telephone. All participants' questions regarding the study were answered, and if the individual met inclusion criteria and agreed to participate in

the study, an appointment was made for data collection at the location preferred by the participant. On the day prior to the interview, the PI contacted the participant to confirm the interview place and time. The PI met individually with each participant to collect data in a quiet, private location or either by telephone in a confidential setting. Each participant was offered the option of being interviewed in person or over the telephone. The participant chose the mode and location of the interview. If the patient requested a telephone interview, this was arranged. Whether the data was collected in person or over the telephone, the participant was allowed to take breaks as needed and could have terminated the interview at any time without consequence.

Prior to the interview, the PI described the purpose of the research and the data collection process, using a standardized script. The PI read the entire consent. After allowing time for questions, clarification, and all questions to be answered, each participant was asked to sign the consent form indicating their voluntary consent to participate in the study or give verbal consent over the telephone. The PI retained a signed copy of the consent, and an unsigned copy will be given to the participant for their personal records. If interviewed by telephone, a copy of the consent was mailed to the participant.

After informed consent was obtained, participants were assigned a unique identification number with a designated folder for their data collection forms. Participants were asked to answer questions on the four self-report instruments: (a) the MAPMISS, (b) a Demographic Data Tool, (c) Time Orientation Scale, and (d) the

BIS-11. To address literacy issues and insure consistency of data collection, the PI read all instruments to each participant in an interview style. Directions were given prior to administration of each instrument. When instruments had a response on a Likert scale, the scale was provided to participants as a visual aid during the interview, if the interview is given face-to-face. If the interview was done over the telephone, the participant was encouraged to write the possible responses down with the corresponding scale as a visual cue. Respondent fatigue was addressed by alternating the order of the data collection instrument scales. Additionally, breaks were offered as needed by the participants. Each data collection session was expected to last approximately 1 to 1.5 hours, and this was explained to the participant prior to the interview.

After completion of the data collection tools, the PI thanked the participants for their time and effort. They were also given $20 cash as a token of appreciation. Those participating by telephone were asked to provide their mailing address, and the money was sent to them along with the consent form. Overall results of the research study would be shared with participants upon request while ensuring confidentiality of individual responses.

Data Analyses

Initially the PI manually entered the data into the Statistical Package for the Social Sciences (SPSS, v. 22). Categorical data were coded to transform the data into a number that could be entered into SPSS. The data were checked for accuracy, with any discrepancies noted checked against the original data collection forms. The data

were cleaned, and descriptive statistics were calculated for each variable, and scatterplots and histograms were examined. Any outliers were examined by comparing the original data collection instruments with the entered data for accuracy. Extreme outliers, those greater than 3 times the interquartile range and those below the first quartile were evaluated and validated (Polit & Beck, 2012). Also, any wild codes, or codes that are not possible, were assessed and corrected; for example, if 0=male and 1=female, a 3 would not be possible. Mean, range, standard deviation, skewness, and kurtosis were determined for all interval-level variables. Proportions were determined for nominal-level variables. All interval-level data that were not normally distributed were transformed to meet assumptions before applying statistical tests.

Instrument testing was done prior to other data analyses. Scores were calculated for the MAPMISS, Time Orientation Scale, and BIS-11. Cronbach's Alpha was calculated for each instrument. Statistical significance for each variable and the overall models was set at alpha = 0.05. All statistics were analyzed using SPSS version 22 software **©.**

Data Analysis for Specific Aims

The specific aims and associated questions are outlined for data analyses.

1. Describe prodromal and acute symptoms of MI in women and the relationship to delays in seeking treatment.

   Q1: What was the mean prodromal score on the MAPMISS?

The participants' mean, standard deviation, minimum, and maximum prodromal scores on the MAPMISS were calculated.

Q2: What was the mean acute score on the MAPMISS?

The participants' mean, standard deviation, minimum, and maximum acute scores on the MAPMISS were calculated.

Q3: What was the mean total symptom score on the MAPMISS?

The participants' mean, standard deviation, minimum and maximum total scores on the MAPMISS were calculated.

Q4: What was the mean delay time for women with MI?

The participants' delay times were calculated, with the mean, standard deviation, minimum, and maximum determined.

Q5: Was there a correlation between the symptom score (prodromal, acute, and total) on the MAPMISS and delay in seeking treatment?

Pearson's *r* is appropriate when both variables are measured on an interval or ratio scale and measure the linear association between 2 continuous variables (Huck, 2008). Three basic assumptions are that participants' responses are independent, are normally distributed, and have equal variance. Each of the scores for symptoms (prodromal, acute, and total) and delay in seeking treatment were checked for normality using Kolmogorov-Smirnov tests, box plots, and p-p plots. If the data were parametric, Pearson's *r* correlation coefficients were calculated to determine the relationship between delay in seeking treatment and each of the

symptoms scores: delay in seeking treatment and prodromal score, delay in seeking treatment and acute score, and delay in seeking treatment and total score. When the data were not normally distributed, then nonparametric tests were used, such as Spearman's *rho*.

2. Examine temporal orientation and impulsivity related to delays in seeking treatment in women with MI.

   Q1: What was the average score on the impulsivity scale (BIS-11)?

   The participants' mean, standard deviation, minimum, and maximum scores on the BIS-11 were calculated.

   Q2: What was the proportion of women with a present temporal orientation?

   The scores on the Time Orientation Scale were calculated for each participant, and the frequency and percentage of women with present temporal orientation was calculated.

   Q3: What was the proportion of women with a future temporal orientation?

   The scores on the Time Orientation Scale were calculated for each participant, and the frequency and percentage of women with future temporal orientation was calculated.

   Q4: Was there an association between time duration estimation (delay), impulsivity, temporal orientation, and symptom scores (prodromal, acute, and total)?

   Each of the scores for symptoms (prodromal, acute, and total), impulsivity, and time duration estimation were checked for normality using

Kolmogorov-Smirnov tests, box plots, and p-p plots. If the data were parametric, Pearson's *r* correlation coefficients were calculated to determine the relationship between time duration estimation and each of the symptoms scores: time duration estimation and prodromal score, time duration estimation and acute score, and time duration estimation and total score. Next, if data were parametric, Pearson's *r* was calculated to determine the relationship between impulsivity and each of the symptom scores: impulsivity and prodromal score, impulsivity and acute score, and impulsivity and total score. If the data were not normally distributed, then nonparametric tests were used, such as Spearman's *rho*. Finally, independent *t*-tests were used to examine the differences in the MAPMISS scores (prodromal, acute, and total) between the two groups of women, those who are future-oriented and those who are present-oriented. Three separate tests were conducted: difference in mean prodromal scores between future and present-oriented women, difference in mean acute scores between future and present-oriented women, and then difference in mean total scores between future and present-oriented women. A 95% confidence interval was built around the difference between the means for each t-test; therefore, if the study were repeated over and over again, each time with 56 participants, then the true population percentage would be found within this interval 95% of the time (Huck, 2008).

Q5: Was there a relationship between impulsivity, temporal orientation, and delay in seeking treatment?

If the variables were normally distributed, Pearson's *r* was calculated to determine the relationship between impulsivity and delay in seeking treatment. Independent t-tests were used to test the mean differences in delay in seeking treatment between the two groups of women, those who are future-oriented and those who are present-oriented. A 95% confidence interval was built around the difference between the two means; therefore, if the study were repeated over and over again, each time with 56 participants, then the true population percentage would be found within this interval 95% of the time (Huck, 2008).

Finally, an independent sample *t*-test was used to examine the difference in the mean scores on the BIS-11 between the two groups of women, those who were present and those who were future-oriented.

Q6: Did the time duration estimation (delay) remembered by the participant correlate with the time delay recorded in the medical record?

If the data were normally distributed, Pearson's *r* was calculated to determine the relationship between the delay remembered by the participant and the delay recorded in the medical record, if the delay was normally distributed in each case. However, if the delay times were not normally distributed then Spearman's rho was calculated.

3. Comprehensively examine the influence of physiologic factors, psychological factors, and situational factors on symptoms and delays in seeking treatment in women who have experienced an MI.

   Q1: Did physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation, time duration estimation, and impulsivity), and situational factors (distance to the emergency department [ED]) explain symptoms (acute, prodromal, and total scores)?

   All independent variables were correlated with each other and checked for multicollinearity. In the event that two variables correlated at 0.85 or higher, one variable was eliminated from the multiple regression or separate models were created (Polit, 2010). In addition, the tolerance level and variance inflation factor of all independent variables were calculated to further determine multicollinearity when all variables are examined together. A tolerance value of less than 0.10 and a variance of inflation factor greater than 10 were used to identify multicollinearity for possible elimination of variables (Polit, 2010).

   Extreme outliers can have an unacceptable impact on a regression solution. Therefore, frequency distributions were conducted for each variable and examined for outliers. In addition, multivariate outliers were detected through standardized residual values, noting those greater than 3.0 or less than -3.0 (Polit, 2010). Outliers were either rescored, deleted, or separate regression models were reported.

Next, all variables were checked for assumptions related to multiple regression, including multivariate normality, linearity, and homoscedasticity by examining standardized scatterplots. Scatterplots should reveal a rectangular form distributed equally along the center line. In the event that any assumptions are violated, appropriate transformations were used and chosen based on skew and kurtosis in an attempt to stabilize the variance and achieve linearity and normality (Tabachnick & Fidell, 2007).

All predictor variables were entered simultaneously into a multiple regression model to determine how well the variables of age, race, first-degree relative with MI, temporal orientation, time duration estimation, impulsivity, distance to ED, and modifiable risk factors influenced the symptom experience. This process was repeated for each dependent variable (prodromal score, acute score, and total score).

Q2: Did physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity) and situational factors (distance to the ED) explain delay in seeking treatment?

The statistical analysis for this question was similar to the analysis done for question 1. Data were checked for multicollinearity, multivariate normality, linearity, homoscedasticity, and outliers. All predictor variables were then entered simultaneously into a multiple regression model to determine how well the variables of age, race, first-degree relative with MI,

modifiable risk factors, temporal orientation, impulsivity, and distance to ED influenced delays in seeking treatment.

Q3: When controlling for physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity) and situational factors (distance to the ED), did symptoms (acute, prodromal, and total) explain delay in seeking treatment?

Data were again checked for multicollinearity, multivariate normality, linearity, homoscedasticity, and outliers. Physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity), and situational factors (distance to ED) were entered into the multiple regression as the first block. The symptom scores were entered as the next block. Three separate analyses were conducted with the second block reflecting prodromal scores, then acute scores, and finally total scores. This analysis determined the specific amount of variance that symptoms have on delay in seeking treatment above and beyond what is explained by physiologic, psychological, and situational factors.

Limitations

The limitations of this study warrant examination. A convenience sample was recruited from women discharged from a regional medical center in the southeast region of the United States. Results obtained from those who agreed to participate may differ from those who declined to participate. This lack of randomization limits generalization beyond this study sample. Additionally, the self-report nature of the

instruments may not accurately reflect actual behaviors or beliefs and may be influenced by participants' perceived social desirability. Furthermore, since portions of this study require remembering an event that occurred up to three years in the past, memory may alter some responses. Because participants were recruited for the study by telephone, those individuals not having a telephone are underrepresented in the sample. Finally, since this was cross-sectional study, changes over time cannot be assessed; therefore, this study examined one point in time using a nonprobability sample of women after experiencing an MI.

Summary

This study was conducted to determine the influence of physiologic, psychological, and situational factors on the symptom experience and on treatment seeking delays in women experiencing symptoms of MI. Additionally, the influence of the symptom experience on treatment seeking delays, while controlling for physiologic, psychological, and situational factors, was determined. A cross-sectional, correlational, non-experimental design was utilized. The study also described the differences within the sample studied. Women who had been discharged from a 365-bed regional medical center in the southeastern United States with the diagnosis of MI were recruited. Approval from the Institutional Review Board (IRB) of The University of North Carolina at Greensboro and the IRB at FirstHealth of the Carolinas were obtained, in addition to consent from the individual participants. Data analysis included descriptive statistics and correlational statistics, as well as multiple regression models to determine the

influence of the 9-predictor variables on delays in seeking treatment. The PI collected and analyzed all data for this research study.

CHAPTER IV

RESULTS

This chapter includes the results of the statistical analyses for the study. This detailed description includes the final sample size along with an examination of outcomes of instrument testing, the study data, and a specific analysis of each research question.

Sample

Participants were recruited by first running a list of women discharged with the diagnosis of myocardial infarction (MI) from FirstHealth of the Carolinas Moore Regional Hospital (Moore Campus) within the past 3 years. An a priori power analysis was conducted using NQuery® , and it was determined that a sample size of 56 women was needed to detect an R^2 of 0.25, with 9 predictors, with a 5% chance of a Type I error and a 20% chance of a Type II error. The women were then contacted by a FirstHealth employee who was not the principal investigator (PI). Those who had an MI within the past 3 months were excluded. Approximately 85 potential participants were initially contacted. Of these, 72 participants agreed to participate. These potential participants were then contacted by the PI to schedule an interview, either by telephone or in person. Of those that initially agreed to be contacted by the PI, 14 declined to participate, one suffered another MI after the

initial contact and was excluded, and one declined after initially agreeing when she became ill with an undisclosed ailment.

Data were collected by the PI in interviews lasting anywhere from 45 to 90 minutes. Although face-to-face interviews were preferable, if the participant preferred a telephone interview, the interview was conducted over the telephone. Twenty-nine participants completed the interviews in-person, with 26 completing the interview at their private residences, and 3 were interviewed at the office of the PI. Twenty-seven were interviewed over the telephone. A total of 56 persons completed the study.

Preliminary Examination of Data

All data were entered into SPSS version 22.0 (SPSS, Inc., Chicago, IL). Three instruments required scores to be calculated. Additionally, a demographic tool was used to collect other data from participants. All data points were checked against the data collection forms for accuracy prior to data analyses and were verified as entered correctly. Frequencies were calculated on all variables to check for missing data and extreme values. There were 18 missing data points for the variable time duration noted on the medical record (there was no time recorded). There was one missing data point in the participant's time estimations of delay, as one participant could not remember the duration of the symptom experience. However, the time delay was noted on the medical record as recorded by the healthcare provider.

Cronbach alphas were calculated for the separate instruments to check for internal reliability. Internal reliability or consistency indices estimate the extent that

different parts of an instrument are equivalent in measuring an attribute (Polit & Beck, 2012). Cronbach alphas of $\geq$0.80 are excellent, while alphas of $\geq$0.70 are considered acceptable (Hulley, Cummings, Browner, Grady, & Newman, 2007). The alpha for the MAPMISS was excellent at 0.831. Cronbach alpha was calculated for the Barratt Impulsivity Scale-11 (BIS-11) and was excellent at 0.809. Finally, Cronbach alpha was calculated for the Temporal Orientation Scale in its entirety. With both present and future scales included, Cronbach alpha was calculated at 0.399. This alpha is very low and indicates that some of the items may be measuring different characteristics (Hulley et al., 2007). This finding is reasonable because individuals usually score either present or future oriented and less often mixed. When the present and future scales were calculated separately, Cronbach alphas were improved at 0.588 and 0.646 respectively; however, they are marginal.

All continuous data were tested for normality with the Kolmogorov-Smirnov Test, box-plots, and histograms. It was determined that six variables did not meet the assumptions of normality: (a) prodromal score, (b) total score, (c) acute symptom duration, (d) medical record duration of symptoms, (e) body mass index (BMI), and (f) distance to the hospital. These variables were transformed when appropriate for the analysis (Tabachnick & Fidell, 2007).

Sample Demographics

The ages of the participants ranged from 37 to 92 years old, with a mean age of 70.2 (*SD*=11.07). The majority of the sample was unmarried, either widowed, divorced, or never married (70%); White (83.9%); and had a 12th grade education or GED or below (55.3%). Forty-one percent reported an income of less than $20,000 per year. Only 21.4% reported that they were employed either full or part-time (see Table 1).

Table 1

Demographic Statistics (N=56)

Variable	n	
Employment Status		
Employed	12	(21.4)
Unemployed/Retired	44	(78.6)
Education		
5-8th grade	4	(7.1)
9-11th grade	7	(12.5)
12th grade or GED	20	(35.7)
Some college or vocational school	11	(19.6)
College graduate	11	(19.6)
Postgraduate work	3	(5.4)
Annual Household Income		
Less than $10,000	2	(3.6)
$10,000-19,000	20	(37.5)
$20,000-29,000	9	(16.1)
$30,000-39,000	4	(7.1)
$40,000-49,000	3	(5.4)
$50,000-59,000	2	(3.6)
$60,000-69,000	3	(5.4)
$70,000-79,000	1	(1.8)

$80,000-89,000	0	(0)
$90,000-99,000	1	(1.8)
$>100,000	2	(3.6)
Don't know	6	(10.7)
Refused	1	(1.8)
<$30,000	2	(3.6)
Attended cardiac rehabilitation		
Yes	13	(23)
No	43	(77)
Mode of transport to hospital		
Ambulance	18	(32)
Private vehicle	38	(68)
Perceived symptoms as life-threatening		
Yes	21	(37.5)
No	35	(62.5)
Number of MIs		
1	44	(78.6)
2	6	(10.7)
3	4	(7.1)
4	2	(3.6)

Theory of Unpleasant Symptoms Variables

The theory of unpleasant symptoms has three major components: the symptom(s) (McSweeney Acute and Prodromal Myocardial Infarction Symptom Scores [MAPMISS]), influencing factors that affect the symptom experience (physiological, psychological, and situational factors), and the performance or outcome (treatment seeking delays) (Lenz et al., 1997). The resulting descriptive statistics for each of the continuous variables of the theory of unpleasant symptoms are listed in Table2.

Table 2

Theory of Unpleasant Symptoms Model Continuous Variables (N=56)

Variable	Mean	*SD(=/-)*	Range
Symptom experience: MAPMISS scores (possible ranges)			
Acute (0-114)	15.8	12.5	2-65
Prodromal (0-594)	49.4	56.8	0-235
Total (0-708)	65.2	65.6	2-259
Age	70.2	11	37-92
Body mass index (BMI)	29.6	7.6	18.4-61.8
Time duration estimation (minutes) *	801.7	2973.9	10-20160
Barratt Impulsivity Scale version 11 score (BIS-11)	60.3	11.6	42-89
Distance to the hospital	17.1	33.3	0.1-247

*One participant could not recall the time duration.

The descriptive statistics for the categorical variables are presented in Table 3.

Table 3

Theory of Unpleasant Symptoms Model Categorical Variables (N=56)

Variable	Frequency	(%)
Race		
White	47	(84)
Black	6	(11)
Native American	3	(5)
1st degree relative with MI		
Yes	37	(66)
No	17	(30)
Don't know	2	(4)
Hypertension		
Yes	45	(80)
No	11	(20)
Hypercholesterolemia		
Yes	42	(75)
No	14	(25)
Diabetes mellitus		
Yes	28	(50)
No	28	(50)
Physical inactivity		
Yes	31	(55)
No	25	(45)
Obesity		
Yes	18	(32)
No	38	(68)
Tobacco abuse		
Yes	13	(23)
No	43	(77)
Marital Status		

Married	17	(30.4)
Single	2	(3.6)
Divorced	16	(28.6)
Widowed	21	(37.5)
Caregiver responsibilities		
Yes	13	(23.2)
No	43	(76.8)
Temporal Orientation		
Present	13	(23.2)
Future	40	(71.4)
Mixed	3	(5.4)

The following correlation table shows the intercorrelations between the continuous variables of interest in this study.

Table 4

Spearman's rho Intercorrelations of Continuous Variables (N=56)

Variable	1	2	3	4	5	6	7
1 Age	1.00	-.383**	-.431**	-.472**	0.01	-0.180	-0.093
2 Acute score	-	1.00	.663**	.788**	-.059	0.128	0.025
3 Prodromal score	-	-	1.00	.976**	-.009	0.010	-.034
4 Total score	-	-	-	1.00	-.046	0.035	-.033
5 Delay	-	-	-	-	1.00	.040	.265*
6 Impulsivity	-	-	-	-	-	1.00	-.285*
7 Distance	-	-	-	-	-	-	1.00

*p=≤0.05
**p= ≤0.01

Age and the symptom scores (acute, prodromal, and total) were negatively correlated, and the correlations were statistically significant. Correlations between age, delay, impulsivity, and distance travelled to the hospital were not statistically significant. Delay and distance were positively correlated (r_s=0.265), and this was statistically significant. Distance and impulsivity were negatively correlated (r_s=-0.285), and this was also statistically significant. Number of MIs was negatively correlated with delay (r_s=-0.38, p=0.004). When extreme outliers (those delaying more than 5000 minutes) were excluded from the analysis, the following scatterplot diagram in Figure 2 shows that those with one MI had extreme variability in delays.

