Perceived Susceptibility of Cardiovascular Disease as a Moderator of Relationships between Perceived Severity and Cardiovascular Health Promoting Behaviors among Female Registered Nurses

Deborah McClendon
ACCEPTANCE

This dissertation, PERCEIVED SUSCEPTIBILITY OF CARDIOVASCULAR DISEASE AS A MODERATOR OF RELATIONSHIPS BETWEEN PERCEIVED SEVERITY AND CARDIOVASCULAR HEALTH PROMOTING BEHAVIORS AMONG FEMALE REGISTERED NURSES by Deborah A. McClendon was prepared under the direction of the candidate's dissertation committee. It is accepted by the committee in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Nursing in the Byrdine F. Lewis School of Nursing in the College of Health and Human Sciences, Georgia State University.

Cecelia Grindel, PhD, RN, FAAN
Committee Chairperson

Laura P. Kimble, PhD, RN, FAHA
Committee Member

Dee Baldwin, PhD, RN, FAAN
Committee Member

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Cecelia Grindel, PhD, RN, FAAN
Associate Director for Graduate Nursing Programs

Barbara C. Woodring, EdD, RN, FAAN
Professor & Director
Byrdine F. Lewis School of Nursing
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Deborah A. McClendon
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The author of this dissertation is:

Deborah A. McClendon
345 Beracah Trail, SW
Atlanta, GA  30331

The director of this dissertation is:

Dr. Cecelia Grindel
Associate Director for Academic Affairs
Byrdine F. Lewis School of Nursing
College of Health and Human Services
Georgia State University
P.O. Box 3995
Atlanta, GA  30302-4019

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VITA

Deborah A. McClendon

ADDRESS: 345 Beracah Trail, SW
Atlanta, GA  30331

EDUCATION:

- PhD  2010  Georgia State University
  Byrdine F. Lewis School of Nursing
  Atlanta, GA
- MPH  2003  Emory University
  Rollins School of Public Health
  Atlanta, GA
- MSN  2000  Georgia State University
  Byrdine F. Lewis School of Nursing
  Atlanta, GA
- BSN  1977  Albany State University
  School of Nursing
  Albany, GA

PROFESSIONAL EXPERIENCE:

- 2008-Present  Unit Director
  Emory University Midtown  Atlanta, GA
- 2003-2008  Clinical Nurse Specialist
  Emory Healthcare
- 1993-2002  Registered Nurse
  Emory Crawford Long Hospital

AWARDS:

National Student Nurses Foundation Scholarship Recipient
Academy of Medical Surgical Nurses Research Award

ORGANIZATIONS:

Sigma Theta Tau International Honor Society of Nursing
Golden Key International Honour Society
Chi Eta Phi Sorority, Inc.
ABSTRACT

PERCEIVED SUSCEPTIBILITY OF CARDIOVASCULAR DISEASE AS A MODERATOR OF RELATIONSHIPS BETWEEN PERCEIVED SEVERITY AND CARDIOVASCULAR HEALTH PROMOTING BEHAVIORS AMONG FEMALE REGISTERED NURSES

by

DEBORAH A. McCLENDON

Significance: Morbidity and mortality related to CVD among women in the U.S. and most developed countries surpasses that of all cancers combined (AHA, 2008). Yet, CVD in women remains understudied, yielding low awareness among women and healthcare providers. The purpose of this study was to examine whether the relationship between health beliefs related to perceived cardiovascular disease (CVD) severity and health promoting behaviors were different in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility.

Methods: This study used a descriptive, correlational design. A convenience sample (N = 220) included female registered nurses (RNs), 23-66 years old (M = 48; SD = 9.7), mostly white (N = 143; 65%), who had worked in nursing an average of 21 years (SD = 11.3) and reported their job as stressful/very stressful (N = 129; 59%). Nurses were recruited from five acute care hospital systems in a large southeastern city. Data were collected using standard questionnaires that measured perceived CVD severity and susceptibility, social support, depression, stress, exercise and nutrition. Participants completed data collection via an online survey method.
Results: Data were analyzed using MANCOVA. For every standardized unit increase in perceived severity of CVD, participants had a 1.26 (95% CI: 0.02, 2.50) unit reduction in their healthy food choice score (lower scores = healthier food choices), and a 0.12 increase in their physical activity score (higher scores = more physical activity) (90% CI: 0.01, 0.23) unit. For every standardized unit increase in perceived CVD susceptibility there was an increase in the healthy food choice score by 2.37 (95% CI: 1.09, 3.65) units, and a reduction in the physical activity score by 0.27 (95% CI: 0.12, 0.41) unit. Greater age (p = 0.01) and greater depression (p = 0.001) were statistically significant predictors of lower physical activity. CVD susceptibility did not moderate the effect of CVD severity on nutrition or physical activity.

Conclusions: Higher perceived CVD severity was associated with increased likelihood for healthy food choices and physical activity. In contrast, higher perceived CVD susceptibility was associated with decreased likelihood for healthy food choices and physical activity. More research is needed to understand how susceptibility beliefs around CVD are formed in women and how to better engage women in risk reduction behavior.
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Georgia State University

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Chapter I

Introduction

Cardiovascular disease (CVD) refers to a group of disorders of the heart and blood vessels. These disorders include but are not limited to coronary heart disease (CHD), hypertension, cerebrovascular disease, peripheral artery disease, heart failure, rheumatic heart disease, and congenital heart disease (World Health Organization, 2009). Despite the fact that deaths resulting from CVD have decreased in the United States (U.S.) for the past four decades, CVD remains the leading cause of morbidity and mortality for both men and women (Crane & Wallace, 2007; Lichtenstein et al., 2006; Lloyd-Jones et al., 2006, National Heart Lung and Blood Institute, 2009) in the U.S., Europe, and worldwide (Crane & Wallace, 2007; Lloyd-Jones et al., 2006). CVD deaths are associated with risk factors, which are multiple and interrelated conditions. When these conditions co-exist, they increase the probability of the development of heart disease (Kannel & Wolf, 2008). The increased prevalence of CVD risk factors has occurred at alarming rates and has ignited concerns that the trends may reverse movement toward the decline in CVD related deaths.

It is projected that the aging population will cause an increased prevalence of CVD for the next 30 years (Block & Pearson, 2007; Gibbons et al., 2008; Kumanyika et al., 2008). Additional projections suggest CVD related deaths will increase at a rate 2.5 times faster than population growth and that heart disease prevalence will increase by 16
percent per decade (Gibbons et al., 2008). Given the increased prevalence, efforts focused on prevention of CVD risk factor reduction continue to be essential. Health promoting behaviors of healthy food choices and physical activity have been identified as lifestyle interventions that promote CVD risk factor reduction.

Using the Health Belief Model (HBM) constructs, this study explored modifying factors (age, race, social support, depression, and perceived stress) and perceived severity as they relate to the use of CVD health promoting behaviors of healthy food choices and physical activity in women, specifically female Registered Nurses. Additionally, the HBM construct perceived susceptibility was examined to see if it moderates the relationship between the aforementioned variables and CVD health promoting behaviors of healthy food choices and physical activity. Healthy food choices and physical activity are recognized as fundamental to CVD risk factor reduction and disease prevention (AHA, 2008; CDC, 2009).

Examining perceived susceptibility as a moderator for engagement in health promoting behaviors of healthy food choices and physical activity is unique to this study. This exploratory study was conducted to help to identify factors that impact CVD health beliefs and CVD health promotion and risk reduction behaviors in women. Additionally, it was hoped that information from this study will serve as foundational work toward evidence to support CVD research investigations that target RNs.

**Significance of the Problem**

The American Heart Association (AHA) classifies CVD risk factors as non-modifiable (cannot be treated or controlled) and modifiable (can be treated or controlled). Non-modifiable risks include age, sex, heredity, and race. Modifiable risks include
hypertension, overweight and obesity, diabetes mellitus, elevated low density lipoprotein (LDL), decreased high density lipoprotein (HDL), physical inactivity, atherogenic diet, tobacco use, consuming more than 1-2 alcoholic drinks per day, and stress. The more risk factors an individual has, the greater the chance of developing CVD (AHA, 2007). Although some may be more pathogenic than others, risk factors identified as having a significant role in increasing CVD are called major risk factors. Less pathogenic risk factors are identified as contributors (AHA, 2007). Preventing, decreasing, and managing CVD includes combinations of therapeutic lifestyle change, pharmacotherapy, and medical procedures (National Heart Lung and Blood Institute, 2009). Understanding CVD risk factors and examining the impact of these factors specific to women is an area where additional research is needed.

The CVD statistics specific to women are astounding. In the U.S. alone, one in six women (nearly one half million) die of CVD annually (AHA, 2008). Because women tend to live longer, this number exceeds the number of CVD deaths in men. Moreover, CVD deaths exceed the next five causes of death in women combined, including all forms of cancer (AHA, 2008). The leading cause of CVD related female deaths is coronary heart disease (CHD). Moreover, CHD is the most common type of heart disease in the U.S.

The AHA (2008) recognizes that the incidence and prevalence of CHD is higher among American men than American women, and that CHD is increasing among American women. Over two-thirds of the women who have had sudden death from CHD had no recognizable preceding symptoms, making CHD prevention in women a priority (Mosca et al., 2007). Despite the fact CHD is the leading cause of mortality among
American women, risk factor screening and interventions to promote risk reduction among women continue to be underused (Mieres, 2006).

Although numerous studies have supported disparities in CVD among men and women and different racial/ethnic groups of women over the decades, disparities continue in diagnostics, treatment and outcomes (Bonte et al., 2008; Ding, Powe, Mason, Sherber, & Braunstein, 2007; Gholizadeh & Davidson, 2008; Matyal, 2008; Rosenfeld, 2006; Verheugt et al., 2008; Warner, 2008). Based on the body of evidence in support of CVD disparities, it is recommended CVD prevention initiatives begin with broad based risk assessments rather than the narrow focus of treatment of individual modifiable risk factors. Preventive initiatives that impact the course of CVD for an individual are those that target the clinical point where the risk factor is in relation to CVD progression. However, it is unknown how self-perception of where one lies on the CVD trajectory influences behavior. Additionally, it is unknown whether self perception of CVD susceptibility moderates health beliefs and CVD health promoting behaviors.

The Nurses’ Health Studies (NHS) started in 1976 with a primary focus on cancer prevention. Since that time, studies from the NHS have been among the largest and longest running investigations producing data specific to CVD and nurses in the areas of work stress and type 2 diabetes (Kroenke et al., 2006), socioeconomic status (Albert, 2006), abdominal obesity (Zhang et al., 2008) obesity and physical activity (Rana, Li, Mason, & Hu, 2007), and other conditions. The impact of shift work on women was examined by Kawachi et al. (1995). The findings suggested an increased risk of CVD for shift workers. Since the majority shift workers had been men, and the majority of nurses work shifts, this was a landmark study for nurses. Data related to the perceptions of
nurses regarding personal susceptibility to CVD using the HBM as the conceptual model remains sparse.