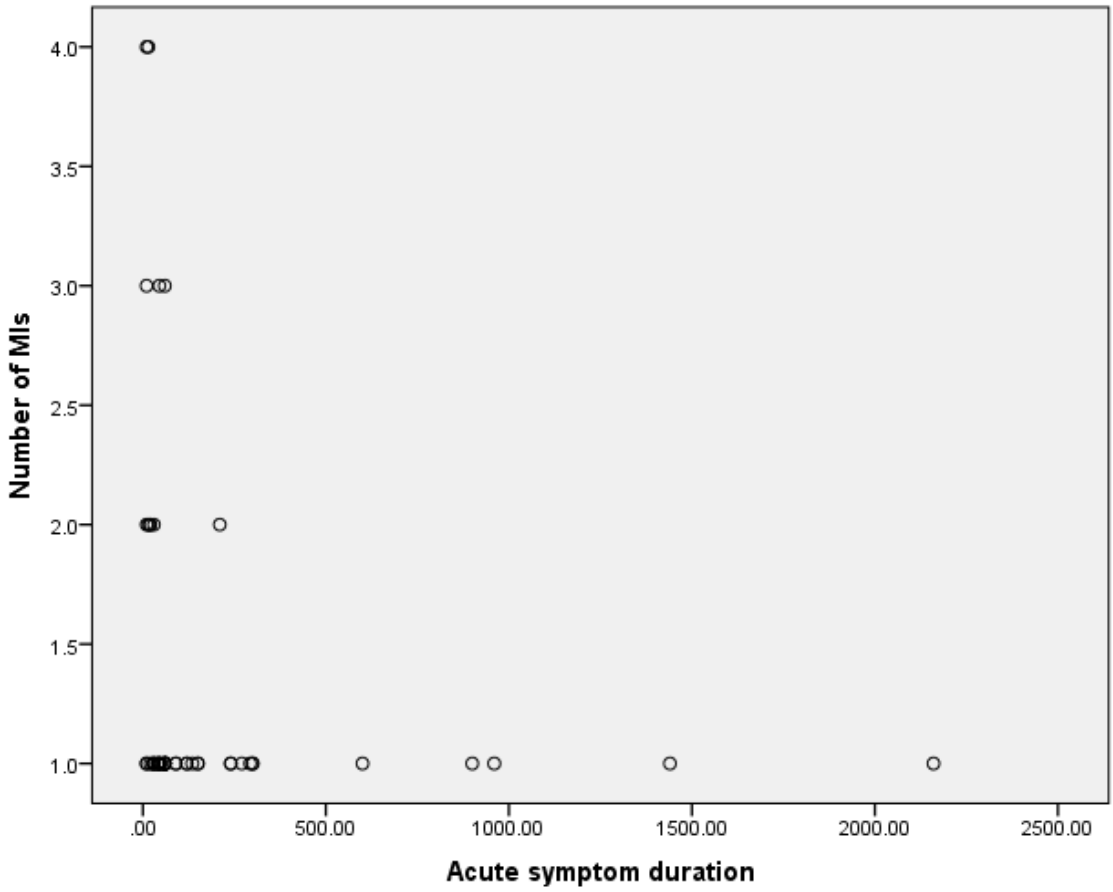

Figure 2. Variability in Delays in Those with One MI and Those with More than One MI

Those who perceived their symptoms as life threatening delayed longer than those who did not. The mean delay time for those perceiving their symptoms as life threatening was 1437.19 compared with 409.12 for those who did not. However, this was not statistically significant, t=-1.016(22), p=0.321. Interestingly, the perception that symptoms were life threatening was not related to mode of transport to the ED either, X^2=0.022(1), p=0.883. Those who had previously sought care with similar symptoms had mean delays of over 400 minutes longer than those

who had never sought care with similar symptoms. This, however, was not statistically significant, t=-0.523(53), p=0.603. Of further concern, those women with lower incomes had a mean delay of almost 900 minutes longer than those with incomes of ≥$20,000. This also was not statistically significant, *t*=0.0904(23.09), p=0.376. Although of not statistically significant, these findings may be of clinical significance since any delays adversely affect outcomes. There was no difference in delay times for those who were caregivers at the time of the MI and those who were not. Similarly, marital status did not affect delay time.

Further analysis showed no relationship between temporal orientation and race, education, and summative risk scores. BIS-11 scores were significantly different between those who were present oriented and those who were future oriented, *t*=2.879(51), *p*=0.006. Present oriented women scored higher on the BIS-11. When socioeconomic status was dichotomized into those earning $20,000 per year or more and those earning less than $20,000, independent *t*-test revealed that those with higher incomes were more future oriented, X^2=6.31(1), *p*=0.012. When education was dichotomized into high school graduate or GED and below and those having higher education, independent *t*-test revealed that the relationship between higher education and impulsivity were not statistically significant, *t*=1.915(54), *p*=0.061. Not surprisingly, when both incomes and education were dichotomized X^2 test indicated that those with higher education earned more, X^2=14.097(1), *p*=<0.001. Interestingly, independent *t*-test showed that those having incomes of less than $20,000 per year also had higher impulsivity scores, *t*=2.998(32.67),

p=0.005. Impulsivity was not related to modifiable risk factors, except for tobacco abuse. Independent t-test showed that there were significant differences in impulsivity between those who used tobacco and those who did not, t=-2.043(54), p=0.046. Impulsivity was negatively correlated with distance to the hospital, and those with higher BIS-11 scores had less distance to travel to seek care (r_s=-0.285, p=0.034).

Women with first degree relatives with MI did not differ from those without first degree relatives with MI in number of modifiable risk factors, t=0.962(52), p=0.935. Most of the women in the sample had HTN (80%), hypercholesterolemia (75%), and were physically inactive (55%). Half of the women had diabetes mellitus; however, only 32% were obese, and 23% abused tobacco at the time of their most recent MI.

Of the women interview in this study, 83.9% of women reported having prodromal symptoms in the weeks and months leading up to their MIs. The prodromal symptoms varied widely and are displayed with their frequency in Table 5.

Table 5

Prodromal Symptoms Experienced by Women Having an MI (N=56)

Symptoms	(%)
Chest pain	32.1
Back pain	8.9
Arms/shoulder pain	21.4
Jaw/teeth pain	7.1
Neck/throat pain	7.1
Legs	5.4
Fatigue	66.1
Sleep disturbances	30.4
Anxiety	25
Cough	14.3
Heart racing	28.6
Shortness of breath/dyspnea	37.5
Loss of appetite	28.6
Indigestion	39.3
Sensations in arms and hands	35.7
Neurological symptoms	32.1

By far the most experienced prodromal symptom reported was fatigue. Over a third of the women reported shortness of breath, indigestion, and unusual

sensations in the arms and hands. Almost a third reported chest pain, sleep disturbances, and neurological symptoms, such as new onset vision problems, headaches, and changes in thinking or remembering. The prodromal symptoms were also reported in varying degrees from mild to severe.

Acute symptoms experienced by the women in the study also varied greatly. Acute symptoms are unrelenting and prompt the women to seek treatment. The following Table 6 shows the acute symptoms with the frequency they were experienced by the women in this study.

Table 6

Acute Symptoms Experienced by Women Having an MI (N=56)

Symptoms	(%)
Chest pain	62.5
Back pain	17.9
Arms/shoulder pain	39.3
Jaw/teeth pain	23.2
Neck/throat pain	28.6
Fatigue	50
Weakness	53.6
Temperature change	50
Heart racing	37.5
Indigestion	57.1
Nausea/vomiting	23.2
Neurological symptoms	37.5
Leg pain	8.9

Over half of the women experienced chest pain, indigestion, and weakness acutely. Experiencing chest pain was unrelated to delay. Independent *t*-test between those who did and those who did not experience chest pain showed no statistically significant difference in delay, t=-0.347(53), p=0.73. The second most common symptom reported was indigestion. Independent *t*-test also revealed that it

was also unrelated to delay, t=1.637(22.09), p=0.116. Finally, the third most common acute symptom was weakness and was also unrelated to delay, t=0.507(53), p=0.614. In fact, independent t-tests showed that none of the acute symptoms were associated with delay.

Research Question #1

The specific aim was to describe prodromal and acute symptoms of MI in women and the relationship to delays in seeking treatment.

Q1: What was the mean prodromal score on the MAPMISS? The mean prodromal score on the MAPMISS was 49.4 (SD $\pm$ 56.8). The scores ranged from 0-235.

Q2: What was the mean acute score on the MAPMISS? The mean acute score on the MAPMISS was 15.8 (SD $\pm$ 12.5). The scores ranged from 2-65.

Q3: What was the mean total symptom score? The mean total symptom score on the MAPMISS was 65.2 (SD $\pm$ 65.6). The scores ranged from 2-259.

Q4: What was the mean delay time for women with MI? The mean delay time for women with MI was 801.7 minutes (SD $\pm$ 2973.9). The delays ranged from 10 minutes to 20160 minutes. However, the median and mode time delays were 60 minutes. As the distribution of time delay was positively skewed, the median may be the preferred measure of central tendency due to extreme outliers.

Q5: Was there a correlation between the symptom score (prodromal, acute, and total) on the MAPMISS and delay in seeking treatment? Each of the scores for symptoms (prodromal, acute, and total) and the delays were checked for normality using Kolmogorov-Smirnov test, box plots, histograms and p-plots. Using these

methods of evaluating normality, it was determined that only the acute symptom score was normally distributed. The prodromal and total scores and the delays were not normally distributed. For this reason, nonparametric testing using the Spearman's rho was used to calculate the correlation between the scores on the MAPMISS and delays. Acute scores and delay were not correlated (r_s =-0.059; p=0.667). Prodromal scores and delay were not correlated (r_s =-0.009; p=0.949). Similarly, total scores and delay were not correlated (r_s =-0.047; p=0.735).

Research Question #2

The specific aim was to examine temporal orientation and impulsivity related to delays in seeking treatment in women with MI.

Q1: What was the average score on the BIS-11? The mean score on the BIS-11 was 60.3 (SD $\pm$ 11.6). The scores ranged from 42-89. The scores were normally distributed, with a skewness of 0.41 and kurtosis of -0.68.

Q2: What was the proportion of women with a present temporal orientation? There were 13 women with present temporal orientation or 23.2% of the sample.

Q3: What was the proportion of women with a future temporal orientation? There were 40 women with future temporal orientation or 71.4% of the sample. Additionally, 3 of the women were mixed in temporal orientation, in that they had equal scores on the present and future scales. This was 5.4% of the sample. These women were excluded from the analysis of temporal orientation and its association with other variables.

Q4: Was there an association between impulsivity, temporal orientation, and symptom scores (prodromal, acute, and total)?

Each of the scores for symptoms (prodromal, acute, and total), impulsivity, and time duration estimation (delay) were checked for normality using Kolmogorov-Smirnov tests, box plots, histograms, and p-p plots. Only the acute scores and the BIS-11 scores were normally distributed. Pearson's correlation was used to calculate the relationship between acute scores and impulsivity. Acute scores and impulsivity, as measured by the BIS-11, were not correlated (r=0.092; p=0.279). Non-parametric testing using Spearman's *rho* correlation coefficients were calculated to determine the relationship between impulsivity and symptom scores: impulsivity and prodromal score and impulsivity and total score. Prodromal scores and impulsivity were not correlated (r_s =-.02; p=0.886). Similarly, total scores and impulsivity were not correlated (r_s =0.006; p=0.968). Independent t-tests were used to examine the differences in the acute scores between the two groups of women, those who are future-oriented and those who are present-oriented. The difference between the acute score means for the two groups of women, those who are present and those who are future oriented were not statistically significant, t=*-0.072* (51) p=0.943. The 3 individuals whose scores indicated mixed temporal orientation were deselected from this analysis.

Finally, since the prodromal and total scores on the MAPMISS were not normally distributed, Mann-Whitney U tests were used to examine the differences in the MAPMISS scores (prodromal and total) between the two groups of women,

those who are future-oriented and those who are present-oriented. Again, the 3 individuals who had mixed temporal orientation were deselected from this analysis. Two separate tests were conducted: difference in mean prodromal scores between future and present-oriented women and difference in mean total scores between future and present-oriented women. The mean difference between the prodromal scores in the two groups of women, those who are present and those who are future oriented, was not statistically significant, U=222(53), p=0.431. Similarly, the difference between the mean total scores between the two groups of women was not statistically significant, U=*232*(53), p=0.563.

Q5: Was there a relationship between impulsivity, temporal orientation, and delay seeking treatment?

Scores for impulsivity (BIS-11) and delays were checked for normality using Kolmogorov-Smirnov test, box plots, histograms and p-plots. The BIS-11 score was normally distributed, but the delays were not. Therefore, nonparametric testing was used to determine the relationship between impulsivity and delay in seeking treatment. Spearman's *rho* showed no correlation between impulsivity and delay in seeking treatment (r_s =0.04, p=0.775).

Independent sample *t*-tests were used to evaluate the mean differences in delay in seeking treatment between the two groups of women, those who are future-oriented and those who are present-oriented. The difference in the mean delays for the two groups of women, those who are present and those who are future-oriented, was not statistically significant, t=-0.024(50), p=0.981.

Finally, an independent sample *t*-test was used to examine the difference in the mean scores on the BIS-11 between the two groups of women, those who are present and those who are future-oriented. The difference between the means of the two groups was statistically significant, t=2.879(51), p=0.006. Those who were present oriented had higher scores on the BIS-11.

Q6: Did the time duration estimation (delay) remembered by the participant correlate with the time delay recorded in the medical record?

As both the recall delay time and the duration of symptoms recorded in the medical record are not normally distributed, Spearman's *rho* was calculated to determine the relationship between the delay remembered by the participant and the delay recorded in the medical record. The patient reported delay in seeking treatment was positively correlated with the duration of symptoms noted on the medical record (r_s =0.351, p=0.033). However, for those that perceived their symptoms as life-threatening, there was no statistically significant correlation between retrospective time duration estimation and delay recorded on the medical record (r_s=0.243, p=0.424). Eighteen charts had no mention of duration of symptoms, as recorded by the healthcare provider, so missing data are a limitation of these correlations.

Research Question #3

The specific aim was to comprehensively examine the influence of physiologic factors, psychological factors, and situational factors on symptoms and delays in seeking treatment in women who have experienced an MI.

Q1: Did physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation, time duration estimation, and impulsivity), and situational factors (distance to the emergency department [ED]) explain symptoms (acute, prodromal, and total scores)?

All independent variables were correlated with each other and checked for multicollinearity. No two variables correlated at 0.85 or higher, so no variables were eliminated. In addition, the tolerance level and variance inflation factor (VIF) of all independent variables were calculated to further determine multicollinearity when all variables are examined together. A tolerance value of less than 0.10 and a VIF greater than 10 were used to identify multicollinearity for possible elimination of variables (Polit, 2010). The tolerance value and VIF were within an acceptable range so there were no issues with multicollinearity.

Extreme outliers can have an unacceptable impact on a regression solution. Therefore, frequency distributions were conducted for each variable and examined for outliers. No multivariate outliers were detected through standardized residual values. Outliers were either rescored, deleted, or separate regression models were reported.

Next, all variables were checked for assumptions related to multiple regression, including multivariate normality, linearity, and homoscedasticity by examining standardized scatterplots. Scatterplots should reveal a rectangular form distributed equally along the center line. In the event that any assumptions were violated, appropriate transformations were used and chosen based on skew and

kurtosis in an attempt to stabilize the variance and achieve linearity and normality (Tabachnick & Fidell, 2007).

All predictor variables were entered simultaneously into a multiple regression model to determine how well the variables of age, race, first-degree relative with MI, temporal orientation, time duration estimation, impulsivity, distance to ED, and modifiable risk factors influenced the symptom experience. This process was repeated for each dependent variable (prodromal score, acute score, and total score). The following Table 7 shows the multiple regression summaries for the prodromal symptom score on the MAPMISS.

Table 7

Multiple Regression Summary for Variables on Prodromal Scores (N=56)

Variables	Standardized Regression Coefficient	*Unstandardized Coefficient*	*P*
Age	-0.572	-0.213	0.001
Race	-0.122	-0.932	0.412
First-degree relative with MI	0.062	0.484	0.657
Temporal orientation	0.076	0.607	0.594
Impulsivity	0.001	0.000	0.993
*Distance to ED	-0.182	-0.323	0.207
Modifiable risk factors	-0.179	-0.296	0.218
*Delay**	-0.057	-0.010	0.681
R^2=0.234 R^2_{adj}=0.101 F=1.759 df=54 p=0.11			

*Used transformed variables.
**One of the women did not recall how long she delayed before seeking treatment.

The following Table 8 shows the multiple regression summaries for the acute symptom score on the MAPMISS.

Table 8

Multiple Regression Summary for Variables on Acute Scores (N=56)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	-0.355	-0.405	0.048
Race	-0.075	-1.758	0.638
First-degree relative with MI	0.89	2.114	0.556
Temporal orientation	0.074	1.808	0.630
Impulsivity	0.094	.101	0.536
*Distance to ED	-0.060	-0.329	0.694
Modifiable risk factors	-0.083	-0.422	0.591
*Delay**	-0.154	-0.081	0.307
R^2=0.119 R^2_{adj}=-0.034 F=0.776 df=54 *p*=0.626			

*Used transformed variables.
**One of the women did not recall how long she delayed before seeking treatment.

The sums of the prodromal and acute scores on the MAPMISS yield the total score. The multiple regression summary for variables on total scores is shown in Table 9.

Table 9

Multiple Regression Summary for Variables on Total Scores (N=56)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	-0.565	-0.195	0.001
Race	-0.101	-0.720	0.495
First-degree relative with MI	0.081	0.588	0.562
Temporal orientation	0.062	0.464	0.662
Impulsivity	0.046	0.015	0.744
*Distance to ED	-0.134	-0.222	0.349
Modifiable risk factors	-0.198	-0.304	0.174
*Delay**	-0.114	-0.018	0.417
R^2=0.235 R^2_{adj}=0.101 F=1.762 df=54 p=0.11			

*Used transformed variables.
**One of the women did not recall how long she delayed before seeking treatment.

Q2: Did physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity) and situational factors (distance to the ED) explain delay in seeking treatment?

The statistical analysis for this question is similar to the analysis done for question 1. Data were checked for multicollinearity, multivariate normality, linearity, homoscedasticity, and outliers. All predictor variables were then be entered simultaneously into a multiple regression model to determine how well the variables of age, race, first-degree relative with MI, modifiable risk factors, temporal orientation, impulsivity, and distance to ED influence delays in seeking treatment. Delays in seeking treatment and distance to the ED were transformed to meet the assumptions of regression. The following table shows the multiple regression summaries for variables influencing delay in seeking treatment. The individual that could not remember the amount of time she delayed was excluded from this analysis.

Table 10

Multiple Regression Summary for Variables Influencing Delay* (N=55)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	-0.132	-0.285	0.443
Race	0.059	2.631	0.704
First-degree relative with MI	-0.038	-1.727	0.795
Temporal orientation	-0.069	-3.208	0.645
Impulsivity	0.14	0.285	0.346
*Distance to ED	0.247	2.561	0.094
Modifiable risk factors	-0.176	-1.694	0.241
R^2=0.136 R^2_{adj}=-0.007 F=1.053 df=54 p=0.408			

*Used transformed variables.

Q3: When controlling for physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity) and situational factors (distance to the ED), did symptoms (acute, prodromal, and total) explain delay in seeking treatment?

Data were again checked for multicollinearity, multivariate normality, linearity, homoscedasticity, and outliers. Physiologic (age, race, first-degree relative with MI, and modifiable risk factors), psychological (temporal orientation and impulsivity), and situational factors (distance to ED) were entered into the multiple regression as the first block. Distance to the ED was transformed to meet the assumptions for regression. The symptom scores were entered as the next block. Three separate analyses were conducted with the second block reflecting prodromal scores, then acute scores, and finally total scores. This analysis determined the specific amount of variance that symptoms had on delay in seeking treatment above and beyond what was explained by physiologic, psychological, and situational factors. Table 11 shows the multiple regression summary for prodromal scores influencing delay when controlling for physiologic, psychological, and situational factors. Prodromal scores were transformed to meet the assumptions for regression. The individual that could not remember the amount of time she delayed was excluded from this analysis.

Table 11

Multiple Regression Summary for Prodromal Symptoms Scores Influencing Delay When Controlling for Other Physiologic, Psychological, and Situational Factors (N=55)

Varibles	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	-0.168	-0.364	0.388
Race	0.051	2.27	0.747
First-degree relative with MI	-0.034	-1.539	0.819
Temporal orientation	-0.064	-2.967	0.674
Impulsivity	0.139	0.284	0.352
*Distance to ED	0.234	2.429	0.123
Modifiable risk factors	-0.187	-1.799	0.224
*Prodromal score	-0.065	-0.376	0.681
R^2=0.139 R^2_{adj}=-0.011 ΔR^2=0.003 F=0.927 df=54 p=0.504			

*Used transformed variables.

Table 12 shows the multiple regression summary for acute scores influencing delay when controlling for physiologic, psychological, and situational factors. Delay was transformed to meet the assumptions for regression. The individual that could not remember the amount of time she delayed was excluded from this analysis.

Table 12

Multiple Regression Summary for Acute Symptoms Scores Influencing Delay When Controlling for Other Physiologic, Psychological, and Situational Factors (N=55)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	-0.181	-0.391	0.311
Race	0.047	2.079	0.764
First-degree relative with MI	-0.024	-1.097	0.869
Temporal orientation	0.057	-2.629	0.706
Impulsivity	0.15	0.306	0.312
*Distance to ED	0.233	2.410	0.116
Modifiable risk factors	-0.184	-1.773	0.220
Acute score	-0.147	-0.28	0.307
R^2=0.155 R^2_{adj}=-0.008 ΔR^2=0.02 F=1.056 df=54 p=0.41 p*≤0.05			

*Used transformed variables.

Total scores in this model reflect the sum of the prodromal and acute scores transformed. Finally, Table 13 shows the multiple regression summary for the total symptom scores influencing delay when controlling for other physiologic, psychological, and situational factors. Delay was transformed to meet the assumptions for regression. The individual that could not remember the amount of time she delayed was excluded from this analysis.

Table 13

Multiple Regression Summary for Total Symptoms Scores Influencing Delay When Controlling for Other Physiologic, Psychological, and Situational Factors (N=55)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	-0.201	-0.435	0.297
Race	0.045	2.023	0.772
First-degree relative with MI	-0.027	-1.238	0.853
Temporal orientation	-0.060	-2.795	0.69
Impulsivity	0.143	0.292	0.335
*Distance to ED	0.227	2.348	0.131
Modifiable risk factors	-0.199	-1.91	0.196
*Total score	-0.126	-0.791	0.417
R^2=0.148 R^2_{adj}=-0.000 ΔR^2=0.012 F=0.999 p=0.45			

*Used transformed variables.

Additional Analyses

Three extreme outliers were noted related to delays in seeking treatment. The three outliers had delays exceeding 5000 minutes. The multiple regression models were rerun with these outliers excluded. Also, the individual that could not remember her time delay was excluded. The following Table 14 displays the multiple regression summary for prodromal symptoms scores influencing delay when controlling for other physiologic, psychological, and situational factors with the three extreme outliers excluded from the analysis. The prodromal scores were transformed to meet the assumptions for regression.

Table 14

Multiple Regression Summary for Prodromal Symptoms Scores Influencing Delay When Controlling for Other Physiologic, Psychological, and Situational Factors with Extreme Outliers Removed (N=52)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	0.252	0.212	0.199
Race	0.052	0.951	0.747
First-degree relative with MI	0.226	3.888	0.135
Temporal orientation	-0.231	-4.027	0.142
Impulsivity	0.054	0.042	0.721
*Distance to ED	0.295	1.137	0.058
Modifiable risk factors	0.14	0.498	0.389
*Prodromal score	0.056	0.122	0.728
R^2=0.155 R^2_{adj}=-0.002 ΔR^2=0.002 F=0.988 df=51 *p*=0.459			

*Used transformed variables.

The following Table 15 displays the multiple regression summary for acute symptoms scores influencing delay when controlling for other physiologic, psychological, and situational factors with the three extreme outliers excluded from the analysis.

Table 15

Multiple Regression Summary for Acute Symptoms Scores Influencing Delay When Controlling for Other Physiologic, Psychological, and Situational Factors with Extreme Outliers Removed (N=52)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	0.216	0.182	0.233
Race	0.040	0.731	0.801
First-degree relative with MI	0.230	3.966	0.128
Temporal orientation	-0.224	-3.893	0.155
Impulsivity	0.053	0.041	0.727
*Distance to ED	0.284	1.094	0.064
Modifiable risk factors	0.129	0.46	0.421
Acute score	-0.014	-0.010	0.926
R^2=0.153 R^2_{adj}=-0.005 $\Delta R^{2=}$.000 F=0.971 df=51 p=0.471			

*Used transformed variables.