**CVD and Perceived Susceptibility**

Low awareness of objective CVD risks and low perceived susceptibility on the part of women may influence willingness to adhere to recommendations to engage in health promoting behaviors. The perception that the need for adherence is low may impact decision making related to cost versus benefit of adopting a behavior (Becker, 1974; Erhardt, 2005). The situation of women’s low CVD knowledge supports the fact that more theoretically based research is needed to better describe and predict contributions to health promoting behaviors of various populations of women. Targeted research designed for diverse groups of women is an additional need (Gholizadeh & Davidson, 2008; Perry, Rosenfeld, & Kendall, 2008). The emerging concern that women may not have full recognition of their risk for CVD suggests that theoretical approaches to understanding contributors to health promoting behaviors in women must include their subjective perceptions of susceptibility and the related constructs. At the same time, there is limited understanding about the outcome of risk information on future behavior (Williams & Noyes, 2007). A better understanding of women’s thoughts and feelings about their CVD risk is needed.

In order to develop more effective interventions related to CVD prevention and to control CVD progression, we need to better understand perceptions of individuals. CVD risk factors and how to prevent and delay sequelae have been well researched and identified in the literature. What we lack in knowledge is how perceived severity and
perceived personal susceptibility interact and moderate. This study will investigate the relationship.

Although the health beliefs of women have been investigated in numerous studies using the HBM, few studies have been specific to the health beliefs of women about CVD. Cognitive theorists of health behaviors have suggested that in order to predict behavior, the measurement of the attitudes of the participants must be specific to the behavior they are intended to predict. Specifically, in order to predict the health promoting behaviors of women related to CVD, the investigations must be specific to the topic of women and CVD (Mirotznik, Feldman, & Stein, 1995).

Currently, the numbers of studies conducted to investigate predictors of CVD health promoting behaviors in women are few. The vast majority of CVD related research studies have focused on men. CVD risks and recommended behaviors for CVD prevention in men are well publicized. Additional studies that include women should be conducted. Evidence-based research that uses a robust theoretical model about a specified target population can aid practitioners when making recommendations to reduce risk.

Finally, the HBM is an individual level theory and individual behavior is the basic unit for group behavior. Individuals are members of groups, have affiliations with organizations, elect and appoint leaders, and influence policy legislation. Policy and institutional changes require influencing individuals.

**Purpose**

The purpose of this study was to examine whether or not the relationship between health beliefs related to perceived CVD severity and health promoting behaviors are
different in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility.

**Research Questions**

1. Is the relationship between perceived CVD severity and health promoting behaviors of healthy food choices different in women with high perceived CVD susceptibility versus women with low perceived CVD susceptibility?

2. Is the relationship between perceived CVD severity and health promoting behaviors of physical activity different in women with high perceived CVD susceptibility versus women with low perceived CVD susceptibility?

3. What is the contribution of personal characteristics (age, race, social support, depression, and perceived stress), perceived severity, and perceived susceptibility to variance in CVD health promoting behaviors of healthy food choices?

4. What is the contribution of personal characteristics (age, race, social support, depression, and perceived stress), perceived severity, and perceived susceptibility to variance in CVD health promoting behaviors of physical activity?

**Theoretical Framework**

One theoretical approach to understanding health promoting behaviors is the Health Belief Model (HBM). The HBM is one of the first and most widely used behavioral and social science theories developed to explain health behavior and human decision making. Perceived risk, described as risk susceptibility in the model, is theorized as an important construct for explaining health behavior. This model has been deemed appropriate for and has been selected as the theoretical framework for this study.
The Health Belief Model

Behavioral and social science theories offer a framework for understanding the rationale for why people participate in health-protecting, health-risking, and health-compromising activities. To that end, theory development and application are useful for understanding factors that influence the adoption or maintenance of health behaviors, especially when used to plan, implement, and evaluate health promotion programs. Factors that influence participation in health promotion behaviors include the diverse categories of individual, familial, social, and cultural (DiClemente et al., 2002; Hochbaum, Sorenson, & Lorig, 1992).

The HBM has an explicit orientation toward the avoidance of disease (Rosenstock, 1974a), and it is one of the most robust theoretical models of health behavior (Glanz et al., 2002; Mirotznik, Feldman, & Stein, 1995). The model has been used by researchers for explaining preventive, protective, illness, and sick role behaviors in general (Mirotznik et al., 1995; Rosenstock, 1974a), and has been used to study health promotion behaviors specific to women.

Key concepts of the HBM

Since development, the HBM has undergone clarification of the concepts and has been expanded for use by investigators beyond behavior screening to include applicability for behaviors related to prevention, illness, and sick-role (Becker, 1974; Janz & Becker, 1984; Rosenstock, 1974). Investigations using the model have supported explaining the following: When people regard themselves as susceptible to a condition that could be serious, and view that a course of actions could be beneficial for decreasing their susceptibility or seriousness, and they also determine that the benefits of taking the
actions outweigh the barriers; they will then take actions to prevent, screen, and control the condition (Glanz et al., 2002).

The original focus of the model was to provide an explanation for the failure of people to take part in disease detection and prevention programs. These actions were simple behaviors, and required a one-shot performance. This being the case, the role of self-efficacy went unrecognized (Glanz et al., 2002; Rosenstock, 1974). Later, the focus of the HBM was broadened to include people’s responses to symptoms and behaviors, and included lifestyle modifications that required sustained behavior changes. Modifying lifelong habits require confidence that the change is possible (Bandura, 1995). In order for an individual to be successful at changing a behavior, they must believe that continuation of that behavior poses a threat (perceived susceptibility and seriousness) and believe that a specific change in behavior will yield a valued outcome at a tolerable cost (perceived benefits and barriers). Additionally, a belief that they have the competence (self-efficiency) to overcome the perceived barriers to change a behavior is vital (Bandura, 1995; Glanz et al., 2002).

The five key concepts of the model are perceived susceptibility, perceived severity, perceived benefits, perceived barriers, and cues to action. Self-efficacy is a variable that is embedded within the concepts. Rosenstock, Stretcher, and Becker (1988) suggested that self-efficacy should be a distinct concept (see Appendix A).

**Perceived Susceptibility**

Perceived susceptibility refers to the subjective opinion of the risk of contracting a condition. There is a wide range of opinions among individuals about personal susceptibility to a disease. The range of opinions includes total denial of the possibility of
contracting a condition, admission to a possibility that the disease may occur, but not to
them; and admission to a belief of actual danger (Rosenstock, 1974).

**Perceived Seriousness**

Perceived seriousness is the subjective opinion of the seriousness of a condition
and its consequences. The degree of seriousness of a condition or disease varies from
person-to-person. The perception of seriousness is influenced by the emotions provoked
by the thought of the disease and by the perception of the difficulty a health condition
will inflict (Rosenstock, 1974).

**Perceived Benefits**

Perceived benefits is the subjective opinion of the effectiveness of a behavior
toward decreasing a disease threat. When personal susceptibility to a condition is
accepted by the individual and there is a move toward adopting health protective
behaviors, the behaviors taken will be influenced by beliefs concerning the effectiveness
of adopting the behaviors. An individual who has beliefs about high personal
susceptibility and high severity would not be likely to accept any recommended health
actions unless the actions were believed to be effective for decreasing the health threat
(Rosenstock, 1974).

**Perceived Barriers**

Perceived barriers are the subjective opinions of the tangible and psychological
expenditures related to participating in the advised action. Although the belief may exist
that a given action may have effectiveness in decreasing the seriousness of a disease, the
individual may simultaneously view the action as painful, upsetting, expensive, or
inconvenient (Becker, 1974).
Cues to Action

Cues to action are factors that activate readiness to take the advised action. They are the instigating events that set the movement toward performing the advised action in motion. Cues may be internal or external, and the intensity of the triggering cue varies by perceived susceptibility and severity (Rosenstock, 1974).

Other Variables

Self-efficacy. In 1977, Bandura identified self-efficacy as a construct of the social learning theory (Glanz et al., 2002). Self-efficacy is the conviction that the advised behavior can be successfully executed. The individual must have beliefs of both competence to perform the behavior and confidence that they can triumph over the perceived barriers and achieve success. Expectations of perceived ability to perform a behavior (self-efficacy) and outcome expectations are different. Measurement of self-efficacy must be unambiguous and specific to the target behaviors, barriers, and the understanding capacity of the target audience (Glanz et al., 2002).

Modifying factors. Modifying factors are categorized as demographic, sociopsychological, and structural. These factors may have an indirect influence on health behaviors by affecting perceptions. Specifically, the demographic variable knowledge may influence the perception of susceptibility, severity, benefits and barriers (Glanz et al., 2002; Rosenstock, 1974).

Susceptibility Attributes

The defining attributes of susceptibility perception include the possibility or chance for loss or harm, an intellectual insight or cognitive recognition into self or others, and a process for decision making that relies on the possible or potential outcomes of a
given event (probability). An antecedent to susceptibility perception is cognitive reasoning, the capacity to make a distinction between two or more choices. In the absence of cognitive reasoning, the individual is unable to formulate a perception about susceptibility and would not be able to perceive when harm may occur. Knowledge about the risk of interest is a precursor to being able to evaluate susceptibility. The perception of having knowledge about the risk is an additional precursor (Jacobs, 2000).

**Perceived Susceptibility**

The subjective perception of personal susceptibility as a pre-requisite for preventive behavior change has been supported in literature reviews and meta-analytic studies (Janz & Becker, 1984; Van der Pligt, 1996; Wit, Das, & Vet, 2008). The perceived susceptibility and the perceived severity of a negative outcome or loss are the two components of risk behavior. Risk behavior involves an action that has the possibility of leading to a negative outcome or loss (Van der Pligt, 1996).

Perceived susceptibility, or risk estimation, is influenced by dynamics such as individual and cultural characteristics, how the risk is described, and the framework within which the risk information is presented. Susceptibility perception varies among individuals and the perception is often minimally correlated to statistics and research findings (Van der Pligt, 1996). Biases have been identified in relation to susceptibility perception. Two biases involve the overestimation of small probabilities and the underestimation of large ones. A third bias involves the overestimation of risks when the individual has higher cognitive availability. Higher cognitive availability may involve mass media coverage or personal exposure, making the risk more easily recalled or pictured. A risk such as breast cancer may have susceptibility perception as likely due to
media exposure (cognitive availability). A risk with less exposure, such as heart disease in women, may influence underestimation of susceptibility (Van der Pligt, 1996).

The role of susceptibility perception should be taken into account when trying to understand human decision making. Research suggests that the cognitive capacity of humans is limited and inhibits the processing of large amounts of factors and issues. Limited cognitive capacity impacts the conceptualization of the multidimensionality of susceptibility. This limitation may lead to impairment of an individual’s susceptibility perception, causing increased risk behavior, increased human error, and suboptimal risk related decision making (Williams & Noyes, 2007).