Total scores in this model reflect the sum of the prodromal and acute scores, and the total scores were transformed to meet the assumptions of multiple regression. The following Table 16 displays the multiple regression summary for total symptoms scores influencing delay when controlling for other physiologic, psychological, and situational factors with the 3 extreme outliers excluded from the analysis.

Table 16

Multiple Regression Summary for Total Symptoms Scores Influencing Delay When Controlling for Other Physiologic, Psychological, and Situational Factors with Extreme Outliers Removed (N=52)

Variables	Standardized Regression Coefficient	Unstandardized Coefficient	*p*
Age	0.232	.0195	0.235
Race	0.045	0.818	0.781
First-degree relative with MI	0.228	3.924	0.133
Temporal orientation	-0.227	-3.954	0.149
Impulsivity	0.052	0.040	0.733
*Distance to ED	0.287	1.109	0.063
Modifiable risk factors	0.134	0.478	0.41
*Total score	0.021	0.049	0.897
R^2=0.153 R^2_{adj}=-0.004 ΔR^2=.000 F=0.972 df=51 p=0.470			

*Used transformed variables.

A post hoc power analysis was calculated using NQuery®. The following Table 17 displays the summary of the post hoc power analysis.

Table 17

Post hoc Power Analysis

Multiple Regression Model	Power
Multiple regression for variables on prodromal scores	77
Multiple regression for variables on acute scores	37
Multiple regression for variables on total scores	77
Multiple regression for variables influencing delay	47
Multiple regression for prodromal symptoms scores influencing delay when controlling for other physiologic, psychological, and situational factors.	7
Multiple regression for acute symptoms scores influencing delay when controlling for other physiologic, psychological, and situational factors.	20
Multiple regression for total symptoms scores influencing delay when controlling for other physiologic, psychological, and situational factors.	13

A post hoc power analysis indicated that the sample was not large enough to lend sufficient power to the study. Effect sizes in this study were smaller than expected except for the multiple regression variables effect on prodromal and acute scores.

Summary

Fifty-six women were interviewed following discharge after hospitalization for MI to determine factors associated with delays in seeking treatment with MI. Participants were mostly widowed, divorced, or single, with a mean age of 70, and White. Forty-one percent reported an income of less than $20,000 per year and only 21.4% reported being employed either full or part-time. For the majority of the women, this was their first MI; however, only 23% attended cardiac rehabilitation after their MI. Modifiable risk factors, HTN, hypercholesterolemia, DM, physical inactivity, obesity, and tobacco abuse were prevalent in the sample. Age was negatively correlated with symptom scores (prodromal, acute, and total), with older individuals reporting lower scores on the MAPMISS. Delay and distance were positively correlated, while distance and impulsivity were negatively correlated. There was no correlation between scores on the MAPMISS (prodromal, acute, and total) and delay. Similarly, there was no correlation between the scores on the MAPMISS and impulsivity. There was no difference in the scores on the MAPMISS between women who were present oriented and those who were future oriented. The patient's reported delay in seeking treatment was positively correlated with the duration recorded in the medical record. Age was the only predictor of all symptom scores (prodromal, acute and total). None of the regression models were statistically significant for symptom scores predicting delay in this study. A post hoc power analysis indicated that the sample size was not large enough to lend sufficient power to the study.

CHAPTER V

DISCUSSION

The purposes of the study were to: (a) describe prodromal and acute symptoms of myocardial infarction (MI) in women and the relationship to delays in seeking treatment; (b) examine temporal orientation and impulsivity related to delays in seeking treatment in women with MI; and (c) comprehensively examine factors associated with symptoms (prodromal and acute) and delay. This chapter provides an interpretation of the findings, implications for nursing practice, and policy implications. Also, recommendations for future research are discussed.

Interpretation of Findings

The theory of unpleasant symptoms is comprised of three major components: the symptom experience, influencing factors that affect the symptom experience, and the outcome or performance (Lenz et al., 1997). The symptom experiences of the women in this study were explored and quantified using the McSweeney Acute and Prodromal Myocardial Infarction Symptom Scale (MAPMISS). Factors influencing the symptom experience include physiological, psychological, and situational factors. In this study physiologic factors examined included age, race, first degree relative that experienced a myocardial infarction (MI), and modifiable risk factors. Psychological factors investigated in this study included time duration estimation, impulsivity, and temporal orientation. Situational factors studied were

distance to the hospital. Additionally, the participants were asked about caregiving responsibilities on the MAPMISS. Finally, the outcome examined in this study was seeking treatment for symptoms of MI. Specifically; delays were estimated by the participant and compared with that recorded in the medical record.

The Symptom Experience

The symptom experience is often described as having two phases: prodromal and acute. Prodromal symptoms often appear intermittently in the weeks and months before an MI, yet may disappear or decrease in frequency or intensity after the MI (McSweeney et al., 2004). Women tend to report more prodromal symptoms than men (Hofgren, Karlson, & Herlitz, 1995). The current study found that approximately 84% of the women experienced prodromal symptoms in the weeks and months leading up to their MIs. This is slightly lower than that reported with previous research which found that over 90% of women experience prodromal symptoms for a period of time before the acute onset of symptoms (McSweeney, & Crane, 2000; McSweeney, Cleves, et al., 2010; McSweeney et al., 2005), but also much higher than the 54.2% reported in other studies (Hwang, Zerwic, & Jeong, , 2011; McSweeney, Cleves, et al., 2010; McSweeney & Crane, 2000; McSweeney, Lefler, & Crowder, 2005). Fatigue was also the most commonly experienced prodromal symptom and occurred in 66% of the women in the current study. This is consistent with previous research which reported that leading up to the MI 55-67.5% of women experienced fatigue which resolved after the MI (McSweeney & Crane, 2000; McSweeney et al., 2001). Only 32% of women in the current study

experienced chest pain as a prodromal symptom, which is similar to the findings in a previous study which found that of those experiencing prodromal symptoms, 34.5% experienced chest/epigastrium pain (Hwang et al., 2011). Women's prodromal symptoms can vary greatly in nature and duration (Lichtman et al., 2015). This was evident in the current study with the most reported prodromal symptoms besides fatigue and chest pain being indigestion (39.3%), shortness of breath (37.5%), sensations in arms and hands (35.7%), neurological symptoms (32.1%), and sleep disturbances (30.4%).

Acute symptoms are often more severe, unrelenting, and are usually the impetus for individuals to seek treatment (McSweeney, Cleves, et al., 2010). The acute symptom experience for women having an MI is often different than the experience of men, which typically includes discomfort in the jaw, neck, or back; weakness or lightheadedness; chest pain; discomfort in arms or shoulder; and shortness of breath (Centers for Disease Control and Prevention, 2008). Women having an MI typically report other more general symptoms, such as diaphoresis, fatigue, generalized chest discomfort, dyspnea, back pain, and gastrointestinal symptoms (Chen, Woods, Wilkie, & Puntillo, 2005; McSweeney, 1998). In the current study, women's symptoms varied widely; however, only 62.5% of women reported that they experienced chest pain as an acute symptom. Previous studies have found that 75-90% of women noted chest pain as an acute symptom with MI (Hwang, Ryan, & Zerwic, 2006; McSweeney, 1998; McSweeney et al., 2001).

When women describe chest "discomfort," they are more likely to rate it lower in intensity than the "classical" chest pain (Chen et al., 2005). Interestingly, previous studies found that the severity of pain did not influence delays, and the presence of chest pain, diaphoresis, and fainting were associated with decreased delays (Hofgren et al., 1988; Meischke, Larsen, & Eisenberg, 1998). In the current study there was no difference in delays between the women who experienced acute chest pain and those that did not. In fact, there was no difference in delay times for those women who experienced any other acute symptom and those who did not. Other acute symptoms that occurred more than 50% of the time for the women in this study were weakness (54%) and indigestion (57%). Other acute symptoms that occurred in more than a third of the women were arm/shoulder pain (39%), heart racing (37.5%), and neurological symptoms such as dizziness, fainting, vision problems, or headache (37.5%).

In the current study, symptom scores (prodromal, acute, and total) did not influence delay even when controlling for other physiologic, psychological, and situational factors. This contrasts with the findings from other studies that demonstrated that those experiencing a greater number of symptoms had shorter delays in seeking treatment with symptoms of MI. (Foster & Mallik, 1998; Khraim & Carey, 2009; Perkins-Porras, Whitehead, Strike, & Steptoe, 2009).

Physiologic Factors

Age. The median age of the participants was 71, with a range of 37 to 92 years. The median age for Moore County, the site of FirstHealth Moore Regional

Hospital, is 45 years old (Moore County Progress, 2015). The median age for the United States is 37.3 years old (United States Census Bureau, 2013). Median age for the patients admitted to FirstHealth Moore Regional Hospital in the past year with MI was 65, with the median age for Whites 71, for Blacks 62.2, and for Native Americans 44 (FirstHealth of the Carolinas, 2015). Women typically develop coronary heart disease (CHD) when they are up to 20 years older than men (Agency for Healthcare Research and Quality, 2012; Hawthorne, 1994). The average age of the women in this sample was 70 years old, and because CHD develops later in women, it is not surprising that this was the first MI for almost 77% of these women.

Age and symptom scores on the MAPMISS were negatively correlated; older women had lower scores or fewer symptoms. This was true for prodromal, acute, and total scores. Previous studies have shown that older adults experienced significantly fewer symptoms than younger individuals yet may experience more prodromal symptoms than younger individuals (Hwang et al., 2006; Hwang et al., 2011). However, another study found that post-menopausal women reported less prodromal symptoms (Norris et al., 2008). Other studies also report that older adults report fewer and less severe symptoms than younger individuals in a variety of settings and with other illnesses including cancer (Cataldo et al., 2013; Cheung, Le, & Zimmermann, 2009). Older adults are also more likely to have other acute and chronic illnesses. Thus, women may attribute their symptoms to normal aging even when symptoms are severe (Leventhal & Prohaska, 1986; Ryan & Zerwic, 2003).

However, this is not consistently documented in the literature. As a study noted that older adults seek treatment earlier with severe symptoms more so than with symptoms of longer duration (Prohaska, Keller, & Leventhal, 1987). In other words, older adults may view symptoms of longer duration as part of the normal aging process and initiate self-treatment strategies that have worked in the past, thus increasing delays (Zerwic, 1999).

Age was not a predictor of increased delays in this study. This is different than previous studies, which showed older individuals having increased delays (DeVon et al., 2010; Gibler et al., 2001; Hwang et al., 2006). Also, studies have also shown that women older than 65 are less likely to call 911 with MI symptoms than younger women (Newman et al., 2013). Yet, in this study there was no difference in age between those who called 911 and those who did not. There was no difference in distance to the hospital for those who called 911 and those who did not. This is in contrast to previous studies of rural patients that show that they are less likely to call 911 (Baker et al., 2011; Jackson & McCulloch, 2014). The reason that the results in this study differ from previous studies is unclear; however, FirstHealth of the Carolinas operates emergency medical service (EMS) agencies in 4 of the counties in the service area for the hospital. Brand recognition and trust in the FirstHealth organization may prompt rural elders to call 911 regardless of distance to the hospital.

Race. The sample in this study was comprised of 84% White women, 11% Black women, and 3% Native American women. While not racially representative of

the area served by FirstHealth Moore Regional Hospital (58% White, 26% Black, and 5% Native American), North Carolina (68.5% White, 21.5% Black, and 1.3% Native American), or the United States (77.7% White, 13.2 % Black, and 1.2% Native American), it is more similar to the racial makeup of those admitted with MI in the past year to FirstHealth Moore Regional Hospital (United States Census Bureau, 2010). Patients admitted to FirstHealth Moore Regional Hospital within the past year with MI were 72.3% White, 20.8% Black, 4.3% Native American, 0.6% Asian, and 0.4% Hispanic. The NC census reported 2.5% Asians and 8.8% Hispanics residing in the state, and the US census reported 5.3% Asians and 17.1% Hispanics residing in the US (United States Census Bureau, 2010). Other races were not represented in the sample for the current study. The number of Asians and Hispanics admitted to FirstHealth Moore Regional Hospital with MI in the past year was very small (<1%), so lack of representation in the sample for the current study is not unexpected (FirstHealth of the Carolinas, 2015).

Race was not a predictor of delay in this study. This contrasts with previous studies that showed that Blacks had increased delays when compared with other races (Gibler et al., 2001; Lee, Bahler, Chung, Alonzo, & Zeller, 2000; Zerwic, Ryan, DeVon, & Drell, 2003). However, in another study median delay for Black women was shorter, but not significantly, than for White women (McSweeney et al., 2007). Previous studies have included largely urban populations. When examining race and delay, the current study included rural residents. Further research is needed to ascertain treatment-seeking delays in rural Blacks.

In this study, all of the Black and Native American women reported chest pain as an acute symptom, but only 55.3% of the White women reported chest pain as an acute symptom. This finding is different that the findings in a previous study that found that acute chest pain was the most common symptom for White and Hispanic women but not for Black women (McSweeney, O'Sullivan, et al., 2010). There were no significant differences between the races on prodromal, acute, or total symptom scores on the MAPMISS.

First degree relative with myocardial infarction. Sixty-six percent of the women interviewed reported that they had a first degree relative with MI. This is slightly lower than the prevalence of 73% reported in another study (Swanson & Pearson, 2001). Despite the strong association between family history and CHD, first-degree relative with MI was not a predictor of delay. There was also no difference in the presence of modifiable risk factors between those having first degree relatives with MI and those that did not. In fact, the summative risk scores, including hypertension (HTN), hypercholesterolemia, diabetes mellitus (DM), physical inactivity, tobacco abuse, and obesity did not differ between those having first degree relatives with MI and those who did not. This is consistent with previous studies of relatives of women with MI which found that even knowledge of a genetic predisposition to CHD does not lead to modification of risk factors (Allen & Blumenthal, 1998; Imes & Lewis, 2014).

Modifiable risk factors. Modifiable risk factors contribute to approximately 80% of cases of CHD (Hippisley-Cox et al., 2007). Eighty percent of the women in

this study reported being diagnosed with HTN. This is much higher than the reported 32.6% of adults older than age 20 in the United States (US) with HTN (Mozaffarian et al., 2015). However, the mean age of the participants in this study was 70, and HTN is much more prevalent in older adults. While over 50% of adults have high cholesterol in the US (Mozaffarian et al., 2015), 75% of women in this study had hypercholesterolemia. Only 10% of adults in the US have diabetes, with 90-95% having Type 2 DM (Mozaffarian et al., 2015). One half of the women in this study had diabetes. Physical inactivity is a major risk factor for cardiovascular disease, but 55% of the women in this study reported that they did not participate in any physical activity for exercise, such walking, running, golfing, or gardening. This is higher than the 30.5% of individuals who do not engage in leisure-time physical activity in the US reported by the National Health Interview Survey (Mozaffarian et al., 2015). Almost 70% of adults in the US are overweight or obese, with 35% of these being obese (Mozaffarian et al., 2015). This is similar to the obesity rate reported in this study of 32%. Currently 17.9% of the US population smokes, 20.4% of men and 15.5% of women (Mozaffarian et al., 2015). Almost a quarter of the women in this study smoked at the time of their MIs. This is much higher than the national rate and very concerning due to the prevalence in this sample of other modifiable risk factors.

Psychological Factors

Time duration estimation. There is a paucity of research that has addressed time duration estimation from a patient's perspective during a

potentially life-threatening event. In determining time duration estimation, the participant was asked to estimate how much time elapsed from symptom onset to their first medical contact. Time duration estimation may be affected during highly stressful events, such as when experiencing symptoms of an MI. The adrenal release of catecholamines during times of stress may affect time duration estimation, which is a function of memory (Block & Zakay, 1997; Rodrigues et al., 2009).

In this study, the participants' recollection of time duration of acute symptoms was positively correlated with that recorded in the medical record by healthcare providers indicating that the symptom experience did not affect time duration estimation when all patients were included in the analysis. Twenty-one women in the study (37.5%) perceived that their symptoms were life-threatening. When only these women were included in the analysis, there was no statistically significant correlation between the retrospective time duration estimation and the medical record duration of symptoms. Thus, in this group the perceptions of the symptoms affected their memory of the time duration. This is consistent with the findings in a study involving 155 patients with MI which found that prehospital delay recorded in the medical record was shorter than the time duration remembered by patients, and this difference was more marked in those with more severe symptoms of MI (Fukuoka et al., 2005). This has clinical implications in that patients with perceptions of higher levels of threat were not as accurate in their retrospective time duration estimation. Further research is needed to evaluate time duration estimation during perceived threat.

Temporal orientation. Previous research has shown that temporal orientation is an important factor in whether an individual has a more proactive or reactive approach to disease management (Alberts & Dunton, 2008). Most of the women in this study were future oriented (71.4%), compared with 23.2% that were present oriented, and 5% who were mixed. This means that the majority had a proactive approach and as such, should have shorter delay times. However, temporal orientation was not a predictor of delay in this study.

There was no association between temporal orientation and symptom scores (prodromal, acute, and total). No previous research was found that evaluated the relationship between symptom scores and temporal orientation. Also, there were no differences in modifiable risk factors (hypertension [HTN], hypercholesterolemia, diabetes mellitus [DM], physical inactivity, tobacco abuse, and obesity) in those with present temporal orientation and those with future orientation in the study. Similarly, there was no relationship between race, age, income, and temporal orientation. This differs from previous studies that found that Blacks and older adults tended to be more present oriented (Bergadaa, 1990; Brown & Segal, 1996). Interestingly, those earning higher incomes were more likely to be future oriented in the current study. It should be noted that previous studies have found that individuals may have different temporal orientations in different settings; for example, future oriented in professional settings and present oriented in personal matters (Goodenough, 1981). Further research is needed to ascertain the influence of temporal orientation on health behaviors and decision-making.

Impulsivity. Impulsivity is characterized by quick reactions to stimuli without regard to consequences (Moeller et al., 2001). Impulsivity scores were significantly different between the present and future oriented groups, with present oriented individuals being more impulsive. This is consistent with a previous study (Baumann & Odum, 2012). Impulsivity was not correlated with symptom scores (prodromal, acute, and total). No previous research has studied impulsivity and symptom scores. Furthermore, impulsivity was not a predictor of delay in women seeking treatment with symptoms of MI, and was also not associated with HTN, hypercholesterolemia, DM, physical inactivity, and obesity. However, it was significantly associated with tobacco abuse. This is consistent with a previous study noting that impulsivity is a predictor of maladaptive behaviors such as tobacco abuse (Leroy, Loas, & Perez-Diaz, 2013). Also, in the current study those with lower incomes had higher impulsivity scores. The reasons for this are unclear; however, in a previous study, those with lower levels of education had lower levels of cognitive restraint, often thought of as the antithesis of impulsivity (Lyke & Spinella, 2004).

Impulsivity was also not a factor in use of 911 with this study. Impulsivity was negatively correlated with distance to the hospital; those with higher impulsivity scores travelled less distance to the hospital. There have been no previous studies linking impulsivity and distance to care, so the reason for this finding is unclear, and future studies may be needed for validation and clarification.

Situational Factors

Rural setting. FirstHealth Moore Regional Hospital is surrounded by several rural counties. The mean distance to the hospital travelled by the women in the study was 17.1 miles. While almost 70% of the women lived within this distance from the hospital, over 30% had to travel greater than this distance, mostly from rural areas. Although a previous study showed that those in rural areas delay longer than those in urban areas (Baker et al., 2011), distance to the emergency department (ED) was not a predictor of delay in this study. There is a paucity of research studies on rural women with MI and delays in seeking treatment. Even though the average distance travelled to the ED for women in this study was 17.1 miles, the range of distances was expansive (0.1-247 miles). In fact, one woman was on vacation with her husband and had him drive her back home so that she could come to "her" hospital. Other factors, such as trust and comfort with a hospital or provider, may be more important to some than distance. Because traveling longer distances means increased delays, and any delay increases myocardial damage during an MI. This is concerning and should be further explored.

There was no statistically significant difference in the distance travelled to the hospital between those who called an ambulance and those who did not. Thirty-two percent of the women in this study called an ambulance for transport to the ED when they experienced symptoms of MI. Another study showed that less than 25% of patients with MI call 911 for transport to the ED (Newman et al., 2013). Again, perhaps more women in this study called 911 due to FirstHealth of the Carolina's

operation of four county ambulance services that provide coverage to the service area. Since 68% of women did not come into the hospital by ambulance, it would seem that the delay to first medical contact would be longer than for those who did call 911; however, this study found that there was no statistically significant difference in delay in those who called 911 compared to those who came into the hospital by personal vehicle.

Caregiving responsibilities. Only 13 (23%) of the women in the study reported that they were a caregiver to an elderly parent, ill husband, disabled child, or grandchild before their MI. Other studies have found that caregivers often neglected preventive health practices due to caregiving responsibilities, minimized their own illnesses in order to continue caring for others, and did not allow adequate time to recuperate from illnesses (Burton, Newsom, Schulz, Hirsch, & German, 1997; Martinez-Marcos & De la Cuesta-Benjumea, 2014; Matthews, Dunbar-Jacob, Sereika, Schulz, & McDowell, 2004; Moser, McKinley, Dracup, & Chung, 2005). Additionally, one study found that women delayed longer to avoid troubling others, and this was not a factor in men's decisions to seek care (Moser et al., 2005). In this study being a caregiver did not affect delays in seeking treatment. The reason for this is unclear, and further research is indicated to ascertain caregivers' treatment-seeking delays with MI symptoms

Outcome

Delay. Studies have shown that median delays for women range from 180-570 minutes and may even extend for days (DeVon et al., 2010; Reilly et al., 1994;

Ting et al., 2008). Symptom duration prior to first medical contact had a very large range in this study (10-20,160 minutes), but the median duration was 60 minutes, which may be a better measure of central tendency due to extreme outliers (> 5000 minutes). Median delays for women in this study were less than those in other studies, but like previous studies the range of delays is very large. One study of 256 patients admitted with MI found that women delayed 9.5 hours compared with 6 hours for men (DeVon et al., 2010). However, in another large study with 5,207 patients, the median delay was 2 hours (Meischke, Ho, Eisenberg, Schaeffer, & Larsen, 1995). In another study, of 1009 women, Black women's median delay was 1.0 hour compared with 1.5 for White women (McSweeney et al., 2007). The median delay for older adults was 2.1 hours and for younger adults 2.5 hours in one study of 239 patients (Hwang et al., 2006). Another study of 271 patients found that adults with prodromal symptoms delayed longer than those who did not, with a median of 15 hours as compared with 4 hours (Hwang et al., 2011). Similarly, a qualitative study with 42 participants found that those individuals with a slow gradual onset of symptoms delayed longer than those with a more rapid onset of symptoms (O'Donnell & Moser, 2012). Those with slow-onset symptoms delayed anywhere from 2 hours to days. Those with fast-onset symptoms usually delayed less than 2 hours. Factors leading to delays include clinical, socioeconomic, and psychosocial factors. Clinical factors leading to delays include the symptom experience, specifically atypical symptoms or the severity of symptoms (Abed, Khalil, & Moser, 2015; Canto et al., 2000; Dracup & Moser, 1997; Gibler et al., 2001; Johnson & King,

1995; Meischke et al., 1995; Reilly et al., 1994). Although symptoms were shown to affect delay, in the current study prodromal, acute, and total scores were not correlated with delays. The symptoms (prodromal, acute, and total scores) were also not a predictor of delays, even when controlled for other variables, such as age, race, first-degree relative with MI, temporal orientation, impulsivity, distance to the ED, and modifiable risk factors. This was also true when extreme outliers (those who delayed >5000 minutes) were excluded from the analysis. These findings differ from the results from previous studies that show symptom severity and number of symptoms influence delay in seeking treatment with MI. (Dracup & Moser, 1997; Gibler et al., 2001; Hwang et al., 2011; Meischke et al., 1995).

Factors contributing to delays have also been identified in previous studies, including female gender, older age, minority groups, transport by private vehicle rather than by ambulance, low socioeconomic status, and lower educational level (Meischke et al., 1998; Reilly et al., 1994; Richards, Funk, & Milner, 2000; Winkleby, Jatulis, Frank, & Fortmann, 1992). Physiologic factors such as age, race, first degree relative with MI and the presence of modifiable risk factors did not predict delay in the current study. There was no difference in delays between those who had previously sought treatment with similar symptoms and those who had not. No previous research has examined first-degree relatives, presence of modifiable risk factors, and having previously sought treatment with similar symptoms and their association with delays. In the current study, distance to the ED and mode of transport to the ED did not predict delay either. Delays in this study were not

different between those with lower and higher education and those with lower and higher incomes. However, lower income women had a mean delay of almost 900 minutes longer than women earning $20,000 per year or more. This was not statistically significant, but may be clinically important, because delay is related to cardiac damage and poorer outcomes. Further research is needed to address delays in women of lower socioeconomic status.

Psychosocial factors contributing to delay have also been identified in the literature. These include emotional, cognitive, and behavioral responses (Dempsey, Dracup, & Moser, 1995; Hwang & Jeong, 2012; Johnson & King, 1995; Khraim & Carey, 2009; Meischke et al., 1995; Moser et al., 2006; Perkins-Porras et al., 2009; Zegrean, Fox-Wasylyshyn, & El-Masri, 2009). Temporal orientation and impulsivity did not predict delay in the current study. There have been no other studies involving temporal orientation and impulsivity in delays in seeking treatment for symptoms of MI. Further research is needed to identify other psychosocial factors contributing to delays in seeking treatment with MI.

Implications for Nursing

The American Heart Association advocates a three-pronged approach to improve cardiovascular health: individual, healthcare systems, and population approaches (Mozaffarian et al., 2015). Lifestyle modification and treatments at the individual level include prevention through control of health behaviors, modification of risk factors, and prompt treatment of acute events. Nurses are uniquely positioned to optimally influence primary prevention to preserve

cardiovascular function in those with optimal health, such as children and adolescents, and maintain function for those with less than optimal health. Nurses provide education about lifestyle modification including good nutrition, increasing physical activity, and avoiding tobacco. Nurses also intervene to maintain function, and this includes treatment of acute cardiac events and disease management of cardiovascular risk factors, such as HTN, DM, and hypercholesterolemia. Targeting those at high risk for CHD, nurses can provide individualized counseling about symptoms of MI (including atypical symptoms), actions to take should they experience any symptoms and the rationale for these actions, and education to significant others in the home (Lefler, 2002; Meischke, Mitchell, et al., 2000). Through these interventions nurses can influence cardiovascular health across the continuum.

Even though heart disease is the leading cause of death for women, many are not aware that they are at risk for CHD, even when they have multiple comorbidities, such as HTN and DM (American Heart Association, 2015). Furthermore, many are not aware that the symptoms of MI are often different than the "classic" symptoms and may often not include chest pain unless it is a later sign. Valuable minutes are wasted as women seek to interpret and assign meaning to their symptoms (Dracup & Moser, 1997; Johnson & King, 1995). In the current study, women who perceived their symptoms as life-threatening had a mean delay of over a 1000 minutes more than those who did not perceive their symptoms as

life-threatening. This was not statistically significant, but certainly clinically significant, as any delays adversely affect outcomes.

System approaches to improved access and care for women with MI include education of emergency personnel about women's risk and symptoms. Nurses in ED who triage or advanced practice nurses in clinics are often the first healthcare providers to see women presenting with symptoms of MI. Heightened awareness about symptoms may lead to an increased index of suspicion for MI in women presenting with symptoms that are not the "classic" symptoms, such as fatigue, weakness, and gastrointestinal symptoms. Other healthcare professionals must be educated about women's unique symptoms and risk for CHD. A study found that if healthcare professionals encourage patients to seek treatment for symptoms of MI, then the patients are less concerned about whether they acted correctly when seeking treatment and reported that they would be less likely to delay if the symptoms occur again. Therefore, healthcare professionals, including nurses, should reassure these patients that that they did the "right" thing in immediately seeking treatment (Meischke, Mitchell, et al., 2000). Twenty-two of the women (39.3%) in the current study had previously sought treatment for similar symptoms. Although not statistically significant, it is clinically significant that these women had mean delays 400 minutes longer than those women who had not previously sought treatment with similar symptoms. It is concerning that previous experience with healthcare providers may have contributed to delays. Previous studies report that women who present with non-classical cardiac symptoms are more likely to have

their symptoms labelled psychological (McCormick & Bunting, 2002; Nieuwenhoven & Klinge, 2010). Thus, it is important that women feel that their symptoms are being taken seriously.

Population approaches to improve cardiovascular health include education for women, such as what has been provided in the American Heart Association's Go Red for Women Campaign. Programs like this should continue; however, such education has had limited success in reducing delays in treatment seeking for women with MI (Dracup et al., 2009; Mooney et al., 2012). However, targeting individuals at risk for MI for structured education and counseling showed an increase in knowledge and perceived control in one study (Tullmann, Haugh, Dracup, & Bourguignon, 2007). Whether this will translate into reduced treatment seeking delays is unknown. Further research is needed to evaluate the effect of targeted education for high-risk individuals on treatment seeking delays.

From school nurses and advanced practice nurses in outpatient clinic settings to nurses in EDs and coronary care units, nurses must get involved to raise awareness of CHD risks for individuals and behavior modification to improve health for all. With the disparities identified in women with CHD, it is important that women be included in cardiovascular medical research in the development of new treatment and procedures.

Nurses must advocate for women through their professional organizations and through the legislature for allocation of resources, such as for education for prevention and management of symptoms, and in policy development, such as

funding for health screenings and risk assessment. We know that individuals with documented CHD have 5 to 7 times the risk of having an MI or dying than the general population (Mozaffarian et al., 2015), and for those over the age of 65 years, 21% of White women and 28% of Black women will have another MI or fatal CHD within 5 years of a first MI (Mozaffarian et al., 2015). Identification of those at risk, implementation of risk modification, and targeted education about symptoms of MI and the importance of immediate care may help improve outcomes for women with CHD. Targeted interventions towards those most at risk are of paramount importance in proactive management of individuals with CHD.

Limitations

The limitations of this study include lack of randomization, self-report potentially influenced by perceived social desirability, and asking for recall of events that may have occurred up to three years prior to the interview. Participants were recruited over the telephone, so those not having a telephone were not represented. As this was a cross-sectional study, it only represented one point in time. A power analysis was conducted prior to recruitment that indicated that a sample size of 56 was needed to detect an R^2 of 0.25, with 9 predictors, with a 5% chance of a Type I error and a 20% chance of a Type II error. A post hoc power analysis indicated that the sample was not large enough to lend sufficient power to the study.

Recommendations for Future Research

There are gaps in the literature related to women's delays in seeking treatment with symptoms of MI. The literature identifies those most likely to have

increased delays: females, older individuals, minorities, lower socioeconomic status, lower education level, those living alone, perceived low risk for CHD, uncertainty of meaning of symptoms, and symptoms not matching expectation of MI (Abed et al., 2015; Canto et al., 2000; Dracup & Moser, 1997; Johnson & King, 1995; Meischke et al., 1995; Meischke et al., 1998; Reilly et al., 1994; Richards et al., 2000; Winkleby et al., 1992). However, there has been limited success with interventions devised to reduce delays. Public health campaigns to raise awareness of women's symptoms and the importance of early treatment have been utilized, but few have made any difference in delays (Bett et al., 1993; Blohm et al., 1994; Dracup et al., 2009; Gaspoz et al., 1996; Ho et al., 1989; Luepker et al., 2000; Meischke et al., 1997; Moses et al., 1991). Other factors may be at play in delays and must be identified to improve outcomes for women with MI. A novel approach was taken in the current study by examining the influence of temporal orientation and impulsivity on delays; however, neither was shown to influence delays. A post hoc power analysis indicated that the sample size was not adequate to lend sufficient power to this study. Other studies with larger sample size may yield different findings.

The symptom experience (prodromal, acute, and total scores) did not predict delays in this study, even when controlling for other factors (age, race, first-degree relative with MI, temporal orientation, impulsivity, distance to the hospital, and modifiable risk factors). Furthermore; age, race, first-degree relative with MI, temporal orientation, impulsivity, distance to the hospital and modifiable risk factors independently did not predict delays. Inadequate sample size may be a

factor in these insignificant findings. Further research is necessary to understand factors related to women's delays in seeking treatment for symptoms of MI, specifically in rural populations, time duration estimation during perceived threat, and the influence of temporal orientation on health behaviors and decision-making. A replication of this study including men from both urban and rural areas may yield further important information about sex differences in treatment seeking delays. Also, future studies should determine what the decision delay was in individuals with MI (excluding transport times). It may also yield valuable information if it can be determined what a healthcare provider told them if they had previously sought treatment with similar symptoms.

Summary

The purpose of this study was to determine the influence of physiologic, psychological, and situational factors on the symptom experience and treatment seeking delays of women having an MI. Additionally, the influence of the symptom experience on treatment seeking delay was determined, while controlling for physiologic, psychological, and situational factors. Symptom scores measured by the MAPMISS were not correlated with delays in this study. Symptoms scores were also not correlated with impulsivity, as measures by the BIS-11. There were no statistically significant differences between women who were present oriented and those who were future oriented. Of the physiologic, psychological, and situational factors measured, only age was predictor of symptom scores (prodromal, acute, and total). Older women had lower scores. None of the physiologic, psychological, and

situational factors were predictors of delay in a multiple regression model. None of the symptom scores predicted delay when controlling for other physiologic, psychological, and situational factors. Finally, a post hoc power analysis indicated that the sample size was not large enough to lend sufficient power to the study. Further research is needed to determine what other factors influence treatment seeking delay in women experiencing symptoms of MI.

REFERENCES

Abed, M. A., Khalil, A. A., & Moser, D. K. (2015). The contribution of symptom incongruence to prehospital delay for acute myocardial infarction symptoms among Jordanian patients. *Research in Nursing and Health, 38*(3), 213-221. doi: 10.1002/nur.21658

Adams, J. (2012). Consideration of immediate and future consequences, smoking status, and body mass index. *Health Psychology, 31*(2), 260-263. doi: 10.1037/a0025790

Agency for Healthcare Research and Quality. (2012, October 2012). Cardiovascular disease and other chronic conditions in women: Recent findings. Retrieved May 4, 2014, from http://www.ahrq.gov/research/findings/factsheets/women/womheart/womheart.pdf

Alberts, J., & Dunton, G. F. (2008). The role of temporal orientation in reactive and proactive illness management. *Psychology & Health, 23*(2), 175-193.

Allen, J. K., & Blumenthal, R. S. (1998). Risk factors in the offspring of women with premature coronary heart disease. *American Heart Journal, 135*(3), 428-434.

American Heart Association. (2012). Understanding your risk of heart attack. Retrieved May 26, 2014, from http://www.heart.org/HEARTORG/Conditions/HeartAttack/UnderstandYou

rRiskofHeartAttack/Understand-Your-Risk-of-Heart-Attack_UCM_002040_Article.jsp

American Heart Association. (2013). American Heart Association recommendations for physical activity in adults. Retrieved May 18, 2014, from http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/StartWalking/American-Heart-Association-Recommendations-for-Physical-Activity-in-Adults_UCM_307976_Article.jsp

American Heart Association. (2013). Physical activity in older Americans. Retrieved November 26, 2014, from http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/FitnessBasics/Physical-Activity-in-Older-Americans_UCM_308039_Article.jsp

American Heart Association. (2013). The price of inactivity. Retrieved November 26, 2014, from http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/FitnessBasics/The-Price-of-Inactivity_UCM_307974_Article.jsp

American Heart Association. (2014). American Heart Association recommendations for physical activity in adults. Retrieved November 26, 2014, from http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/FitnessBasics/American-Heart-Association-Recommendations-for-Physical-Activity-in-Adults_UCM_307976_Article.jsp

American Heart Association. (2014). Drug therapy for cholesterol. Retrieved May 26, 2014, from

http://www.heart.org/HEARTORG/Conditions/Cholesterol/PreventionTreatmentofHighCholesterol/Drug-Therapy-for-Cholesterol_UCM_305632_Article.jsp

American Heart Association. (2014). Go red for women. Retrieved November 26, 2014, from https://www.goredforwomen.org/

American Heart Association. (2014). Obesity information. Retrieved November 26, 2014, from http://www.heart.org/HEARTORG/GettingHealthy/WeightManagement/Obesity/Obesity-Information_UCM_307908_Article.jsp

American Heart Association. (2014). Prevention and treatment of high cholesterol. Retrieved May 26, 2014, from http://www.heart.org/HEARTORG/Conditions/Cholesterol/PreventionTreatmentofHighCholesterol/Prevention-and-Treatment-of-High-Cholesterol_UCM_001215_Article.jsp

American Heart Association. (2014). Warning signs of a heart attack. Retrieved May 20, 2014, from http://www.heart.org/HEARTORG/Conditions/HeartAttack/WarningSignsofaHeartAttack/Warning-Signs-of-a-Heart-Attack_UCM_002039_Article.jsp

American Heart Association. (2015). Heart attack symptoms in women. Retrieved July 29, 2015, from http://www.heart.org/HEARTORG/Conditions/HeartAttack/WarningSignsofaHeartAttack/Heart-Attack-Symptoms-in-Women_UCM_436448_Article.jsp

Andresdottir, M. B., Sigurdsson, G., Sigvaldason, H., Gudnason, V., & Reykjavik Cohort, S. (2002). Fifteen percent of myocardial infarctions and coronary revascularizations explained by family history unrelated to conventional risk factors. The Reykjavik Cohort Study. *European Heart Journal, 23*(21), 1655-1663.

Angerud, K. H., Brulin, C., Naslund, U., & Eliasson, M. (2013). Longer pre-hospital delay in first myocardial infarction among patients with diabetes: an analysis of 4266 patients in the northern Sweden MONICA Study. *BMC Cardiovascular Disorders, 13*, 6. doi: 10.1186/1471-2261-13-6

Arslanian-Engoren, C. (2007). Black, Hispanic, and white women's perception of heart disease. *Progress in Cardiovascular Nursing, 22*(1), 13-19.

Averill, J. B. (2012). Priorities for action in a rural older adults study. *Family and Community Health, 35*(4), 358-372. doi: 10.1097/FCH.0b013e318266686e

Avis, N. E., Smith, K. W., & McKinlay, J. B. (1989). Accuracy of perceptions of heart attack risk: What influences perceptions and can they be changed? *American Journal of Public Health, 79*(12), 1608-1612.

Ayanian, J. Z., & Epstein, A. M. (1991). Differences in the use of procedures between women and men hospitalized for coronary heart disease. *New England Journal of Medicine, 325*(4), 221-225. doi: 10.1056/NEJM199107253250401

Baker, T., McCombe, S., Mercer-Grant, C., & Brumby, S. (2011). Chest pain in rural communities: Balancing decisions and distance. *Emergency Medicine Australasia, 23*, 337-345.

Banerjee, A., Silver, L. E., Heneghan, C., Welch, S. J., Bull, L. M., Mehta, Z., & …Rothwell, P. M. (2009). Sex-specific familial clustering of myocardial infarction in patients with acute coronary syndromes. *Circulation: Cardiovascular Genetics, 2*(2), 98-105. doi: 10.1161/CIRCGENETICS.108.806562

Bank, I., Libourel, E. J., Middeldorp, S., Hamulyak, K., van Pampus, E. C., Koopman, M. M., .& …Buller, H. R. (2005). Elevated levels of FVIII:C within families are associated with an increased risk for venous and arterial thrombosis. *Journal of Thrombosis and Haemostasis, 3*(1), 79-84. doi: 10.1111/j.1538-7836.2004.01033.x

Barantke, M., Krauss, T., Ortak, J., Lieb, W., Reppel, M., Burgdorf, C., & Bonnemeier, H. (2008). Effects of gender and aging on differential autonomic responses to orthostatic maneuvers. *Journal of Cardiovascular Electrophysiology, 19*(12), 1296-1303.

Barratt, E. S. (1959). Anxiety and impulsiveness related to psychomotor efficiency. *Perceptual and Motor Skills, 9*, 191-198.

Barratt, E. S. (1965). Factor analysis of some psychometric measures of impulsiveness and anxiety. *Psychological Reports, 16*, 547-554.

Barratt, E. S. (1983). The biological basis of impulsiveness: The significance of timing and rhythm disorders. *Personality and Individual Differences, 4*, 387-391.

Barsevick, A. M., Whitmer, K., Nail, L. M., Beck, S. L., & Dudley, W. N. (2006). Symptom cluster research: Conceptual, design, measurement, and analysis issues. *Journal of Pain and Symptom Management, 31*(1), 85-95.

Baumann, A. A., & Odum, A. L. (2012). Impulsivity, risk taking, and timing. *Behavioral Processes, 90*(3), 408-414.

Bergadaa, M. M. (1990). The role of time in the action of the consumer. *Journal of Consumer Research, 17*, 289-302.

Berger, P. B., Ellis, S. G., Holmes, D. R., Jr., Granger, C. B., Criger, D. A., Betriu, A., . . . Califf, R. M. (1999). Relationship between delay in performing direct coronary angioplasty and early clinical outcome in patients with acute myocardial infarction: results from the global use of strategies to open occluded arteries in Acute Coronary Syndromes (GUSTO-IIb) trial. *Circulation, 100*(1), 14-20.

Berlin, H. A., & Rolls, E. T. (2004). Time perception, impulsivity, emotionality, personality in self-harming borderline personality disorder patients. *Journal Personality Disorders, 18*, 358-378.

Berlin, H. A., Rolls, E. T., & Kischka, U. (2004). Impulsivity, time perception, emotion and reinforcement sensitivity in patients with orbitofrontal cortex lesions. *Brain, 127*(Pt 5), 1108-1126. doi: 10.1093/brain/awh135

Bertuzzi, M., Negri, E., Tavani, A., & La Vecchia, C. (2003). Family history of ischemic heart disease and risk of acute myocardial infarction. *Preventive Medicine, 37*(3), 183-187.

Bett, N., Aroney, G., & Thompson, P. (1993). Impact of a national educational campaign to reduce patient delay in possible heart attack. *Australian and New Zealand Journal of Medicine, 23*(2), 157-161.

Block, R. A. (1989). Experiencing and remembering time: Affordances, context, and cognition. In L. Levin & D. Zakay (Eds.), *Time and Human Cognition: A Life-Span Perspective*. North Holland: Elsevier Science Publishers B.V.

Block, R. A., Buggie, S. E., & Matsui, F. (1996). Beliefs about time: Cross-cultural comparisons. *The journal of Psychology, 130*(1), 5-22.

Block, R. A., Hancock, P. A., & Zakay, D. (2000). Sex differences in duration judgments: A meta-analytic review. *Memory and Cognition, 28*(8), 1333-1346.

Block, R. A., Hancock, P. A., & Zakay, D. (2010). How cognitive load affects duration judgments: A meta-analytic review. *Acta Psychologica, 134*(3), 330-343. doi: 10.1016/j.actpsy.2010.03.006

Block, R. A., & Zakay, D. (1997). Prospective and retrospective duration judgments: A meta-analytic review. *Psychon Bulletin Review, 4*(2), 184-197. doi: 10.3758/BF03209393

Block, R. A., Zakay, D., & Hancock, P. A. (1998). Human aging and duration judgments: A meta-analytic review. *Psychology and Aging, 13*(4), 584-596.

Block, R. A., Zakay, D., & Hancock, P. A. (1999). Developmental changes in human duration judgments: A meta-analytical review. *Developmental Review, 19*, 183-211.

Blohm, M., Hartford, M., Karlson, B. W., Karlsson, T., & Herlitz, J. (1994). A media campaign aiming at reducing delay times and increasing the use of ambulance in AMI. *American Journal of Emergency Medicine, 12*(3), 315-318.

Botto, N., Maffei, S., Manfredi, S., Colombo, M. G., Mazzone, A. M., & Andreassi, M. G. (2011). Prothrombotic mutations, family history and the risk of thrombosis in postmenopausal women: implications for hormone replacement therapy. *Climacteric, 14*(1), 25-30. doi: 10.3109/13697137.2010.528814

Brady, W. J., Perron, A. D., & Riviello, R. (2001). Acute MI: How to avoid pitfalls in reperfusion therapy. *Consultant, 41*(11), 1505-1508.

Brant, J. M., Beck, S., & Miaskowski, C. (2010). Building dynamic models and theories to advance the science of symptom management research. *Journal of Advanced Nursing, 66*(1), 228-240. doi: 10.1111/j.1365-2648.2009.05179.x

Brown, C. M., & Segal, R. (1996). Ethnic differences in temporal orientation and its implications for hypertension management. *Journal of Health and Social Behavior, 37*(4), 350-361.

Brown, C. M., & Segal, R. (1997). The development and evaluation of the hypertension temporal orientation (HTO) scale. *Ethnicity and Disease, 7*(1), 41-54.

Burton, L. C., Newsom, J. T., Schulz, R., Hirsch, C. H., & German, P. S. (1997). Preventive health behaviors among spousal caregivers. *Preventive Medicine, 26*(2), 162-169.

Cameron, K., Song, J., Manheim, L., & Dunlop, D. (2010). Gender disparities in health and healthcare use among older adults. *Journal of Women's Health, 19*(9), 1643-1650.