There is limited research using the HBM to examine women and CVD. An integrated literature review was conducted which focused on cardiovascular disease and women published in the English language using the following search mechanisms: Cochrane Library, MEDLINE (1996-present), CINAHL (1983-present), EMBASE (1980-present), Web of Science (1900-present), government reports and manual searches of bibliographies. Key search words included: heart disease, Health Belief Model, perceived susceptibility, perceived severity, and nurses. The findings suggested the absence of other sources using the HBM as the conceptual framework and the variable of perceived CVD susceptibility as a moderator between perceived severity and the outcome of CVD health promoting behaviors. The Health Belief Model has been adapted for this study for the purpose of conducting a more focused investigation to examine these key HBM variables in a way that is unique to this study. The schematic description of the theoretical framework is in Appendix B. The conceptual definitions of each of the variables of interest are discussed below.
HBM Modifying Factors

HBM Modifying factors may be demographic (age and race), sociopsychological (social support, depression, and perceived stress), or structural (knowledge of CVD and prior contact with CVD) variables, and may have a direct or an indirect influence on health behaviors by affecting perceptions. The modifying factors we will look at for this study include age, race, social support, depression, and perceived stress. The original HBM includes knowledge as a modifying variable. The variable knowledge of CVD may influence the perceptions of susceptibility and severity with regard to CVD (Glanz et al., 2002; Rosenstock, 1974). Knowledge is not a key variable for this study. The target population of nurses can be considered as a homogeneous group who has had formal education about CVD, may or may not have been exposed to caring for patients with CVD, works in a large metropolitan city in the Southeast U. S., and has been exposed to health-related information within the greater Atlanta community. It is an assumption that having a homogeneous group, with respect to CVD knowledge, understanding the role of personal perceptions of CVD risk will be enhanced.

Age and CVD. Chronological age in years was self reported in demographic data. The National Heart, Lung, and Blood Institute’s Framingham Heart Study (FHS) has collected cohort data from original and offspring participants from 1980 to 2003. The findings suggest there is an association with age and a rise in the annual first cardiovascular event rates. For men 35 to 44 years of age, the rate rises from 3 per 1,000 to 74 per 1,000 at 85 to 94 years. The rates for women are comparable, but at 10 years later in life. However, the gap between men and women narrows with advancing age. Before age 75, CVD events owing to CHD have a greater prevalence among men than
women, while women have a higher proportion of events due to stroke. Additionally, the lifetime risk for CVD is 2 in 3 per 1,000 for men, but more than 1 in 2 per 1,000 for women at 40 years of age (Heart Disease and Stroke Statistics-2009 Update, 2009). As women get older, their risk of CVD increases and continues to increase with aging (AHA, 2009).

**Race and CVD.** Race was self-reported in demographic data. The overall death rate attributed to CVD for 2005 was 278.9 per 100,000. Black males had the highest rate of 438.4 per 100,000, followed by White males at 324.7 per 100,000. Black females had a rate of 319.7 per 100,000, compared to the rate of White females at 230.4 per 100,000. For people 18 years of age or older, the 2007 CVD prevalence estimates among races from the National Health Interview Survey, National Center for Health Statistics follow: approximately 11.4% of Whites have heart disease (HD) and 6.1% have CHD; 10.2% of Blacks or African Americans have HD and 6% have CHD; 8.8% of Hispanics or Latinos have HD and 5.7% have CHD; and, 6.9% of Asians have HD and 4.3% have CHD. The estimates for Pacific Islanders or Native Hawaiians have been suppressed due to large relative standard error (National Center for Health Statistics, 2007).

In the U. S., Blacks who have CHD have a higher mortality rate than Whites. Contributory factors may be that articulation of CHD symptoms among Blacks differ from Whites and that coronary revascularization procedures are less likely to be offered to Blacks (Hravnak et al., 2007). Bhalotra et al. (2007) conducted a literature synthesis on disparities in CAD. The findings indicated that the relationship between health outcomes and disparities in treatment by race, ethnicity and gender existed. The natural history of CAD was examined at multiple clinical points and by provision of care at the
following steps: screening, diagnosis, treatment, management, and rehabilitation activities. Race, ethnicity and gender differences were detected at each step.

**Social support and CVD.** Social support was defined as perceived or actual provisions supplied from family, friends, and significant others (Zimet et al., 1988). As a result of their nine-year study, Berkman and Syme (1979) were leaders in finding links that demonstrated a relationship between social networks and mortality. Their findings suggested a higher mortality rate among participants who had less social integration. Subsequent studies maintain findings of higher mortality rates, especially from CVD, among those with low levels of social support (Mookadam & Arthur, 2004; Reblin & Uchino, 2008; Rutledge et al., 2004; Uchino, 2004). Despite previous studies including gender balanced populations, there remains a dearth of clinical samples with adequate women representation. Additionally, in comparison to men, the research findings related to health benefits of social support for women are less consistent (Rutledge et al., 2004).

**Depression and CVD.** Depression was defined as having chronic or recurrent feelings of sad mood, loss of interest or pleasure, feelings of guilt or worthlessness, disturbed sleep or appetite, and poor concentration (Davidson, Rieckmann, & Rapp, 2005; WHO, 2009). Even when controlling for traditional CHD risk factors, depression has been independently associated with a 1.5% to 2% increase in CHD (Schulman & Shapiro, 2008). The AHA Science Advisory published the multi-specialty document, Depression and Coronary Heart Disease: Recommendations for Screening, Referral, and Treatment: A Science Advisory From the American Heart Association Prevention Committee of the Council on Cardiovascular Nursing, Council on Clinical Cardiology, Council on Epidemiology and Prevention, and Interdisciplinary Council on Quality of
Care and Outcomes Research: Endorsed by the American Psychiatric Association (2008). The document supports that elevated and major depressive symptoms have an association with less than optimal outcomes in patients with CHD. It also includes findings from studies investigating the relationship between increasing depression and cardiac events. The studies show a positive correlation between severe depression and severe cardiac events. Although methodological differences may account for variance across studies, depression continues to be associated with a 200% increased risk of having a cardiac event one to two years after a myocardial infarction (MI) (Lichtman et al., 2008). The World Health Organization suggests by year 2020, depression will be second to heart disease as the leading cause of disability in developed countries, for all ages and both sexes (WHO, 2009).