Canto, J. G., Rogers, W. J., Goldberg, R. J., Peterson, E. D., Wenger, N. K., Vaccarino, V., . . . Zheng, Z. J. (2012). Association of age and sex with myocardial infarction symptom presentation and in-hospital mortality. *JAMA: Journal of the American Medical Association, 307*(8), 813-822. doi: 10.1001/jama.2012.199

Canto, J. G., Shlipak, M. G., Rogers, W. J., Malmgren, J. A., Frederick, P. D., Lambrew, C. T., . . . Kiefe, C. I. (2000). Prevalence, clinical characteristics, and mortality among patients with myocardial infarction presenting without chest pain. *JAMA: Journal of the American Medical Association, 283*(24), 3223-3229.

Carey, S. A., & Gray, J. R. (2012). Women and heart disease: A diagnostic challenge. *Journal for Nurse Practitioners, 8*(6), 458-463. doi: 10.1016/j.nurpra.2012.02.024

Carter, C. O. (1961). The inheritance of congenital pyloric stenosis. *British Medical Bulletin, 17*, 251-254.

Cataldo, J. K., Paul, S., Cooper, B., Skerman, H., Alexander, K., Aouizerat, B., . . . Miaskowski, C. (2013). Differences in the symptom experience of older versus younger oncology outpatients: A cross-sectional study. *BMC Cancer, 13*, 6-6. doi: 10.1186/1471-2407-13-6

Centers for Disease Control and Prevention. (2008). Disparities in adult awareness of heart attack: Warning signs and symptoms-14 states, 2005. *MMWR: Morbidity and Mortality Weekly Report, 57*(7), 175-179.

Centers for Disease Control and Prevention. (2011). Million hearts: Strategies to reduce teh prevalence of leading cardiovascular disease risks-United States, 2011. *MMWR: Morbidity and Mortality Weekly Report, 60*(36), 1248-1251.

Centers for Disease Control and Prevention. (2012). Vital signs: Awareness and treatment of uncontrolled hypertension among adults- United States, 2003-2010. *Morbidity and Mortality Weekly Report, 61*(35), 703-709.

Centers for Disease Control and Prevention. (2013). Vital signs: Avoidable deaths from heart disease, stroke, and hypertensive disease-United States, 2001-2010. *MMWR: Morbidity and Mortality Weekly Report, 62*(35), 721-727.

Centers for Disease Control and Prevention. (2014). Basics about diabetes. Retrieved November 26, 2014, from http://www.cdc.gov/diabetes/basics/diabetes.html

Centers for Disease Control and Prevention. (2014). Healthy weight - it's not a diet, its a lifestyle. Retrieved November 26, 2014, from http://www.cdc.gov/healthyweight/assessing/index.html

Centers for Disease Control and Prevention. (2014, February 19, 2014). Heart disease facts. Retrieved May 18, 2014, from http://www.cdc.gov/heartdisease/facts.htm

Centers for Disease Control and Prevention. (2014). National diabetes statistics report, 2014. Retrieved November 26, 2014, from http://www.cdc.gov/diabetes/pubs/statsreport14/national-diabetes-report-web.pdf

Chen, W., Woods, S. L., Wilkie, D. J., & Puntillo, K. A. (2005). Gender differences in symptom experiences of patients with acute coronary syndromes. *Journal of Pain and Symptom Management, 30*(6), 553-562. doi: 10.1016/j.jpainsymman.2005.06.004

Cheung, W. Y., Le, L. W., & Zimmermann, C. (2009). Symptom clusters in patients with advanced cancers. *Supportive Care in Cancer, 17*(9), 1223-1230. doi: 10.1007/s00520-009-0577-7

Ciruzzi, M., Schargrodsky, H., Rozlosnik, J., Pramparo, P., Delmonte, H., Rudich, V., . . . La Vecchia, C. (1997). Frequency of family history of acute myocardial infarction in patients with acute myocardial infarction. *The American Journal of Cardiology, 80*(2), 122-127.

Ciruzzi, M., Schargrodsky, H., Rozlosnik, J., Pramparo, P., Delmonte, H., Rudich, V., . . . La Vecchia, C. (1997). Frequency of family history of acute myocardial infarction in patients with acute myocardial infarction. Argentine FRICAS (Factores de Riesgo Coronario en America del Sur) Investigators. *American Journal of Cardiology, 80*(2), 122-127.

Collins, K. M., Dantico, M., Shearer, N. B., & Mossman, K. L. (2004). Heart disease awareness among college students. *Journal of Community Health, 29*(5), 405-420.

Coyne, J., Fry, B., Murphy, S., Smith, G., & Short, R. (2012). What is the impact of health reforms on uncompensated care in critical access hospitals? A 5-year forecast in Washington State. *Journal of Rural Health, 28*(3), 221-226. doi: 10.1111/j.1748-0361.2011.00400.x

Davis, L. L., Mishel, M., Moser, D. K., Esposito, N., Lynn, M. R., & Schwartz, T. A. (2013). Thoughts and behaviors of women with symptoms of acute coronary syndrome. *Heart & Lung, 42*(6), 428-435. doi: 10.1016/j.hrtlng.2013.08.001

Dempsey, S. J., Dracup, K., & Moser, D. K. (1995). Women's decision to seek care for symptoms of acute myocardial infarction. *Heart and Lung, 24*(6), 444-456.

DeVon, H. A., Block, M. E., Moyle-Wright, P., Ernst, D. M., Hayden, S. J., Lazzara, D. J., . . . Kostas-Polston, E. (2007). A psychometric toolbox for testing validity and reliability. *Journal of Nursing Scholarship, 39*(2), 155-164. doi: 10.1111/j.1547-5069.2007.00161.x

DeVon, H. A., Hogan, N., Ochs, A. L., & Shapiro, M. (2010). Time to treatment for acute coronary syndromes: The cost of indecision. *Journal of Cardiovascular Nursing, 25*(2), 106-114. doi: 10.1097/JCN.0b013e3181bb14a0

Diercks, D. B., & Miller, C. D. (2008). Disparities in the care of chest pain. *Canadian Medical Association Journal, 179*(7), 631-632.

Diercks, D. B., Owen, K. P., Kontos, M. C., Blomkalns, A., Chen, A. Y., Miller, C., . . . Peterson, E. D. (2010). Gender differences in time to presentation for myocardial infarction before and after a national women's cardiovascular awareness campaign: a temporal analysis from the Can Rapid Risk Stratification of Unstable Angina Patients Suppress ADverse Outcomes with Early Implementation (CRUSADE) and the National Cardiovascular Data Registry Acute Coronary Treatment and Intervention Outcomes Network-Get with the Guidelines (NCDR ACTION Registry-GWTG). *American Heart Journal, 160*(1), 80-87 e83. doi: 10.1016/j.ahj.2010.04.017

Dracup, K., McKinley, S., Riegel, B., Moser, D. K., Meischke, H., Doering, L. V., . . . Pelter, M. (2009). A randomized clinical trial to reduce patient prehospital delay to treatment in acute coronary syndrome. *Circulation: Cardiovascular Quality and Outcomes, 2*(6), 524-532. doi: 10.1161/CIRCOUTCOMES.109.852608

Dracup, K., & Moser, D. K. (1997). Beyond sociodemographics: factors influencing the decision to seek treatment for symptoms of acute myocardial infarction. *Heart and Lung, 26*(4), 253-262.

Dreyer, R. P., Ranasinghe, I., Wang, Y., Dharmarajan, K., Murugiah, K., Nuti, S. V., . . . Krumholz, H. M. (2015). Sex differences in the rate, timing and principal diagnoses of 30-day readmissions in younger patients with acute myocardial infarction. *Circulation*. doi: 10.1161/circulationaha.114.014776

Dreyer, R. P., Smolderen, K. G., Strait, K. M., Beltrame, J. F., Lichtman, J. H., Lorenze, N. P., . . . Spertus, J. A. (2015). Gender differences in pre-event health status of

young patients with acute myocardial infarction: A VIRGO study analysis. *Eurpean Heart Journal of Acute Cardiovascular Care*. doi: 10.1177/2048872615568967

Dreyer, R. P., Wang, Y., Strait, K. M., Lorenze, N. P., D'Onofrio, G., Bueno, H., . . . Krumholz, H. M. (2015). Gender differences in the trajectory of recovery in health status among young patients with acute myocardial infarction: Results from the variation in recovery: Role of gender on outcomes of young AMI patients (VIRGO) Study. *Circulation, 131*(22), 1971-1980. doi: 10.1161/circulationaha.114.014503

Eckhardt, A. L., Devon, H. A., Piano, M. R., Ryan, C. J., & Zerwic, J. J. (2014). Fatigue in the presence of coronary heart disease. *Nursing Research, 63*(2), 83-93. doi: 10.1097/NNR.0000000000000019

Edwards, T. A., Thompson, H. S., Kwate, N. O. A., Brown, K., McGovern, M. M., Forman, A., . . . Valdimarsdottir, H. B. (2008). Association between temporal orientation and attitudes about BRCA1/2 testing among women of African descent with family histories of breast cancer. *Patient Education and Counseling, 72*, 276-282.

Elderkin-Thompson, V., Irwin, M. R., Hellemann, G., & Kumar, A. (2012). Interleukin-6 and memory functions of encoding and recall in healthy and depressed elderly adults. *American Journal of Geriatric Psychiatry, 20*(9), 753-763. doi: 10.1097/JGP.0b013e31825d08d6

Fahs, P. S., & Kalman, M. (2008). Matters of the heart: Cardiovascular disease and rural nursing. *Annual Review of Nursing Research, 26*, 41-84.

Fan, L., Shah, M. N., Veazie, P. J., & Friedman, B. (2011). Factors associated with emergency department use among the rural elderly. *Journal of Rural Health, 27*(1), 39-49. doi: 10.1111/j.1748-0361.2010.00313.x

Farquharson, B., Johnston, M., & Bugge, C. (2012). Appraisal and illness delay with symptoms of ACS: A questionnaire study of illness representations. *British Journal of Cardiac Nursing, 7*(10), 493-499.

FirstHealth of the Carolinas. (2015). Business Development Department Statistics: FirstHealth of the Carolinas.

Foster, S., & Mallik, M. (1998). A comparative study of differences in the referral behaviour patterns of men and women who have experienced cardiac-related chest pain. *Intensive and Critical Care Nursing, 14*(4), 192-202.

Friedlander, Y., Arbogast, P., Marcovina, S. M., Austin, M. A., Rosendaal, F. R., Reiner, A. P., . . . Siscovick, D. S. (2001). Family history as a risk factor for early onset myocardial infarction in young women. *Atherosclerosis, 156*, 201-207.

Friedlander, Y., Arbogast, P., Schwartz, S. M., Marcovina, S. M., Austin, M. A., Rosendaal, F. R., . . . Siscovick, D. S. (2001). Family history as a risk factor for early onset myocardial infarction in young women. *Atherosclerosis, 156*(1), 201-207.

Friedlander, Y., Siscovick, D. S., Weinmann, S., Austin, M. A., Psaty, B. M., Lemaitre, R. N., . . . Cobb, L. A. (1998). Family history as a risk factor for primary cardiac arrest. *Circulation, 97*(2), 155-160.

Fukuoka, Y., Dracup, K., Moser, D. K., McKinley, S., Ball, C., Yamasaki, K., & Kim, C. J. (2007). Is severity of chest pain a cue for women and men to recognize acute myocardial infarction symptoms as cardiac in origin? *Progress in Cardiovascular Nursing, 22*(3), 132-137.

Fukuoka, Y., Dracup, K., Ohno, M., Kobayashi, F., & Hirayama, H. (2005). Symptom severity as a predictor of reported differences of prehospital delay between medical records and structured interviews among patients with AMI. *European Journal of Cardiovascular Nursing, 4*(2), 171-176. doi: 10.1016/j.ejcnurse.2005.03.002

Galbraith, M. D., Mehta, P. K., Veledar, E., Vaccarino, V., & Wenger, N. K. (2011). Women and heart disease: Knowledge, worry, and motivation. *Journal of Women's Health, 20*(10), 1529-1534.

Gamm, L. D., Hutchison, L. L., Dabney, B. J., & Dorsey, A. M. (2003). Rural healthy people 2010: A companion document to Healthy People 2010. *1*. http://sph.tamhsc.edu/centers/rhp2010/Volume1.pdf

Garavalia, L. S., Decker, C., Reid, K. J., Lichtman, J. H., Parashar, S., Vaccarino, V., . . . Spertus, J. A. (2007). Does health status differ between men and women in early recovery after myocardial infarction? *Journal of Womens Health (Larchmont), 16*(1), 93-101. doi: 10.1089/jwh.2006.M073

Gaspoz, J. M., Unger, P. F., Urban, P., Chevrolet, J. C., Rutishauser, W., Lovis, C., . . . Waldvogel, F. A. (1996). Impact of a public campaign on pre-hospital delay in patients reporting chest pain. *Heart, 76*(2), 150-155.

Gibler, W. B., Armstrong, P. W., Ohman, E. M., Weaver, W. D., Stebbins, A. L., Gore, J. M., . . . Topol, E. J. (2001). Persistence of delays in presentation and treatment for patients with acute myocardial infarciton: The GUSTO-1 adn GUSTO-III experience. *Annals of Emergency Medicine, 39*(2), 123-130.

Go, A. S., Mozaffarian, D., Roger, V. L., Benjamin, E. J., Berry, J. D., Blaha, M. J., . . . Turan, T. N. (2014). Executive summary: heart disease and stroke statistics--2014 update: A report from the american heart association. *Circulation, 129*(3), 399-410. doi: 10.1161/01.cir.0000442015.53336.12

Go, A. S., Mozaffarian, D., Roger, V. L., Benjamin, E. J., Berry, J. D., Borden, W. B., . . . Turner, M. B. (2013). Executive summary: Heart disease and stroke statistics--2013 update: a report from the American Heart Association. *Circulation, 127*(1), 143-152. doi: 10.1161/CIR.0b013e318282ab8f

Gochfield, M. (2010). Sex-gender research sensitivity and healthcare disparities. *Journal of Women's Health, 19*(2), 189-194.

Goldberg, R. J., McGovern, P. G., Guggina, T., Savageau, J., Rosamond, W. D., & Luepker, R. V. (1998). Prehospital delay in patients with acute coronary heart disease: concordance between patient interviews and medical records. *American Heart Journal, 135*(2 Pt 1), 293-299.

Goldberg, R. J., Yarzebski, J., Lessard, D., & Gore, J. M. (2000). Decade-long trends and factors associated with time to hospital presentation in patients with acute myocardial infarction: The Worcester Heart Attack Study. *Archives of Internal Medicine, 160*(21), 3217-3223.

Gonzalez, A., & Zimbardo, P. G. (1985). Time in perspective. *Psychology Today*.

Goodenough, W. H. (1981). *Culture, language, and society*. Menlo Park, CA: Benjamin/Cummings.

Gozlan, M. (2013). A stopwatch on the brain's perception of time. *The Guardian*.

Graham, R. J. (1981). The role of perception of time in consumer research. *Journal of Consumer Research, 7*, 335-342.

Grant, J. E., & Kim, S. W. (2014). Brain circuitry of compulsivity and impulsivity. *CNS Spectrums, 19*(1), 21-27. doi: 10.1017/S109285291300028X

Hawe, E., Talmud, P. J., Miller, G. J., & Humphries, S. E. (2003). Family history is a coronary heart disease risk factor in the second Northwick Park Heart Study. *Annals of Human Genetics, 67*(2), 97-106.

Hawthorne, M. H. (1994). Gender differences in recovery after coronary artery surgery. *Image: Journal of Nursing Scholarship, 26*(1), 75-80.

Healy, B. (1991). The Yentl syndrome. *New England Journal of Medicine, 325*(4), 274-276. doi: 10.1056/NEJM199107253250408

Hess, E. P., Perry, J. J., Calder, L. A., Thiruganasambandamoorthy, V., Roger, V. L., Wells, G. A., & Stiell, I. G. (2010). Sex differences in clinical presentation,

management, and outcome in emergency department patients with chest pain. *Canadian Journal of Emergency Medicine, 12*(5), 405-413.

Higginson, R. (2008). Women's help-seeking behaviour at the onset of myocardial infarction. *British Journal of Nursing, 17*(1), 10-14.

Hill, O. W., Block, R. A., & Buggie, S. E. (2000). Culture and beliefs about time: comparisons among black Americans, black Africans, and white Americans. *Journal of Psychology, 134*(4), 443-461. doi: 10.1080/00223980009598228

Hippisley-Cox, J., Coupland, C., Vinogradova, Y., Robson, J., May, M., & Brindle, P. (2007). Derivation and validation of QRISK, a new cardiovascular disease risk score for the United Kingdom: prospective open cohort study. *British Medical Journal, 335*(7611), 136. doi: 10.1136/bmj.39261.471806.55

Ho, M. T., Eisenberg, M. S., Litwin, P. E., Schaeffer, S. M., & Damon, S. K. (1989). Delay between onset of chest pain and seeking medical care: The effect of public education. *Annals of Emergency Medicine, 18*(7), 727-731.

Hoekstra, J. W., Roe, M. T., Peterson, E. D., Menon, V., Mulgund, J., Pollack, C. V., . . . Gibler, W. B. (2005). Early glycoprotein IIb/IIIa inhibitor use for non-ST-segment elevation acute coronary syndrome: Patient selection and associated treatment patterns. *Academic Emergency Medicine, 12*(5), 431-438. doi: 10.1197/j.aem.2004.11.029

Hofgren, C., Karlson, B. W., & Herlitz, J. (1995). Prodromal symptoms in subsets of patients hospitalized for suspected acute myocardial infarction. *Heart and Lung, 24*(1), 3-10.

Hofgren, K., Bondestam, E., Johansson, F. G., Jern, S., Herlitz, J., & Holmberg, S. (1988). Initial pain course and delay to hospital admission in relation to myocardial infarct size. *Heart and Lung, 17*(3), 274-280.

Horne, B. D., Camp, N. J., Muhlestein, J. B., & Cannon-Albright, L. A. (2006). Identification of excess clustering of coronary heart diseases among extended pedigrees in a genealogical population database. *American Heart Journal, 152*(2), 305-311.

Horne, B. D., Camp, N. J., Muhlestein, J. B., & Cannon-Albright, L. A. (2006). Identification of excess clustering of coronary heart diseases among extended pedigrees in a genealogical population database. *American Heart Journal, 152*(2), 305-311. doi: 10.1016/j.ahj.2005.12.028

Huck, S. W. (2008). *Reading statistics adn research* (5th ed.). Boston, MA: Pearson.

Hulley, S. B., Cummings, S. R., Browner, W. S., Grady, D. G., & Newman, T. B. (2007). *Designing Clinical Research* (3rd ed.). Philadelphia: Wolters Kluwer/Lippincott, Williams, and Wilkins.

Hunt, S. C., Blickenstaff, K., Hopkins, P. N., & Williams, R. R. (1986). Coronary disease and risk factors in close relatives of Utah women with early coronary death. *Western Journal of Medicine, 145*(3), 329-334.

Hwang, S. Y., & Jeong, M. H. (2012). Cognitive factors that influence delayed decision to seek treatment among older patients with acute myocardial infarction in Korea. *European Journal of Cardiovascular Nursing, 11*(2), 154-159.

Hwang, S. Y., Ryan, C., & Zerwic, J. J. (2006). The influence of age on acute myocardial infarction symptoms and patient delay in seeking treatment. *Progress in Cardiovascular Nursing, 21*(1), 20-27.

Hwang, S. Y., Zerwic, J. J., & Jeong, M. H. (2011). Impact of prodromal symptoms on prehospital delay in patients with first-time acute myocardial infarction in Korea. *Journal of Cardiovascular Nursing, 26*(3), 194-201. doi: 10.1097/JCN.0b013e3181f3e2e0

Ikeda, U., Ohkawa, F., Seino, Y., Yamamoto, K., Hidaka, Y., Kasahara, T., . . . Shimada, K. (1992). Serum interleukin 6 levels become elevated in acute myocardial infarction. *Journal of Molecular and Cellular Cardiology, 24*(6), 579-584.

Imes, C. C., & Lewis, F. M. (2014). Famiy history of cardiovascular disease, perceived cardiovascular disease risk, and health-related behavior: A review of the literature. *Journal of Cardiovascular Nursing, 29*(2), 108-129.

Jackson, M. N., & McCulloch, B. J. (2014). 'Heart attack' symptoms and decision-making: the case of older rural women. *Rural Remote Health, 14*, 2560.

Jackson, R. L., Neumann, C. S., & Vitacco, M. J. (2007). Impulsivity, anger, and psychopathy: The moderating effect of ethnicity. *Journal of Personality Disorders, 21*(3), 289-304.

Jacobs, A. K. (2009). Coronary intervention in 2009: Are women no different than men? *Circulation: Cardiovascular Interventions, 2*(1), 69-78.

Johnson, J. A., & King, K. B. (1995). Influence of expectations about symptoms on delay in seeking treatment during a myocardial infarction. *American Journal of Critical Care, 4*(1), 29-35.

Jollis, J. G., Al-Khalidi, H. R., Monk, L., Roettig, M. L., Garvey, J. L., Aluko, A. O., . . . Granger, C. B. (2012). Expansion of a regional ST-segment-elevation myocardial infarction system to an entire state. *Circulation, 126*(2), 189-195.

Kaikkonen, K. S., Kortelainen, M. L., Linna, E., & Huikuri, H. V. (2006). Family history and the risk of sudden cardiac death as a manifestation of an acute coronary event. *Circulation, 114*(14), 1462-1467. doi: 10.1161/CIRCULATIONAHA.106.624593

Kanamasa, K., Ishikawa, K., Hayashi, T., Hoshida, S., Yamada, Y., Kawarabayashi, T., . . . South Osaka Acute Coronary Syndrome Study, G. (2004). Increased cardiac mortality in women compared with men in patients with acute myocardial infarction. *Internal Medicine, 43*(10), 911-918.

Kantarci, O. H., Barcellos, L. F., Atkinson, E. J., Ramsay, P. P., Lincoln, R., Achenbach, S. J., . . . Weinshenker, B. G. (2006). Men transmit MS more often to their children vs women: the Carter effect. *Neurology, 67*(2), 305-310. doi: 10.1212/01.wnl.0000225070.13682.11

Khraim, F. M., & Carey, M. G. (2009). Predictors of pre-hospital delay among patients with acute myocardial infarction. *Patient Education and Counseling, 75*(2), 155-161. doi: 10.1016/j.pec.2008.09.019

Kirchberger, I., Heier, M., Wende, R., von Scheidt, W., & Meisinger, C. (2012). The patient's interpretation of myocardial infarction symptoms and its role in the decision process to seek treatment: The MONICA/KORA Myocardial Infarction Registry. *Clinical Research in Cardiology, 101*(11), 909-916. doi: 10.1007/s00392-012-0475-8

Kreatsoulas, C., Shannon, H. S., Giacomini, M., Velianou, J. L., & Anand, S. S. (2013). Reconstructing angina: cardiac symptoms are the same in women and men. Journal of the American Medical Association Internal Medicine, *173*(9), 829-831. doi: 10.1001/jamainternmed.2013.229

Lage, G. M., Albuquerque, M. R., Fuentes, D., Correa, H., & Malloy-Diniz, L. F. (2013). Sex differences in dimensions of impulsivity in a non-clinical sample. *Perceptual and Motor Skills, 117*(2), 601-607.

LaVeist, T. A. (2002). *Race, ethnicity, and health*. San Francisco, CA: John Wiley & Sons.

Lawler, J., McHenry, K., Duquette, M., & Derick, L. (1995). Characterization of human thrombospondin-4. *Journal of Biological Chemistry, 270*(6), 2809-2814.

Lee, H., Bahler, R., Chung, C., Alonzo, A., & Zeller, R. A. (2000). Prehospital delay with myocardial infarction: The interactive effect of clinical symptoms and race. *Applied Nursing Research, 13*(3), 125-133.

Lefler, L. (2002). Evidence-based practice. The advanced practice nurse's role regarding women's delay in seeking treatment with myocardial infarction.

Journal of the American Academy of Nurse Practitioners, 14(10), 449-456. doi: 10.1111/j.1745-7599.2002.tb00075.x

Lefler, L. L., & Bondy, K. N. (2004). Women's delay in seeking treatment with myocardial infarction: A metasynthesis. *Journal of Cardiovascular Nursing, 19*(4), 251-268.

Leifheit-Limson, E. C., Spertus, J. A., Reid, K. J., Jones, S. B., Vaccarino, V., Krumholz, H. M., & Lichtman, J. H. (2013). Prevalence of traditional cardiac risk factors and secondary prevention among patients hospitalized for acute myocardial infarction (AMI): Variation by age, sex, and race. *Journal of Women's Health (Larchmont), 22*(8), 659-666. doi: 10.1089/jwh.2012.3962

Lenz, E. R., Pugh, L. C., Milligan, R. A., Gift, A., & Suppe, F. (1997). The middle-range theory of unpleasant symptoms: An update. *Advances in Nursing Science, 19*(3), 14-27.

Lenz, E. R., Suppe, F., Gift, A. G., Pugh, L. C., & Milligan, R. A. (1995). Collaborative development of middle-range nursing theories: Toward a theory of unpleasant symptoms. *Advances in Nursing Science, 17*(3), 1-13.

Leroy, M., Loas, G., & Perez-Diaz, F. (2013). Is impulsivity a risk factor of clinical events in acute coronary syndromes? A three-year follow-up study. *Progress in Neuro-Psychopharmacology and Biological Psychiatry, 40*, 149-152.

Leslie, W. S., Urie, A., Hooper, J., & Morrison, C. E. (2000). Delay in calling for help during myocardial infarction: Reasons for the delay and subsequent pattern of accessing care. *Heart, 84*(2), 137-141.

Leventhal, E. A., & Prohaska, T. R. (1986). Age, symptom interpretation, and health behavior. *Journal of the American Geriatrics Society, 34*, 185-191.

Li, R., O'Sullivan, M. J., Robinson, J., Safford, M. M., Curb, D., & Johnson, K. C. (2009). Family history of myocardial infarction predicts incident coronary heart disease in postmenopausal women with diabetes: The Women's Health Initiative Observational Study. *Diabetes/Metabolism Research and Reviews, 25*(8), 725-732. doi: 10.1002/dmrr.1010

Lichtman, J. H., Leifheit-Limson, E. C., Watanabe, E., Allen, N. B., Garavalia, B., Garavalia, L. S., . . . Curry, L. A. (2015). Symptom recognition and healthcare experiences of young women with acute myocardial infarction. *Circulation: Cardiovascular Quality and Outcomes, 8*(2), S31-38. doi: 10.1161/CIRCOUTCOMES.114.001612

Lloyd-Jones, D., Adams, R., Carnethon, M., De Simone, G., Ferguson, T. B., Flegal, K., . . . Stroke Statistics, S. (2009). Heart disease and stroke statistics--2009 update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation, 119*(3), 480-486. doi: 10.1161/CIRCULATIONAHA.108.191259

Lloyd-Jones, D., Adams, R. J., Brown, T. M., Carnethon, M., Dai, S., De Simone, G., . . . Stroke Statistics, S. (2010). Executive summary: heart disease and stroke statistics--2010 update: A report from the American Heart Association. *Circulation, 121*(7), 948-954. doi: 10.1161/CIRCULATIONAHA.109.192666

Lloyd-Jones, D. M., Nam, B. H., D'Agostino, R. B., Sr., Levy, D., Murabito, J. M., Wang, T. J., . . . O'Donnell, C. J. (2004). Parental cardiovascular disease as a risk factor for cardiovascular disease in middle-aged adults: A prospective study of parents and offspring. *JAMA, 291*(18), 2204-2211. doi: 10.1001/jama.291.18.2204

Lortie, J. (2012). Gender differences in employment: Why they matter for rural women. *Global Social Policy, 12*(2), 189-192.

Luepker, R. V., Raczynski, J. M., Osganian, S., Goldberg, R. J., Finnegan, J. R., Jr., Hedges, J. R., . . . Simons-Morton, D. G. (2000). Effect of a community intervention on patient delay and emergency medical service use in acute coronary heart disease: The Rapid Early Action for Coronary Treatment (REACT) Trial. *Journal of the American Medical Association, 284*(1), 60-67.

Lukwago, S. N., Kreuter, M. W., Bucholtz, D. C., Holt, C. L., & Clark, E. M. (2001). Development and validation of brief scales to measure collectivism, religiosity, racial pride, and time orientation in urban African American women. *Family and Community Health, 24*(3), 63-71.

Lyke, J. A., & Spinella, M. (2004). Associations among aspects of impulsivity and eating factors in a nonclinical sample. *International Journal of Eating Disorders*, 229-233. doi: 10.1002/ear.20025

Marenberg, M. E., Risch, N., Berkman, L. F., Floderus, B., & de Faire, U. (1994). Genetic susceptibility to death from coronary heart disease in a study of twins. *The New England Journal of Medicine, 330*(15), 1041-1046.

Martin, L. E., & Potts, G. F. (2009). Impulsivity in decision-making: An event-related potential investigation. *Personality and Individual Differences, 46*(3), 303. doi: 10.1016/j.paid.2008.10.019

Martinez-Marcos, M., & De la Cuesta-Benjumea, C. (2014). How women caregivers deal with their own long-term illness: A qualitative study. *Journal of Advanced Nursing, 70*(8), 1825-1836. doi: 10.1111/jan.12341

Mateen, F. J., Josephs, K. A., Trenerry, M. R., Felmlee-Devine, M. D., Weaver, A. L., Carone, M., & White, R. D. (2011). Long-term cognitive outcomes following out-of-hospital cardiac arrest: A population-based study. *Neurology, 77*(15), 1438-1445. doi: 10.1212/WNL.0b013e318232ab33

Matthews, J. T., Dunbar-Jacob, J., Sereika, S., Schulz, R., & McDowell, B. J. (2004). Preventive health practices: Comparison of family caregivers 50 and older. *Journal of Gerontological Nursing, 30*(2), 46-54.

Mayer, B. E. J. S. H. (2007). Genetics and heritability of coronary artery disease and myocardial infarction. *Clinical Research in Cardiology, 96*(1), 1-7.

McAllister, T. W., Flashman, L. A., Sparling, M. B., & Saykin, A. J. (2004). Working memory deficits after traumatic brain injury: catecholaminergic mechanisms and prospects for treatment: A review. *Brain Injury, 18*(4), 331-350. doi: 10.1080/02699050310001617370

McCormick, K. M., & Bunting, S. M. (2002). Application of feminist theory in nursing research: The case of women and cardiovascular disease. *Health Care for Women International, 23*(8), 820-834. doi: 10.1080/07399330290112344

McEwen, B. S. (1999). Stress and hippocampal plasticity. *Annual Review of Neuroscience, 22*, 105-122. doi: 10.1146/annurev.neuro.22.1.105

McKee, G., Mooney, M., O'Donnell, S., O'Brien, F., Biddle, M. J., & Moser, D. K. (2013). Multivariate analysis of predictors of pre-hospital delay in acute coronary syndrome. *International Journal of Cardiology, 168*(3), 2706-2713. doi: 10.1016/j.ijcard.2013.03.022

McSweeney, J., Cleves, M. A., Fischer, E. P., Moser, D. K., Wei, J., Pettey, C., . . . Armbya, N. (2013). Predicting coronary heart disease events in women: A longitudinal cohort study. *Journal of Cardiovascular Nursing*. doi: 10.1097/JCN.0b013e3182a409cc

McSweeney, J., & Crane, P. B. (2000). Challenging the rules: Women's prodromal and acute symptoms of myocardial infarction. *Research in Nursing and Health, 23*, 135-146.

McSweeney, J. C. (1998). Women's narratives: Evolving symptoms of myocardial infarction. *Journal of Women and Aging, 10*(2), 67-83.

McSweeney, J. C., Cleves, M. A., Zhao, W., Lefler, L. L., & Yang, S. (2010). Cluster analysis of women's prodromal and acute myocardial infarction symptoms by race and other characteristics. *Journal of Cardiovascular Nursing, 25*(4), 311-322. doi: 10.1097/JCN.0b013e3181cfba15

McSweeney, J. C., Cody, M., & Crane, P. B. (2001). Do you know them when you see them? Women's prodromal and acute symptoms of myocardial infarction. *Journal of Cardiovascular Nursing, 15*(3), 26-38.

McSweeney, J. C., & Crane, P. B. (2000). Challenging the rules: women's prodromal and acute symptoms of myocardial infarction. *Research in Nursing and Health, 23*(2), 135-146.

McSweeney, J. C., Lefler, L. L., & Crowder, B. F. (2005). What's wrong with me? Women's coronary heart disease diagnostic experiences. *Progress in Cardiovascular Nursing, 20*(2), 48-57.

McSweeney, J. C., Lefler, L. L., Fischer, E. P., Naylor, A. J., Jr., & Evans, L. K. (2007). Women's prehospital delay associated with myocardial infarction: does race really matter? *Journal of Cardiovascular Nursing, 22*(4), 279-285; quiz 286-277. doi: 10.1097/01.JCN.0000278958.98124.6e

McSweeney, J. C., O'Sullivan, P., Cleves, M. A., Lefler, L. L., Cody, M., Moser, D. K., . . . Zhao, W. (2010). Racial differences in women's prodromal and acute symptoms of myocardial infarction. *American Journal of Critical Care, 19*(1), 63-73. doi: 10.4037/ajcc2010372

McSweeney, J. C., O'Sullivan, P., Cody, M., & Crane, P. B. (2004). Development of the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey. *Journal of Cardiovascular Nursing, 19*(1), 58-67.

McSweeney, J. C., Pettey, C. M., Souder, E., & Rhoads, S. (2011). Disparities in women's cardiovascular health. *Journal of Obstetric, Gynecologic, and Neonatal Nursing, 40*(3), 362-371. doi: 10.1111/j.1552-6909.2011.01239.x

Meirelles, R. M. (2014). [Menopause and metabolic syndrome]. *Arquivos Brasileiros de Endocrinologia e Metabologia, 58*(2), 91-96.

Meischke, H., Dulberg, E. M., Schaeffer, S. S., Henwood, D. K., Larsen, M. P., & Eisenberg, M. S. (1997). 'Call fast, Call 911': A direct mail campaign to reduce patient delay in acute myocardial infarction. *American Journal of Public Health, 87*(10), 1705-1709.

Meischke, H., Ho, M. T., Eisenberg, M. S., Schaeffer, S. M., & Larsen, M. P. (1995). Reasons patients with chest pain delay or do not call 911. *Annals of Emergency Medicine, 25*(2), 193-197.

Meischke, H., Larsen, M. P., & Eisenberg, M. S. (1998). Gender differences in reported symptoms for acute myocardial infarction: Impact on prehospital delay time interval. *American Journal of Emergency Medicine, 16*(4), 363-366.

Meischke, H., Mitchell, P., Zapka, J., Goff, D. C., Jr., Smith, K., Henwood, D., . . . Taylor, J. (2000). The emergency department experience of chest pain patients and their intention to delay care seeking for acute myocardial infarction. *Progress in Cardiovascular Nursing, 15*(2), 50.

Meischke, H., Sellers, D. E., Robbins, M. L., Goff, D. C., Daya, M. R., Meshack, A., . . . Hand, M. M. (2000). Factors that influence personal perceptions of the risk of an acute myocardial infarction. *Behavioral Medicine, 26*(1), 4-13. doi: 10.1080/08964280009595748

Merkatz, R. B. (1998). Inclusion of women in clinical trials: A historical overview of scientific, ethical, and legal issues. *Journal of Obstetric, Gynecological, and Neonatal Nursing, 27*(1), 78-84.

Merriam-Webster, I. (2014). from http://www.merriam-webster.com/dictionary/

Miyao, Y., Yasue, H., Ogawa, H., Misumi, I., Masuda, T., Sakamoto, T., & Morita, E. (1993). Elevated plasma interleukin-6 levels in patients with acute myocardial infarction. *American Heart Journal, 126*(6), 1299-1304.

Moeller, F. G., Barratt, E. S., Dougherty, D. M., Schmitz, J. M., & Swann, A. C. (2001). Psychiatric aspects of impulsivity. *American Journal of Psychiatry, 158*(11), 1783-1793.

Mooney, M., McKee, G., Fealy, G., O' Brien, F., O'Donnell, S., & Moser, D. (2014). A randomized controlled trial to reduce prehospital delay time in patients with acute coronary syndrome (ACS). *Journal of Emergency Medicine, 46*(4), 495-506. doi: 10.1016/j.jemermed.2013.08.114

Mooney, M., McKee, G., Fealy, G., O'Brien, F., O'Donnell, S., & Moser, D. (2012). A review of interventions aimed at reducing pre-hospital delay time in acute coronary syndrome: What has worked and why? *European Journal of Cardiovascular Nursing*. doi: 10.1016/j.ejcnurse.2011.04.003

Moore County Progress. (2015). Population by Race and Gender. .Retrieved June 20, 2015, from http://www.moorebusiness.org/2009/07/population-by-age-group/

Mosca, L., Jones, W. K., King, K. B., Ouyang, P., Redberg, R. F., & Hill, M. N. (2000). Awareness, perception, and knowledge of heart disease risk and prevention among women in the United States. American Heart Association Women's Heart Disease and Stroke Campaign Task Force. *Archives of Family Medicine, 9*(6), 506-515.

Mosca, L., Linfante, A. H., Benjamin, E. J., Berra, K., Hayes, S. N., Walsh, B. W., & Simpson, S. L. (2005). National study of physician awareness and adherence to cardiovascular disease prevention guidelines. *Circulation, 111*(4), 499-510.

Mosca, L., Mochari-Greenberger, H., Dolor, R. J., Newby, L. K., & Robb, K. J. (2010). Twelve-year follow-up of American women's awareness of cardiovascular disease risk and barriers to heart health. *Circulation: Cardiovascular Quality and Outcomes, 3*(2), 120-127. doi: 10.1161/CIRCOUTCOMES.109.915538

Moser, D. K., Kimble, L. P., Alberts, M. J., Alonzo, A., Croft, J. B., Dracup, K., . . . Zerwic, J. J. (2006). Reducing delay in seeking treatment by patients with acute coronary syndrome and stroke: A scientific statement from the American Heart Association Council on cardiovascular nursing and stroke council. *Circulation, 114*(2), 168-182. doi: 10.1161/CIRCULATIONAHA.106.176040

Moser, D. K., Kimble, L. P., Alberts, M. J., Alonzo, A., Croft, J. B., Dracup, K., . . . Stroke, C. (2007). Reducing delay in seeking treatment by patients with acute coronary syndrome and stroke: A scientific statement from the American Heart Association Council on Cardiovascular Nursing and Stroke Council. *Journal of Cardiovascular Nursing, 22*(4), 326-343. doi: 10.1097/01.JCN.0000278963.28619.4a

Moser, D. K., McKinley, S., Dracup, K., & Chung, M. L. (2005). Gender differences in reasons patients delay in seeking treatment for acute myocardial infarction symptoms. *Patient Education and Counseling, 56*(1), 45-54. doi: 10.1016/j.pec.2003.11.011

Moses, H. W., Engelking, N., Taylor, G. J., Prabhakar, C., Vallala, M., Colliver, J. A., . . . Schneider, J. A. (1991). Effect of a two-year public education campaign on reducing response time of patients with symptoms of acute myocardial infarction. *American Journal of Cardiology, 68*(2), 249-251.

Mozaffarian, D., Benjamin, E. J., Go, A. S., Arnett, D. K., Blaha, M. J., Cushman, M., . . . Turner, M. B. (2015). Heart disease and stroke statistics-2015 update: A report from the American Heart Association. *Circulation, 131*(4), e29-e322. doi: 10.1161/CIR.0000000000000152

Muñoz Lr, E. A. A. M. H. S. W. A. H. C. B. S. E. R. J. M. E. (2010). Awareness of heart disease among female college students. *Journal of Women's Health (2002), 19*(12), 2253-2259.

Murabito, J. M., Pencina, M. J., Nam, B. H., D'Agostino, R. B., Sr., Wang, T. J., Lloyd-Jones, D., . . . O'Donnell, C. J. (2005). Sibling cardiovascular disease as a risk factor for cardiovascular disease in middle-aged adults. *Journal of the American Medical Association, 294*(24), 3117-3123. doi: 10.1001/jama.294.24.3117

Mussi, F. C., Mendes, A. S., Damasceno, C. A., Gibaut Mde, A., Guimaraes, A. C., & Teles, C. A. (2014). [Environmental factors associated with the decision time for seeking care in myocardial infarction]. *Revista Brasileira de Enfermagem, 67*(5), 722-729. doi: 10.1590/0034-7167.2014670508

Myers, J. S. (2009). A comparison of the theory of unpleasant symptoms and the conceptual model of chemotherapy-related changes in cognitive function. *Oncology Nursing Forum, 36*(1), E1-10. doi: 10.1188/09.ONF.E1-E10

Myers, R. H., Kiely, D. K., Cupples, L. A., & Kannel, W. B. (1990). Parental history is an independent risk factor for coronary artery disease: The Framingham Study. *American Heart Journal, 120*(4), 963-969.

Nallamothu, B. K., Bates, E. R., Wang, Y., Bradley, E. H., & Krumholz, H. M. (2006). Driving times and distances to hospitals with percutaneous coronary intervention in the United States: Implications for prehospital triage of patients with ST-elevation myocardial infarction. *Circulation, 113*(9), 1189-1195. doi: 10.1161/CIRCULATIONAHA.105.596346

National Library of Medicine. (2014). Medline Plus. Retrieved April, 19, 2014, from http://www.nlm.nih.gov/medlineplus/highbloodpressure.html - cat32

National Rural Health Association. (2014). What's different about rural care? Retrieved May 27, 2014, from http://www.ruralhealthweb.org/go/left/about-rural-health/what-s-different-about-rural-health-care

Newman, J. D., Davidson, K. W., Ye, S., Shaffer, J. A., Shimbo, D., & Muntner, P. (2013). Gender differences in calls to 9-1-1 during an acute coronary syndrome. *American Journal of Cardiology, 111*(1), 58-62. doi: 10.1016/j.amjcard.2012.08.048

Nieuwenhoven, L., & Klinge, I. (2010). Scientific excellence in applying sex-and gender-sensitive methods in biomedical and health research. *Journal of Women's Health, 19*(2), 313-321.

Nilsson, P. M., Nilsson, J., & Berglund, G. (2004). Family burden of cardiovascular mortality: risk implications for offspring in a national register linkage study based upon the Malmö Preventive Project. *Journal of Internal Medicine, 255*(2), 229-235.

Norris, C. M., Hegadoren, K. M., Patterson, L., & Pilote, L. (2008). Sex differences in prodromal symptoms of patients with acute coronary syndrome: A pilot study. *Progress in Cardiovascular Nursing, 23*(1), 27-31.

Nymark, C., Mattiasson, A. C., Henriksson, P., & Kiessling, A. (2014). Emotions delay care-seeking in patients with an acute myocardial infarction. *European Journal of Cardiovascular Nursing, 13*(1), 41-47. doi: 10.1177/1474515113475953

O'Donnell, S., McKee, G., Mooney, M., O'Brien, F., & Moser, D. K. (2014). Slow-onset and fast-onset symptom presentations in acute coronary syndrome (ACS): New perspectives on prehospital delay in patients with ACS. *Journal of Emergency Medicine, 46*(4), 507-515. doi: 10.1016/j.jemermed.2013.08.038

O'Donnell, S., McKee, G., O'Brien, F., Mooney, M., & Moser, D. K. (2012). Gendered symptom presentation in acute coronary syndrome: a cross sectional analysis. *International Journal of Nursing Studies, 49*(11), 1325-1332. doi: 10.1016/j.ijnurstu.2012.06.002

O'Donnell, S., & Moser, D. K. (2012). Slow-onset myocardial infarction and its influence on help-seeking behaviors. *Journal of Cardiovascular Nursing, 27*(4), 334-344. doi: 10.1097/JCN.0b013e31822071f3

Paas, F., Tuovinen, J. E., Tabbers, H., & Van Gerven, P. W. M. (2003). Cognitive lead measurement as a means to advance cognitive load theory. *Educational Psychologist, 38*(1), 63-71.

Page, M. R. (2014). The JNC 8 hypertension guidelines: An in-depth guide. Retrieved May 18, 2014, from http://www.ajmc.com/publications/evidence-based-diabetes-management/2014/jan-feb2014/the-jnc-8-hypertension-guidelines-an-in-depth-guide

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. *Journal of Clinical Psychology, 51*(6), 768-774.

Pearsall, M. (1997). *The other within us: Feminist explorations of women and aging*. Boulder, CO: Westview Press.

Perkins-Porras, L., Whitehead, D. L., Strike, P. C., & Steptoe, A. (2009). Pre-hospital delay in patients with acute coronary syndrome: Factors associated with patient decision time and home-to-hospital delay. *European Journal of Cardiovascular Nursing, 8*(1), 26-33. doi: 10.1016/j.ejcnurse.2008.05.001

Perry, P. A. (1994). Feminist empiricism as a method of inquiry for nursing. *Western Journal of Nursing Research, 16*(5), 480-494.

Pierce, C. (2001). The impact of culture on rural women's descriptions of health. *Journal of Multicultural Nursing and Health, 7*(1), 50-56.

Polit, D. F. (2010). *Statistics and data analysis for nursing research* (2nd ed.). Upper Saddle River, NJ: Pearson Education Inc.