**Perceived stress and CVD.** Stress was defined as the feeling of worry, nervousness, impatience, angst, or sleeplessness (Nielsen, 2006) in reaction to the perception of a threatening or demanding situation, and a perception of insufficient resources to cope with the situation (Cohen, Kamarck, & Mermerstein, 1983). Scientific evidence supporting the effects of stress on CVD began to emerged over 30 years ago with a report showing that men with type A behavior (time urgency, hostility, and achievement striving) had a 2-fold greater likelihood of developing CVD than their counterparts with type B behavior (absence of type A behavior) (Rosenman et al., 1975; Williams, Barefoot, & Schneiderman, 2008). Recent studies have suggested that psychosocial risk factors tend to cluster in the same person or groups, rather than one risk having more importance than another. Studies have also suggested women who experience high job strain also display high levels of anger, depression, hostility, anxiety,
and social isolation (Williams, Barefoot, & Blumenthal, 1997; Williams, Barefoot, & Schneider, 2008). Orth-Gomër et al. (2009) suggest stress reduction increases years of life in women with CVD.

**Perceived Severity and CVD**

Perceived severity was defined as the subjective opinion of the seriousness of a condition and its consequences. The degree of severity of a condition or disease varies from person-to-person. The perception of severity is influenced by the emotions provoked by the thought of the disease and by the perception of the difficulty the contraction of the disease will inflict (Rosenstock, 1974). Awareness of personal susceptibility for CVD does not always change the perception of degree of severity. A 2003 AHA survey revealed that 46% of women surveyed were able to recognize heart disease as the leading cause of death in women. However, they listed their greatest health problem as breast cancer (Mosca et al., 2004). A more recent study by Mosca et al. (2006) suggested a positive correlation between awareness of CVD prevalence in women and CVD risk reduction behaviors.

**Perceived Susceptibility and CVD**

Perceived susceptibility referred to the subjective opinion of the risk of contracting a condition. There is a wide range of opinions about personal susceptibility to a disease. The range includes total denial of the possibility of contracting a condition, admission to a possibility that the disease may occur, but not to them; and admission to a belief of actual danger (Rosenstock, 1974). Although the percentage of women who recognize CVD as the leading cause of death in women has risen over time, it remains unknown whether the greater awareness of risks has led to personalization of their own
susceptibility, or has led to increased participation in health promoting behaviors to decrease susceptibility (Mosca et al., 2006). Individuals have a reluctance to acknowledge personal susceptibility to harm, even when they have knowledge of the risk to others (Weinstein & Sandman, 2002).

**Health Promoting Behaviors and CVD**

Health promoting behaviors referred to actions and activities with the underlying motivation to increase health potential and optimize well-being. When these behaviors are incorporated into a healthy lifestyle and permeate all facets of the individual’s living, the outcomes are likely to promote prevention, improve health, and enhance quality of life (Pender et al., 2006). CVD related health promoting behaviors include following the AHA guidelines for nutrition and physical activity.

**Strengths of HBM for Use in Research Related to Women and CVD**

The HBM has been used extensively to study risk behaviors that include dental hygiene, smoking and alcohol use, dietary adherence, and medication adherence with hypertension and diabetes (Becker et al., 1977). Although the HBM has been used extensively in female specific research studies, the bulk of the investigations addressed factors that influence women to comply with cancer related screening guidelines, mainly mammography screening, cervical cancer screening, and contraceptive use (Becker, 1974; Wood, 2008). Screening behaviors among multi-cultured women differing by age as well as ethnicity within and among cultures were examined across studies. The screenings included mammography, cervical cancer, colorectal cancer, clinical breast exam, and breast self-exam (Glanz et al., 2002; Tang, Solomon, & McCracken, 2000; Tang, Solomon, Yeh, & Worden, 1999). A 2010 CINHAL search using the Health Belief
Model and women reveals studies using the HBM and women continue to have a high association with cancer screening. Of note, research studies using the HBM involving non American women have increased.

The strengths of the HBM in respect to female gender-specific studies have been supported in research. Studies have supported the ability of the HBM to identify variables that impact decision making (Weinstein & Sandman, 2002), understanding screening behavior (Janz & Becker, 1984), and predicting health behavior (Rosenstock, 1974).

When investigating differences in HBM constructs between White and African American (AA) women for cancer screening behaviors, AA women had different perceived barriers and experienced greater levels of cancer fatalism than White women (Glanz et al., 2002; Miller & Champion, 1997).

Although the HBM has been useful in understanding health behaviors in various settings, an important consideration when using the model is that the underlying assumptions should be consistent with the cultural beliefs and values placed on health and illness by the target population (Glanz et al., 2002). A comparison of breast cancer screening among inner city Hispanic women with other inner city women suggested that Hispanic women were less likely to perceive breast cancer as curable and that they had low perceived susceptibility (Fulton, Rakowski, & Jones, 1995; Glanz et al., 2002).

The number of studies using the HBM constructs to determine susceptibility to CVD in women is limited. Self perception of susceptibility influence health and lifestyle decisions. Limited data about discrepancies between perceived and actual susceptibility for CVD among women justifies future research (Ali, 2002).
**Appropriateness of Use of HBM for Women-Focused Research**

The HBM has been applied to a variety of health behaviors and populations and is appropriate to study health promoting behaviors in women. Discovering health motivation of the individual is the primary focus of the model, making it a good fit to examine behaviors related to health concerns (Rimer & Glanz, 2005). The model would be good for determining the perceived susceptibility women have about CVD, the degree of severity they feel about the threat of CVD, and whether or not they believe they are capable of reducing the severity of CVD by participating in health promoting behaviors of nutrition and physical activity.

In cases of nonadherence, the model would be useful for strategy development to increase adherence. Diabetes screening programs identify women who have diabetes and an increased risk for having a cardiovascular event. At this secondary prevention stage, the diabetes is preclinical and has not progressed to the point of causing signs and symptoms. Because the individual does not feel sick, she may not follow the recommended preventive health behaviors or pharmacologic interventions (Rimer & Glanz, 2005).

Increasing the level of awareness of women for their risks, emphasizing the benefits of behavior change, recognizing and reducing perceived barriers to change, and increasing self-efficacy should support optimism related to the ability to change behavior and reduce CVD risk. Using the HBM, investigators should find that women who have high perceived susceptibility to CVD would have a strong intention to change behavior. Those with high perceived benefits would be more likely to engage in the change of
behavior, and those with high self-efficacy would have a high likelihood of engaging in a variety of health-related behaviors (Glanz et al., 2002; Humphries & Krummel, 1999).

**Significance to Nursing**

Nurses frequently educate women on CVD risk factors and provide information on health promoting behaviors as a means to decrease CVD risks. In order to effectively address the individual and global risks of the patient, the nurse has to have an accurate perception of the actual CVD risks and must use evidence-based guidelines. Nurses can be instrumental in development of strategies to improve the partnership between women and their primary care providers. These strategies may provide support for adoption and adherence to therapy recommendations and the attainment of target levels for CVD risk reduction.

This study enhanced the science of nursing by contributing information to develop a more accurate understanding by nurses about their own personal and their patient’s perceptions regarding CVD risks and personal susceptibility. This may help nurses to better address CVD at both the individual and community levels. With a better understanding of how perceptions of risk affect behavior, interventions can be developed to better frame risk reduction messages. Knowledge of the current practices and guidelines related to CVD risk identification in women is an important step in discovering and correcting missed opportunities for prevention of CVD events.

**Summary**

CVD remains the leading cause of death in the U. S. among both men and women. However, annual CVD deaths for women exceed the number of deaths for men and the next five causes of death in women, including all forms of cancer. Prevention
initiatives that impact the course of CVD should target the clinical point where the risk factor lies on the course of CVD progression.

The Health Belief Model has been used in previous research to guide investigations examining a variety of health behaviors and populations, and is an appropriate model for this study concerned with decision-making and predicting health promoting behaviors among women. Literature searches indicate the use of the HBM constructs to determine perceived susceptibility to CVD and the influence it has on health promoting behaviors among women remains limited. To date, little is known about the influence high or low self-perception of susceptibility related to CVD has on health promoting behaviors of healthy food choices and physical activity.
Chapter II

Review of the Literature

This chapter presents an overview of the literature related to primary, secondary and tertiary disease prevention, major cardiovascular disease (CVD) risk factors (obesity, hypertension, type II diabetes mellitus, hypertriglyceridemia, low high density lipoprotein cholesterol, and tobacco), and other variables used within this study as they relate to CVD risk factors and women. In addition, discussion includes literature review related to the study’s key variables: modifying factors (age, race, social support, depression and stress), perceived severity, perceived susceptibility, and CVD health promoting behaviors associated with healthy food choices and physical activity. The key variables and their relationships are that modifying factors (age, race, social support, depression and stress) influence perceived severity and CVD health promoting behaviors. Perceived susceptibility may moderate the relationship between perceived severity and the CVD health promoting behaviors healthy food choices and physical activity.

Morbidity and mortality related to CVD among women in the U. S. and most developed countries continue to surpass that of all cancers combined (AHA, 2008; Heart Disease and Stroke Statistics, 2008). Although CVD is the leading cause of death among women, there is inadequate representation of women in federally funded and non-federally funded clinical trials (Kim & Menon, 2009). Clinical trials such as the
Women’s Health Study and the Women’s Health Initiative were large single-sex studies that increased the overall number of women in clinical trials. When these studies are excluded from analysis, the proportion of women enrollment decreased and the proportion of women in mixed-gender clinical trials remained inadequate (Blauwet et al., 2007; Department of Health and Human Services, 2007; Kim & Menon, 2009).

A consequence of inadequate representation of women in CVD related clinical trials is the conclusions do not always apply to women (AHA, 2009). An additional consequence is cardiac risk for women may be underestimated by healthcare providers, women, and the general public (Kim & Menon, 2009). A final consequence is low awareness of female specific signs and symptoms of CVD by both women and their healthcare providers (Mosca et al., 2005). This low awareness may negatively influence the perception level of CVD severity and willingness to engage in CVD health promoting behaviors (Rosenstock, 1974). An understanding of factors influencing engagement in health promoting behaviors is important because the incidence of CVD is not decreasing in women (AHA, 2008; Heart Disease and Stroke Statistics, 2008; Shivley, Musselman, & Willard, 2009) and disparities have been identified between men and women related to CVD.

Even when numerous studies have supported the existence of disparities in CVD among men and women and different racial/ethnic groups of women, disparities have continued over decades through diagnostics, treatments and outcomes (Bonte et al., 2008; Ding, Powe, Mason, Sherber, & Braunstein, 2007; Gholizadeh & Davidson, 2008; Matyal, 2008; Rosenfeld, 2006; Verheugt et al., 2008; Warner, 2008). Based on the body of evidence in support of CVD disparities, it is recommended that individual level CVD
prevention initiatives begin with a broad based assessment of risks followed by a more
narrowed focus to manage risks that are modifiable. Appropriate management of risks is
a key activity for prevention initiatives. Prevention initiatives that impact the course of
CVD for an individual are those that target the clinical point where the risk factor is in
relation to CVD progression.