Polit, D. F., & Beck, C. T. (2012). *Nursing research: Generating and assessing evidence for nursing practice* (9th ed.). Philadelphia, PA: Wolters Kluwer/Lippincott Williams & Wilkins.

Probst, J. C., Moore, C. B., Glover, S. H., & Samuels, M. E. (2004). Person and place: The compounding effects of race/ethnicity on rurality on health. *American Journal of Public Health, 94*(10), 1694-1703.

Prohaska, T. R., Keller, M. L., & Leventhal, E. A. (1987). Impact of symptoms and aging attributions on emotions and coping. *Health Psychology, 6*, 495-514.

Pulla, R. B., Srikanthbabu, B. M., VendataKarunakar, K., Yasovanthi, J., Munshi, A., Sampath, K. P., & Sharath, A., & Jvothy, A. (2010). Angiotensin-converting enzyme gene variant and its levels: Risk factors for myocardial infarction in a South Indian population. *Singapore Medical Journal, 51*(7), 576-581.

Rasmussen, C. H., Munck, A., Kragstrup, J., & Haghfelt, T. (2003). Patient delay from onset of chest pain suggesting acute coronary syndrome to hospital admission. *Scandinavian Cardiovascular Journal, 37*(4), 183-186.

Reilly, A., Dracup, K., & Dattolo, J. (1994). Factors influencing prehospital delay in patients experiencing chest pain. *American Journal of Critical Care, 3*(4), 300-306.

Reise, S. P., Moore, T. M., Sabb, F. W., Brown, A. K., & London, E. D. (2013). The Barratt Impulsiveness Scale-11: Reassessment of its structure in a

community sample. *Psychological Assessment, 25*(2), 631-642. doi: 10.1037/a0032161

Reynolds, B., & Schiffbauer, R. (2004). Measuring state changes in human delay discounting: An experiential discounting task. *Behavioral Processes, 67*, 343-356.

Richards, H. M., Reid, M. E., & Watt, G. C. M. (2002). Why do men and women respond differently to chest pain? A qualitative study. *Journal of the American Medical Women's Association, 57*(2), 79-81.

Richards, S. B., Funk, M., & Milner, K. A. (2000). Differences between blacks and whites with coronary heart disease in initial symptoms and in delay in seeking care. *American Journal of Critical Care, 9*(4), 237-244.

Rodrigues, S. M., LeDoux, J. E., & Sapolsky, R. M. (2009). The influence of stress hormones on fear circuitry. *Annual Review of Neuroscience, 32*, 289-313. doi: 10.1146/annurev.neuro.051508.135620

Roger, V. L., Go, A. S., Lloyd-Jones, D. M., Benjamin, E. J., Berry, J. D., Borden, W. B., . . . Stroke Statistics, S. (2012). Heart disease and stroke statistics--2012 update: A report from the American Heart Association. *Circulation, 125*(1), e2-e220. doi: 10.1161/CIR.0b013e31823ac046

Ryan, C. J., & Zerwic, J. J. (2003). Perceptions of symptoms of myocardial infarction related to health care seeking behaviors in the elderly. *Journal of Cardiovascular Nursing, 18*(3), 184-196.

Schober, S. E., Makuc, D. M., Zhang, C., Kennedy-Stephenson, J., & Burt, V. (2011). Health insurance affects diagnosis and control of hypercholesterolemia and hypertension among adults aged 20-64: United States, 2005-2008. *NCHS National Data Brief, 57*, 1-8.

Shaw, L. J., Merz, C. N. B., Bittner, V., Kip, K., Johnson, B. D., Reis, S. E., . . . Pepine, C. J. (2008). Importance of socioeconomic status as a predictor of cardiovascular outcome and costs of care in women with suspected myocardial ischemia. Results from the National Institutes of Health, National Heart, Lung and Blood Institute-Sponsored Women's Ischemia Syndrome Evaluation (WISE). *Journal of Women's Health (15409996), 17*(7), 1081-1092. doi: 10.1089/jwh.2007.0596

Sheifer, S. E., Rathore, S. S., Gersh, B. J., Weinfurt, K. P., Oetgen, W. J., Breall, J. A., & Schulman, K. A. (2000). Time to presentation with acute myocardial infarction in the elderly: Associations with race, sex, and socioeconomic characteristics. *Circulation, 102*(14), 1651-1656.

Sherrill, W. W., Crew, L., Mayo, R. M., Mayo, W. F., Rogers, B. L., & Haynes, D. F. (2005). Educational and health services innovation to improve care for rural Hispanic communities in the US. *Education for Health, 18*(3), 356-367.

Sidney, S., Rosamond, W. D., Howard, V. J., & Luepker, R. V. (2013). The "heart disease and stroke statistics--2013 update" and the need for a national cardiovascular surveillance system. *Circulation, 127*(1), 21-23. doi: 10.1161/CIRCULATIONAHA.112.155911

Simmons, L. A., Anderson, E. A., & Braun, B. (2008). Health needs and health care utilization among rural, low-income women. *Women and Health, 47*(4), 53-69. doi: 10.1080/03630240802100317

Singer, I. B. (1971). *Yentl the yeshiva boy*. New York: Farrar, Straus, and Giroux.

Sjostrom-Strand, A., & Fridlund, B. (2008). Women's descriptions of symptoms and delay reasons in seeking medical care at the time of a first myocardial infarction: A qualitative study. *International Journal of Nursing Studies, 45*(7), 1003-1010. doi: 10.1016/j.ijnurstu.2007.07.004

Soderqvist, S., Bergman Nutley, S., Peyrard-Janvid, M., Matsson, H., Humphreys, K., Kere, J., & Klingberg, T. (2012). Dopamine, working memory, and training induced plasticity: Implications for developmental research. *Developmental Psychology, 48*(3), 836-843. doi: 10.1037/a0026179

Stanford, M. S., Mathias, C. W., Dougherty, D. M., Lake, S. L., Anderson, N. E., & Patton, J. H. (2009). Fifty years of the Barratt Impulsiveness Scale: An update and review. *Personality and Individual Differences, 47*, 385-395.

Steinberg, L., Sharp, C., Stanford, M. S., & Tharp, A. T. (2013). New tricks for an old measure: The development of the Barratt Impulsiveness Scale-Brief (BIS-Brief). *Psychological Assessment, 25*(1), 216-226. doi: 10.1037/a0030550

Steingart, R. M., Packer, M., Hamm, P., Coglianese, M. E., Gersh, B., Geltman, E. M., . . . et al. (1991). Sex differences in the management of coronary artery disease. Survival and Ventricular Enlargement Investigators. *New England Journal of Medicine, 325*(4), 226-230. doi: 10.1056/NEJM199107253250402

Sullivan, A. L., Beshansky, J. R., Ruthazer, R., Murman, D. H., Mader, T. J., & Selker, H. P. (2014). Factors associated with longer time to treatment for patients with suspected acute coronary syndromes: a cohort study. *Circulation: Cardiovascular Quality and Outcomes, 7*(1), 86-94. doi: 10.1161/CIRCOUTCOMES.113.000396

Swanson, J. R., & Pearson, T. A. (2001). Screening family members at high risk for coronary disease. Why isn't it done? *American Journal of Preventive Medicine, 20*(1), 50-55.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (Fifth ed.). Boston: Pearson Education Inc.

Tamam, L., Bican, M., & Keskin, N. (2014). Impulse control disorders in elderly patients. *Comprehensive Psychiatry, 55*(4), 1022-1028. doi: 10.1016/j.comppsych.2013.12.003

Texas A & M Health Science Center. (2014). Rural healthy people 2020. Retrieved November 26, 2014 from http://sph.tamhsc.edu/srhrc/rhp2020.html

Ting, H. H., Bradley, E. H., Wang, Y., Lichtman, J. H., Nallamothu, B. K., Sullivan, M. D., . . . Krumholz, H. M. (2008). Factors associated with longer time from symptom onset to hospital presentation for patients with ST-elevation myocardial infarction. *Archives of Internal Medicine, 168*(9), 959-968. doi: 10.1001/archinte.168.9.959

Torgersen, J., Strand, K., Bjelland, T. W., Klepstad, P., Kvale, R., Soreide, E., . . . Flaatten, H. (2010). Cognitive dysfunction and health-related quality of life

after a cardiac arrest and therapeutic hypothermia. *Acta Anaesthesiologica Scandinavica, 54*(6), 721-728. doi: 10.1111/j.1399-6576.2010.02219.x

Tullmann, D. F., Haugh, K. H., Dracup, K. A., & Bourguignon, C. (2007). A randomized controlled trial to reduce delay in older adults seeking help for symptoms of acute myocardial infarction. *Research in Nursing and Health, 30*(5), 485-497.

Tyler, R., & Pugh, L. C. (2009). Application of the theory of unpleasant symptoms in bariatric surgery. *Bariatric Nursing & Surgical Patient Care, 4*(4), 271-276. doi: 10.1089/bar.2009.9953

United States Census Bureau. (2010). 2010 Census Data. Retrieved June 20 2015, from http://www.census.gov/2010census/data/

United States Census Bureau. (2013). American Community Survey Demographic and Housing Estimates. *American Fact Finder.* Retrieved July 2, 2015, from http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_13_5YR_DP05&src=pt.

United States Census Bureau. (2014). American Fact Finder. Retrieved May 23, 2014, from http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

United States Department of Health and Human Services. (2012). Women's Health USA 2012. http://mchb.hrsa.gov/whusa12/hs/hssp/pages/ruw.html

United States Department of Health and Human Services. (2013, November 1, 2013). Improving federal health care in rural America: Developing the workforce

and building partnerships. Retrieved May 18, 2014, from http://www.hhs.gov/asl/testify/2013/05/t20130523c.html

United States Department of Health and Human Services. (2013). Women's Health USA 2013. from http://www.mchb.hrsa.gov/whusa13/population-characteristics/p/rural-urban-women.html

Vaccarino, V., Parsons, L., Every, N. R., Barron, H. V., & Krumholz, H. M. (1999). Sex-based differences in early mortality after myocardial infarction. National Registry of Myocardial Infarction 2 Participants. *New England Journal of Medicine, 341*(4), 217-225. doi: 10.1056/NEJM199907223410401

Vavouranakis, I., Fanioudaki, A., Lamprogiannakis, E., Baltzakis, I., Sidiropoulou, K., Porfiri, E., & Ganotakis, E. S. (2010). Delays incurred during acute myocardial infarction: A comparative study of rural and urban populations in Greece. *Rural Remote Health, 10*(2), 1271.

Vujcic, I., Vlajinac, H., Dubljanin, E., Vasiljevic, Z., Matanovic, D., Maksimovic, J., . . . Marinkovic, J. (2014). Long-term prognostic significance of living alone and other risk factors in patients with acute myocardial infarction. *Irish Journal of Medical Science*. doi: 10.1007/s11845-014-1079-2

Weafer, J., & de Wit, H. (2013). Sex differences in impulsive action and impulsive choice. *Addictive Behaviors*. doi: 10.1016/j.addbeh.2013.10.033

Wessel, J., Topol, E. J., Ji, M., Meyer, J., & McCarthy, J. J. (2004). Replication of the association between the thrombospondin-4 A387P polymorphism and

myocardial infarction. *American Heart Journal, 147*(5), 905-909. doi: 10.1016/j.ahj.2003.12.013

Whittmann, M., & Paulus, M. P. (2007). Decision making, impulsivity, and time perception. *TRENDS in Cognitive Science*. doi: 10.1016/j.tics.2007.10.004

Wikstrand, J., Warnold, I., Olsson, G., Tuomilehto, J., Elmfeldt, D., & Berglund, G. (1988). Primary prevention with metoprolol in patients with hypertension. Mortality results from the MAPHY study. *JAMA, 259*(13), 1976-1982.

Wilhelmsen, L., Berglund, G., Elmfeldt, D., Fitzsimons, T., Holzgreve, H., Hosie, J., . . . Wedel, H. (1987). Beta-blockers versus diuretics in hypertensive men: Main results from the HAPPHY trial. *Journal of Hypertension, 5*(5), 561-572.

Wilson, B. A. (1996). Cognitive functioning of adult survivors of cerebral hypoxia. *Brain Injury, 10*(12), 863-874.

Winkleby, M. A., Jatulis, D. E., Frank, E., & Fortmann, S. P. (1992). Socioeconomic status and health: How education, income, and occupation contribute to risk factors for cardiovascular disease. *American Journal of Public Health, 82*(6), 816-820. doi: 10.2105/AJPH.82.6.816

Winters, C. A., Cudney, S. A., Sullivan, T., & Thuesen, A. (2006). The rural context and women's self-management of chronic health conditions. *Chronic Illn, 2*(4), 273-289. doi: 10.1179/174592006X157517

Wittmann, M., & Paulus, M. P. (2008). Decision making, impulsivity and time perception. *Trends Cognitive Science, 12*(1), 7-12. doi: 10.1016/j.tics.2007.10.004

Yawn, B. P., Wollan, P. C., Jacobsen, S. J., Fryer, G. E., & Roger, V. L. (2004). Identification of women's coronary heart disease and risk factors prior to first myocardial infarction. *Journal of Women's Health (Larchmont), 13*(10), 1087-1100. doi: 10.1089/jwh.2004.13.1087

Zegrean, M., Fox-Wasylyshyn, S. M., & El-Masri, M. M. (2009). Alternative coping strategies and decision delay in seeking care for acute myocardial infarction. *Journal of Cardiovascular Nursing, 24*(2), 151-155. doi: 10.1097/01.JCN.0000343561.06614.92

Zerwic, J. J. (1999). Patient delay in seeking treatment for acute myocardial infarction symptoms. *Journal of Cardiovascular Nursing, 13*(3), 21-32.

Zerwic, J. J., Ryan, C. J., DeVon, H. A., & Drell, M. J. (2003). Treatment seeking for acute myocardial infarction symptoms: Differences in delay across sex and race. *Nursing Research, 52*(3), 159-167.

APPENDIX A

CONSENT FORM

Principal Investigator: Gloria Walters

AUTHORIZATION TO SHARE PERSONAL HEALTH INFORMATION IN RESEARCH

We are asking you to take part in the research described in the attached consent form. To do this research, we need to collect health information that identifies you. We may collect the results of questionnaires and interviews. We may also collect information from your medical record. We will only collect information that is needed for the research. This information is described in the attached consent form. For you to be in this research, we need your permission to collect and share this information.

The word "you" means both the person who takes part in the research, and the person who gives permission to be in the research. This form and the attached research consent form need to be kept together.

We will share your health information with people at the hospital who help with the research. We may share your information with other researchers outside of the hospital. We may also share your information with people outside of the hospital who are in charge of the research, or who pay for, or work with us on the research. Some of these people make sure we do the research properly. The "confidentiality" section of the consent form identifies who these people are. Some of these people may share your health information with someone else. If they do, the same laws that the hospital must follow may not protect your health information.

During the course of this study, the data collected will include your name, medical record number, telephone number, discharge date, height, weight, the length of symptom duration reported in the medical record before first medical contact, and distance travelled to the Emergency Department. Your name will only be used here at FirstHealth Moore Regional Hospital and School of Nursing at the University of North Carolina at Greensboro.

If you authorize us to use and share your health information by signing this form, we will collect your health information until the end of the research. We may collect some information from your medical records even after your direct participation in the research study ends. We will keep all the information until three years after the end of the study, in case we need to look at it again. We will protect the information and keep it confidential. (After the time for keeping your information has passed, we will destroy the research records).

Your information may also be useful for other studies. We can only use your information again if a special committee in the hospital gives us permission. This committee may ask us to talk to you again before doing the research. But the committee may also let us do the research without talking to you again if we keep your health information private.

Principal Investigator: Gloria Walters

AUTHORIZATION TO SHARE PERSONAL HEALTH INFORMATION IN RESEARCH

We are asking you to take part in the research described in the attached consent form. To do this research, we need to collect health information that identifies you. We may collect the results of questionnaires and interviews. We may also collect information from your medical record. We will only collect information that is needed for the research. This information is described in the attached consent form. For you to be in this research, we need your permission to collect and share this information.

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If you agree by signing this form, you are giving us permission to collect, use and share your health information with the organizations listed under the "**How will you keep my information confidential?**" section of the consent. If you decide not to sign this form, you cannot be in the research study. You need to sign this form and the attached consent form if you want to be in the research study. We cannot do the research if we cannot collect, use and share your health information.

This consent has no expiration date. However, if you change your mind later and do not want us to collect or share your health information, you need to send a letter to the researcher listed on the attached consent form. The letter needs to say that you have changed your mind and do not want the researcher to collect and share your health information. You may also need to leave the research study if we cannot collect any more health information about you as required for the purposes of this research study. We may still use the information we have already collected up to the point that we receive your letter withdrawing your authorization to use your personal information. We need to know what happens to everyone who starts a research study, not just those people who stay in it. We will not use any identifiable information about you collected after you withdraw your authorization for this or any other research.

Do you have any questions? Please contact the principal investigator, Gloria Walters, at (910) 715-2235 with questions about your rights as a research participant and the research use of your health information. The researcher will give you a signed copy of this form.

The health information of _____ can be collected and used by the researchers and staff for the research study described in this form and the attached consent form.

Signature: _____ Date: _____

Print name: _____ Relation: _____

UNCG IRB
Approved Consent Form
Valid from:
8/4/14 to **8/3/15**

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM

Project Title: **Women and MI: Symptoms and Delays in Seeking Treatment**

Project Director: Gloria Walters MSN
Faculty Advisor: Susan Letvak PhD

Participant's Name: _____

What are some general things you should know about research studies?
You are being asked to take part in a research study. Your participation in the study is voluntary. You may choose not to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. There may not be any direct benefit to you for being in the research study. There also may be risks to being in research studies. If you choose not to be in the study or leave the study before it is done, it will not affect your relationship with the researcher or the University of North Carolina at Greensboro.
Details about this study are discussed in this consent form. It is important that you understand this information so that you can make an informed choice about being in this research study.

You will be given a copy of this consent form. If you have any questions about this study at any time, you should ask the researchers named in this consent form. Their contact information is below.

What is the study about?
This is a research project. We are inviting you to be a part of a study about symptoms you may have had with your heart attack. The purpose of this study is to learn about symptoms of a heart attack in women and other factors that may have influenced your decision to seek care.

Why are you asking me?
We are asking you because you are 18 or older and had a heart attack in the last 3 years and expressed interest in the study to a nurse from Moore Regional Hospital. The researcher would like to look at your name, medical record number, telephone number, discharge date, height, weight, the length of symptom duration reported in the medical record before first medical contact, and distance travelled to the Emergency Department. You will also be asked to sign a separate HIPAA Authorization form in order for the researcher to look at your medical record.

What will you ask me to do if I agree to be in the study?
You will be asked to answer questions in an interview. These questions will ask about general information, such as your age, race, and marital status, about your health, including any medications you may be taking, and about your symptoms when you had your heart attack. It will take about 60 - 90 minutes to complete all of the things listed above.

UNCG IRB
Approved Consent Form
Valid from:
8/4/14 to 8/3/15

Are there any audio/video recording?
No.

What are the dangers to me?
The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants.
It is possible that discussions about health may cause embarrassment. This should be no more than everyday discussions with your family, friends, neighbors, and coworkers. If the questions make you uncomfortable, you may choose not to respond or withdraw from the study.

Are there any benefits to me for taking part in this research study?
There are no direct benefits from being in this study. You may benefit by having your voice heard and opinions expressed about your symptoms and experiences. Further, you may benefit from increased understanding of research and your rights to participate or not to participate in research.

Are there any benefits to society as a result of me taking part in this research?
Findings may assist health professionals, providers, agencies, organizations and educators to find ways to reduce delays in seeking treatment for heart attacks.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you for participating in this study. After you answer all of the questions, you will receive $20.

How will you keep my information confidential?
All information obtained in this study is strictly confidential unless disclosure is required by law. There will be a code number assigned to you information. Your name will not be on this information. Your consent form will be kept in a locked container separate from the rest of your information. The information will be kept in a locked file cabinet. Consent forms will be placed in a separate locked file cabinet in a faculty member's office at UNCG. The master list will be stored on a password protected computer. All information obtained in this study is strictly confidential unless disclosure is required by law.

Your name will not appear on any published results from this study.

What if I want to leave the study?
You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped. Choosing not to participate or withdrawing from the study will not affect your relationship with or the care you receive at First Health Moore Regional Hospital

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:
By signing this consent form you are agreeing that you have read it, or that it has been read to you. You agree that you fully understand the information on this form. You agree that you are openly willing to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate.

- If you have questions, want more information or have suggestions, please contact Gloria Walters, who may be reached at (910)715-2235 or Susan Letvak at (336) 256-1024. If you have any concerns about your rights, how you are being treated, concerns or complaints about this project or benefits or risks associated with being in this study please contact the Office of Research Integrity at UNCG toll-free at (855)-251-2351.

Would you be willing to be contacted about another study? Yes _____ No _____

Signature: _____ Date: _____

UNCG IRB
Approved Consent Form
Valid from:
8/4/14 to 8/3/15

APPENDIX B

UNCG IRB LETTER

From: IRB [mailto:ori@uncg.edu]
Sent: Wednesday, July 01, 2015 12:19 PM
To: Walters, Gloria
Cc: irbcorre@uncg.edu; saletvak@uncg.edu; dcwallac@uncg.edu
Subject: IRB Notice

To: Gloria Walters

800 East Washington Street Ext., Rockingham, NC 28379

From: IRB

Approval Date: 7/01/2015
Expiration Date of Approval: 6/30/2016

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Renewal
Expedited Category: 7.Surveys/interviews/focus groups
Study #: 14-0254**Sponsors:** Firsthealth Of The Carolinas
Study Title: Women and pre-hospital delays associated with myocardial infarction

This submission has been approved by the IRB for the period indicated.

Study Description:

The purposes of this proposed study are to describe the symptom experience of women having a heart attack, explore the factors that influence the symptom experience (such as time duration estimation, temporal orientation, and impulsivity), and determine how these factors influence treatment seeking. The theory of unpleasant symptoms is the framework proposed to guide this study. Results of this study will assist researchers and clinicians to identify other explanations for treatment delays in women with MI and design interventions to reduce delays and disparities in the care and health outcomes of women with MI.

Study Specific Details:

- Study involves DATA ANALYSIS ONLY.

Regulatory and other findings:

- **This approval includes a limited waiver of HIPAA authorization to identify potential subjects for recruitment into this research study, as allowed under 45 CFR 164.512. <u>This limited waiver provides access to protected health information (PHI) to confirm eligibility and facilitate initial contact, after which consent and HIPAA authorization will be sought.</u>**

Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://integrity.uncg.edu/institutional-review-board/). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the "Unanticipated Problem-Adverse Event Form" at the same website.

Please be aware that valid human subjects training and signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found at http://policy.uncg.edu/research_data/.

CC:
Susan Letvak, School of Nursing
Debra Wallace, Community Practice Nursing

THE UNIVERSITY of NORTH CAROLINA
GREENSBORO

OFFICE OF RESEARCH INTEGRITY
2718 Beverly Cooper Moore and Irene Mitchell Moore
Humanities and Research Administration Bldg.
PO Box 26170
Greensboro, NC 27402-6170
336.256.0253
Web site: www.uncg.edu/orc
Federalwide Assurance (FWA) #216

To: Gloria Walters

800 East Washington Street Ext., Rockingham, NC 28379

From: IRB

Authorized signature on behalf of IRB

Approval Date: 8/04/2014
Expiration Date of Approval: 8/03/2015

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 7.Surveys/interviews/focus groups
Study #: 14-0254**Sponsors:** Firsthealth Of The Carolinas
Study Title: Women and pre-hospital delays associated with myocardial infarction

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:

The purposes of this proposed study are to describe the symptom experience of women having a heart attack, explore the factors that influence the symptom experience (such as time duration estimation, temporal orientation, and impulsivity), and determine how these factors influence treatment seeking. The theory of unpleasant symptoms is the framework proposed to guide this study. Results of this study will assist researchers and clinicians to identify other explanations for treatment delays in women with MI and design interventions to reduce delays and disparities in the care and health outcomes of women with MI.

Regulatory and other findings:

- **This approval includes a limited waiver of HIPAA authorization to identify potential subjects for recruitment into this research study, as allowed under 45 CFR 164.512. This limited waiver provides access to protected health information (PHI) to confirm eligibility and facilitate initial contact, after which consent and HIPAA authorization will be sought.**

Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://integrity.uncg.edu/institutional-review-board/). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using

the "Unanticipated Problem-Adverse Event Form" at the same website.
Please be aware that valid human subjects training and signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found at http://policy.uncg.edu/research_data/.

CC:
Susan Letvak, School of Nursing
Debra Wallace, Community Practice Nursing

APPENDIX C

FIRSTHEALTH OF THE CAROLINAS IRB LETTER

From: IRB [mailto:ori@uncg.edu]
Sent: Wednesday, July 01, 2015 12:19 PM
To: Walters, Gloria
Cc: irbcorre@uncg.edu; saletvak@uncg.edu; dcwallac@uncg.edu
Subject: IRB Notice

To: Gloria Walters

800 East Washington Street Ext., Rockingham, NC 28379

From: IRB

Approval Date: 7/01/2015
Expiration Date of Approval: 6/30/2016

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Renewal
Expedited Category: 7.Surveys/interviews/focus groups
Study #: 14-0254**Sponsors:** Firsthealth Of The Carolinas
Study Title: Women and pre-hospital delays associated with myocardial infarction

This submission has been approved by the IRB for the period indicated.

Study Description:

The purposes of this proposed study are to describe the symptom experience of women having a heart attack, explore the factors that influence the symptom experience (such as time duration estimation, temporal orientation, and impulsivity), and determine how these factors influence treatment seeking. The theory of unpleasant symptoms is the framework proposed to guide this study. Results of this study will assist researchers and clinicians to identify other explanations for treatment delays in women with MI and design interventions to reduce delays and disparities in the care and health outcomes of women with MI.

Study Specific Details:

- Study involves DATA ANALYSIS ONLY.

Regulatory and other findings:

- **This approval includes a limited waiver of HIPAA authorization to identify potential subjects for recruitment into this research study, as allowed under 45 CFR 164.512. <u>This limited waiver provides access to protected health information (PHI) to confirm eligibility and facilitate initial contact, after which consent and HIPAA authorization will be sought.</u>**

Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://integrity.uncg.edu/institutional-review-board/). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the "Unanticipated Problem-Adverse Event Form" at the same website.

Please be aware that valid human subjects training and signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found at http://policy.uncg.edu/research_data/.

CC:
Susan Letvak, School of Nursing
Debra Wallace, Community Practice Nursing

FirstHealth Institutional Review Board

NOTICE OF IRB APPROVAL

CO 601-A

Date: 07/10/2014

FIRSTHEALTH INSTITUTIONAL REVIEW BOARD
5 AVIEMORE DRIVE
PO BOX 3000
PINEHURST, NC 28374
910-715-4434

To: Gloria Walters
Attention: Susan Letvak, UNCG Faculty
Re: **Women and Pre-Hospital Delays Associated with Myocardial Infarction**
Date 7/10/2014

This is to inform you that FirstHealth Institutional Review Board (IRB) has approved the above research study.

The approval period is from 07/10/2014 **to 07/09/2015.**

Continued approval is conditional upon your compliance with the following requirements:

- A copy of the **Informed Consent Document**, approved as of **07/10/2014**, is enclosed. No other consent form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject must be given a copy of the signed consent form.
- All protocol amendments and changes to approved research must be submitted to the IRB and not be implemented until approved by the IRB except where necessary to eliminate apparent immediate hazards to the study subjects.
- Advertisements, letters, internet postings and any other media for subject recruitment must be submitted to IRB and approved prior to use.
- Significant changes to the study site and significant deviations from the research protocol and all unanticipated problems that may involve risks or affect the safety or welfare of subjects or others, or that may affect the integrity of the research must be promptly reported to the IRB.
- All deaths, life-threatening problems or serious or unexpected adverse events, *whether related to the study article or not*, must be reported to the IRB.
- Please complete and submit reports to the IRB as follows:

  Renewal of the study - complete and return the Continuing Review Report-Renewal Request 4-6 weeks prior to the expiration of the approval period. The study cannot continue after 07/09/2015 until re-approved by the IRB.

  Completion, termination, or if not seeking renewal of the project - send the report upon completion of the study.

Please call me if you have any questions about the terms of this approval.

Signature
IRB Chairperson/ Designee

OMB No. 0990-0263
Approved for use through 3/31/2015

Protection of Human Subjects
Assurance Identification/IRB Certification/Declaration of Exemption
(Common Rule)

Policy: Research activities involving human subjects may not be conducted or supported by the Departments and Agencies adopting the Common Rule (56FR28003, June 18, 1991) unless the activities are exempt from or approved in accordance with the Common Rule. See section 101(b) of the Common Rule for exemptions. Institutions submitting applications or proposals for support must submit certification of appropriate Institutional Review Board (IRB) review and approval to the Department or Agency in accordance with the Common Rule.

Institutions must have an assurance of compliance that applies to the research to be conducted and should submit certification of IRB review and approval with each application or proposal unless otherwise advised by the Department or Agency.

1. Request Type	2. Type of Mechanism	3. Name of Federal Department or Agency and, if known, Application or Proposal Identification No.
(X) ORIGINAL ( ) CONTINUATION ( ) EXEMPTION ( ) Amendment	[ ] GRANT [ ] CONTRACT [ ] FELLOWSHIP X COOPERATIVE AGREEMENT [ ] OTHER:_____	

4. Title of Application or Activity	5. Name of Principal Investigator, Program Director, Fellow, or Other:
Women and Pre-Hospital Delays Associated with Myocardial Infarction	Gloria Walters, MSN

6. Assurance Status of this Project *(Respond to one of the following)*

X This Assurance, on file with Department of Health and Human Services, covers this activity:
Assurance Identification No. FWA00002181 the expiration date 03/20/2019 IRB Registration No. 00001513

[ ] This Assurance, on file with *(agency/dept)*_____, covers this activity. Assurance No._____, the expiration date_____ IRB Registration/identification No._____*(if applicable)*

[ ] No assurance has been filed for this institution. This institution declares that it will provide an Assurance and Certification of IRB review and approval upon request.

[ ] Exemption Status: Human subjects are involved, but this activity qualifies for exemption under Section 101(b), paragraph_____.

7. Certification of IRB Review (Respond to one of the following IF you have an Assurance on file)

X This activity has been reviewed and approved by the IRB in accordance with the Common Rule and any other governing regulations. by:
(X) Full IRB Review on (date of IRB meeting) 07/10/2014 or [()] Expedited Review on (date) _____
[ ] If less than one year approval, provide expiration date _____ ( ) Facilitated Review on (date)_____

[ ] This activity contains multiple projects, some of which have not been reviewed. The IRB has granted approval on condition that all projects covered by the Common Rule will be reviewed and approved before they are initiated and that appropriate further certification will be submitted.

8. Comments: Approval Period from 07/10/2014 to 07/09/2015.

9. The official signing below certifies that the information provided above is correct and that, as required, future reviews will be performed until study closure and certification will be provided.	10. Name and Address of Institution
11. Phone No. *(with area code)* 910-715-4434 12. Fax No. *(with area code)* 910-715-6279 13. Email: tpthompson@firsthealth.org	FirstHealth Moore Regional Hospital Tina Thompson 5 Aviemore Drive P.O. Box 3000 Pinehurst, N.C. 28374
14. Name of Official: George Atherholt	15. Title FHIRB Chairperson
16. Signature George H. Atherholt	17. Date 7/10/2014

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FirstHealth Institutional Review Board

NOTICE OF RENEWAL APPROVAL

CO 601-F

Date: 06/04/2015

FIRSTHEALTH INSTITUTIONAL REVIEW BOARD
5 AVIEMORE DRIVE
PO BOX 3000
PINEHURST, NC 28374
910-715-4434

To: Gloria Walters
Attention: Susan Letvak, UNCG Faculty
Re: **Women and Pre-Hospital Delays Associated with Myocardial Infarction**
Date 06/04/2015

This is to inform you the FirstHealth Institutional Review Board (IRB) has renewed its approval of the above research study.

The approval period is from 06/04/2015 to 06/03/2016.

All conditions for continued approval during the prior approval period remain in effect. These include, but are not necessarily limited to the following requirements:

- A copy of the **Informed Consent Document**, approved as of **06/04/2015** is enclosed. No other consent form should be used. It must be signed by each subject prior to initiation of any protocol procedures. In addition, each subject must be given a copy of the signed consent form.
- All protocol amendments and changes to approved research must be submitted to the IRB and not be implemented until approved by the IRB except where necessary to eliminate apparent immediate hazards to the study subjects.
- Advertisements, letters, Internet postings and any other media for subject recruitment must be submitted to IRB and approved prior to use.
- Significant changes to the study site and significant deviations from the research protocol must be reported.
- All deaths, life-threatening problems or serious or unexpected adverse events, *whether related to the study article or not*, must be reported to the IRB.
- Please complete and submit reports to the IRB as follows:

  Renewal of the study - complete and return the Continuing Review Report-Renewal Request 4-6 weeks prior to the expiration of the approval period. The study cannot continue after **06/03/2016** until re-approved by the IRB.

  Completion, termination, or if not renewing the project - send the report upon completion of the study.

Please call me if you have any questions about the terms of this approval.

IRB Chairperson/Designee

APPENDIX D

MCSWEENEY ACUTE AND PRODROMAL MYOCARDIAL INFARCTION SYMPTOM SURVEY STATEMENT

Due to copyright regulations, the McSweeney Acute and Prodromal Myocardial Infarction Symptom Survey cannot be published. To obtain a copy of the instrument please contact Dr. Jean McSweeney at (501) 296-1982 or email mcsweeneyjean@uams.edu.

UAMS
COLLEGE OF NURSING
UNIVERSITY OF ARKANSAS FOR MEDICAL SCIENCES

4301 W. Markham St., #529
Little Rock, AR 72205-7199

501-686-5374
501-686-8350 (fax)

www.nursing.uams.edu

September 19, 2012

Gloria Walters MSN, RN, CCRN, ACNP-BC

I understand that I have permission to use and copy the McSweeney Acute and Prodromal Infarction Symptom Survey for the purpose of collecting data from women about symptoms with AMI for my dissertation.
The MAPMISS is not to be changed or used for any other purposes without the written authorization of Dr. Jean McSweeney.

I agree to the terms stated above, and to cite the MAPMISS in any presentations or publications. I will send (or fax) a copy of this signed letter to Dr. Jean McSweeney, 4301 W. Markham St., Slot 529, Little Rock, AR 72223; fax number 501-296-1765.

Signature Gloria Walters Date 9/19/2012

APPENDIX E

DEMOGRAPHIC DATA FORM

ID Number: _____

Demographic Data Form

1. Do you have a first-degree relative with coronary heart disease (mother, father, sibling, or child)?

☐ Yes

☐ No

2. How far did you travel to the hospital with your MI? _____

3. Did you perceive that your symptoms were life-threatening?

☐ Yes

☐ No

4. Had you previously sought care in the past for similar symptoms?

☐ Yes

☐ No

If so, what symptoms did you report at that time?_____

_____.

5. How long did you experience the symptoms before you accessed care (hospital or EMS)? _____

6. Were you told that you had a cardiac or respiratory arrest with your MI?

☐ Yes

☐ No

APPENDIX F

TEMPORAL ORIENTATION SCALE

Temporal Orientation Scale Permission

From: Brown, Carolyn M [mailto:cmbrown@austin.utexas.edu]
Sent: Monday, March 31, 2014 3:48 PM
To: Walters, Gloria
Subject: RE: Temporal Orientation Scale

Hi Gloria,

Here's the article that details the HTO scale development. You can cite this article as your source. I believe it is pretty clear regarding scoring, but let me know if you have any questions.

Thanks,

Carolyn Brown, Ph.D.
Professor
Tanabe Research Endowed Fellow
The University of Texas at Austin
College of Pharmacy
Health Outcomes and Pharmacy Practice
1 University Station, Mail Code A1930
Austin, Texas 78712-0127
(512) 471-2374 (Voice)

From: Walters, Gloria [mailto:GWalters@firsthealth.org]
Sent: Friday, March 28, 2014 1:57 PM
To: Brown, Carolyn M
Subject: RE: Temporal Orientation Scale

Thank you! Have a nice weekend.

From: Brown, Carolyn M [mailto:cmbrown@austin.utexas.edu]
Sent: Friday, March 28, 2014 2:42 PM
To: Walters, Gloria
Subject: Re: Temporal Orientation Scale
I'm out of the office and will return on Monday. I'll respond to your request next week.

Sent from my Verizon Wireless 4G LTE DROID

"Walters, Gloria" <GWalters@firsthealth.org> wrote:

Hi Dr. Brown, I am a PhD nursing student at the University of North Carolina at Greensboro. I am interested in your Temporal Orientation Scale and would like to use it to evaluate temporal orientation in women after experiencing a myocardial infarction. Would you allow me to use your scale? If so, could you please send me your instrument and instructions on how to score? Thank you.

Gloria Walters MSN, RN-BC, CCRN
Nursing Professional Development Specialist
Magnet Program Director
Clinical Practice/Professional Development
FirstHealth Moore Regional Hospital
PO Box 3000
Pinehurst, NC 28374
(910)715-2235
gwalters@firsthealth.org

Temporal Orientation Scale

Directions: Please read each statement and circle your response. Do not spend too much time on any statement. Answer quickly and honestly. There is no right or wrong answers.

Present Orientation

1. My day-to-day life is too busy to think about the future.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

2. If I want something now, I always buy it no matter what the price.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

3. There's no sense in thinking about the future before it gets here.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

4. What happens to me in the future is out of my control.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

5. As long as I feel good now, I don't worry about having health problems later in life.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

Future Orientation

6. I have a plan for what I want to do in the next 5 years of my life.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

7. I often save money or use layaway to buy things I can't afford right now.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

8. The choices I have made in life clearly show that I think about the future.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

9. When I plan a party or a get-together, I always start weeks ahead of time.
   1-strongly disagree
   2-disagree
   3-agree
   4-strongly agree

10. I often think about how my actions today will affect my health when I am older.
    1-strongly disagree
    2-disagree
    3-agree
    4-strongly agree

Reference:

Brown, C.M., & Segal, R. (1997). The development and evaluation of the hypertension temporal orientation (HTO) scale. *Ethnicity of Disease,* 7(41), 41-54.

APPENDIX G

BARRATT IMPULSIVITY SCALE VERSION 11

From: Stanford, Matthew S. [mailto:Matthew_Stanford@baylor.edu]
Sent: Thursday, August 14, 2014 1:00 PM
To: Walters, Gloria
Subject: RE: BIS-1

Gloria,

I have attached several documents that should be helpful to you.

Best Regards,
Matt

Matthew S. Stanford, Ph.D.
Professor
Department of Psychology and Neuroscience
Baylor University
One Bear Place # 97334
Waco, TX 76798-7334
tel: 254-710-2236
fax: 254-710-3033
http://www.mentalhealthgracealliance.org

Physical address for packages:
Baylor Sciences Facility
Attn: Psychology & Neuroscience
101 Bagby Avenue
Waco TX 76706

From: Walters, Gloria [mailto:GWalters@firsthealth.org]
Sent: Thursday, August 14, 2014 11:58 AM
To: Stanford, Matthew S.
Subject: BIS-1

Dr. Stanford, I am a PhD nursing student at the University of North Carolina at Greensboro and am interested in using the BIS-11 in my research. Do I have your permission to use this scale, and could you please provide me with a key to scoring? Thank you so much for your time.

Gloria Walters PhD(c), RN-BC, CCRN

Nursing Professional Development Specialist
Magnet/Research/RACE Coordinator
Clinical Practice/Professional Development
FirstHealth Moore Regional Hospital
PO Box 3000
Pinehurst, NC 28374
(910)715-2235
gwalters@firsthealth.org

BS-11 ENGLISH VERSION

DIRECTIONS: People differ in the ways they act and think in different situations. This is a test to measure some of the ways in which you act and think. Read each statement and put an X on the appropriate circle on the right side of this page. Do not spend too much time on any statement. Answer quickly and honestly.

	O	O	O	O
	Rarely/Never	Occasionally	Often	Almost Always/Always
1 I plan tasks carefully.	O	O	O	O
2 I do things without thinking.	O	O	O	O
3 I make-up my mind quickly.	O	O	O	O
4 I am happy-go-lucky.	O	O	O	O
5 I don't "pay attention."	O	O	O	O
6 I have "racing" thoughts.	O	O	O	O
7 I plan trips well ahead of time.	O	O	O	O
8 I am self controlled.	O	O	O	O
9 I concentrate easily.	O	O	O	O
10 I save regularly.	O	O	O	O
11 I "squirm" at plays or lectures.	O	O	O	O
12 I am a careful thinker.	O	O	O	O
13 I plan for job security.	O	O	O	O
14 I say things without thinking.	O	O	O	O
15 I like to think about complex problems.	O	O	O	O
16 I change jobs.	O	O	O	O
17 I act "on impulse."	O	O	O	O
18 I get easily bored when solving thought problems.	O	O	O	O
19 I act on the spur of the moment.	O	O	O	O
20 I am a steady thinker.	O	O	O	O

21 I change residences.	0	0	0	0
22 I buy things on impulse.	0	0	0	0
23 I can only think about one thing at a time.	0	0	0	0
24 I change hobbies.	0	0	0	0
25 I spend or charge more than I earn.	0	0	0	0
26 I often have extraneous thoughts when thinking.	0	0	0	0
27 I am more interested in the present than the future.	0	0	0	0
28 I am restless at the theater or lectures.	0	0	0	0
29 I like puzzles.	0	0	0	0
30 I am future oriented.	0	0	0	0

BS-11 SCORING GUIDE

The Barratt Impulsiveness Scale, Version 11 (BIS-11; Patton et al., 1995) is a 30 item self-report questionnaire designed to assess general impulsiveness taking into account the multi-factorial nature of the construct. The structure of the instrument allows for the assessment of six first-order factors (attention, motor, self-control, cognitive complexity, perseverance, cognitive instability) and three second-order factors (attentional impulsiveness [attention and cognitive instability], motor impulsiveness [motor and perseverance], nonplanning impulsiveness [self-control and cognitive complexity]). A total score is obtained by summing the first or second-order factors. The items are scored on a four point scale (Rarely/Never [1], Occasionally [2], Often [3], Almost Always/Always [4]).

1st Order Factor Item Content

Attention (5 items): 5, 9*, 11, 20*, 28
Motor (7 items): 2, 3, 4, 17, 19, 22, 25
Self-Control (6 items): 1*, 7*, 8*, 12*, 13*, 14
Cognitive Complexity (5 items): 10*, 15*, 18, 27, 29*
Perseverance (4 items): 16, 21, 23, 30*
Cognitive Instability (3 items): 6, 24, 26

2nd Order Factor Item Content

Attentional Impulsiveness (8 items): 5, 6, 9*, 11, 20*, 24, 26, 28
Motor Impulsiveness (11 items): 2, 3, 4, 16, 17, 19, 21, 22, 23, 25, 30*
Nonplanning Impulsiveness (11 items): 1*, 7*, 8*, 10*, 12*, 13*, 14, 15*, 18, 27, 29*
*Reversed item scored 4, 3, 2, 1

Reference:

Patton, J. H., Stanford, M. S. and Barratt, E. S. (1995). Factor structure of the Barratt impulsiveness scale. *Journal of Clinical Psychology, 51,* 768-774.

APPENDIX H

PERMISSION TO USE THE THEORY OF UNPLEASANT SYMPTOMS

WOLTERS KLUWER HEALTH LICENSE TERMS AND CONDITIONS

Mar 31, 2014

This is a License Agreement between Gloria A Walters ("You") and Wolters Kluwer Health ("Wolters Kluwer Health") provided by Copyright Clearance Center ("CCC"). The license consists of your order details, the terms and conditions provided by Wolters Kluwer Health, and the payment terms and conditions.

All payments must be made in full to CCC. For payment instructions, please see information listed at the bottom of this form.

License Number	3359500914162
License date	Mar 31, 2014
Licensed content publisher	Wolters Kluwer Health
Licensed content publication	Advances in Nursing Science
Licensed content title	The Middle-Range Theory of Unpleasant Symptoms: An Update
Licensed content author	Elizabeth R. Lenz, Linda C. Pugh, Renee A. Milligan, et al
Licensed content date	Jan 1, 1997
Volume Number	19
Issue Number	3
Type of Use	Dissertation/Thesis
Requestor type	Individual
Portion	Figures/table/illustration
Number of figures/tables/illustrations	1
Figures/tables/illustrations used	Fig. 2
Author of this Wolters Kluwer article	No
Title of your thesis / dissertation	Treatment Seeking Delays in Women with Symptoms of Myocardial Infarction
Expected completion date	Dec 2014
Estimated size(pages)	180
Billing Type	Invoice
Billing address	800 East Washington Street Ext. Rockingham, NC 28379 United States
Total	0.00 USD

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Terms and Conditions

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APPENDIX I

PERMISSION TO USE SCALES

Copyright Clearance Center

Confirmation Number: 11452224
Order Date: 09/24/2015

Customer Information

Customer: Gloria Walters
Account Number: 3000960175
Organization: UNCG
Email: gwaltersphd@gmail.com
Phone: +1 (910)7303368
Payment Method: Invoice

This is not an invoice

Order Details

Personality and individual differences

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