**CVD Prevention Clinical Points**

Delivering optimal care for those at varying clinical points on the CVD
continuum is the mission of many organizations (Bairey et al., 2009). The clinical points
for care delivery are primary, secondary and tertiary. The American college of
Cardiology Foundation (ACCF)/American Heart Association (AHA)/American College
of Physicians (ACP) Task Force on Clinical Competence support that approaches aimed
at detection and modification of CVD risk factors can slow disease progression and
decrease the incidence of adverse cardiovascular events (Bairey et al., 2009). CVD
related prevention initiatives involve taking proactive measures to reduce CVD
occurrence and to delay the associated sequela. The type of prevention intervention to be
applied is decided by identifying where the individual is in the natural history of the
course of CVD. The CVD course is from its beginning to its final clinical endpoint (Friis
& Sellers, 1999). Health promoting behaviors continue to be applicable at each clinical
point.

**Primary Prevention**

Primary prevention of CVD takes place before there are precursory signs of CVD,
prior to the onset of biological risk factors or at prepathogenesis. Prevention activities at
this level may be active or passive. Active prevention requires the individual to make a
behavioral change, while passive prevention does not require intentional efforts. An example of passive preventive measures is laws that prohibit smoking in public places. An intervention at this level may be aimed at education to increase awareness of what the risks for CVD are and identify measures to avoid them (Friis & Sellers, 1999). Some measures to prevent CVD include regular physical activity, healthy food choices, and avoidance of tobacco.

**Secondary Prevention**

Secondary prevention occurs at the stage of pathogenesis where the initial appearance of CVD risk factors takes place. Pathogenesis is detectable by physiologic changes. The risk has not progressed to the point of causing signs and symptoms, but is preclinical, and is usually detected by disease screening. Examples of disease screenings include annual physical examinations to assess the level of risk for hypertension, diabetes, and dislipidemia. Secondary prevention activities are aimed at preventing recurrence, progression, or complications of a condition. This level may require therapeutic lifestyle change (TLC), medication, or other clinical interventions (Friis & Sellers, 1999). As recommended by the National Cholesterol Education Program (NCEP) (2002) and the American Heart Association (AHA) (2008), TLC is characterized by healthy food choices and moderate physical activity most days a week.

Each risk factor should be treated individually; however, the first line approach for clinical management of CVD includes interventions that attenuate the underlying risk factors of atherogenic diet, physical inactivity, and overweight and obesity. The goals for CVD interventions are to target the underlying risk factors and to modify their effect by
preventing, delaying, or managing their sequela (Grundy et al., 2005; Kahn et al., 2008; Stone & Saxon, 2005).

**Tertiary Prevention**

Tertiary prevention of CVD involves prevention of disease progression and reducing limitations and disability that may result from CVD. CVD has already been diagnosed and treated clinically, but more intense activities are needed to limit disease progression and promote optimal function level. Tertiary prevention interventions include disease management and minimization of side effects from clinical treatments (Friis & Sellers, 1999). Appropriate intervention at each stage of CVD prevention requires accurate and systematic assessment and diagnosis of risks. TLC remains the fundamental treatment during all of the stages of prevention and requires behavior change on the part of the individual (AHA, 2008; NCEP, 2002).

**CVD Risk Factors**

The AHA classifies CVD risk factors as modifiable (can be treated or controlled) and nonmodifiable (cannot be treated or controlled). Nonmodifiable risks include age, gender, heredity, and race. Modifiable risks include hypertension, overweight and obesity, diabetes mellitus, high low density lipoprotein, low high density lipoprotein, physical inactivity, atherogenic diet, tobacco use, consuming more than 1-2 alcoholic drinks per day, and stress. The more risk factors an individual has, the greater the chance of developing CVD (AHA, 2008). The risk factors that research has identified as having a significant role in increasing CVD are called major risk factors. Additional factors are identified as contributors (AHA, 2008).
The best practices for prevention and reduction of CVD involve assessing the profile and global risk of the individual and developing appropriate intervention strategies (Bohm & Werner, 2008). The concept of global risk includes recognizing the need to consider all independent CVD risk factors during the physical assessment, developing the individual’s CVD profile, and developing treatment goals for each risk as they interrelate to form an overall risk (Assmann, Cullen, Jossa, Lewis & Mancini, 1999; Levy, Wilson, Anderson, & Castelli, 1990). A more indepth discussion of global CVD risks will follow information on the major and contributing CVD risk factors.

Major CVD Risk Factors

Obesity

One major CVD risk factor is obesity. Obesity is a multi-system condition that is linked to increased risk for a number of medical conditions. In 2005, a CDC study suggested that annually, nearly 112,000 deaths have an association with obesity in the U.S., making it the second leading cause of preventable deaths. Obesity is projected to overtake smoking as the leading cause of illness and preventable deaths in the U.S. Evidence suggests that even being overweight is associated with some increase in mortality risk (Foreyt, 2004; Haslam, 2005; Vasan, Pencina, Cobain, Freiberg, & D’Agostino, 2005). Adams et al. (2006) conducted a prospective examination of the relationship of BMI to all cause mortality among a cohort of 527,265 U.S. men and women enrolled in the National Institutes of Health–AARP. The age range of participants from 1995-1996 was 50 to 71 years. The findings after a maximum ten year follow-up indicated that among overweight participants at midlife (50 years old) who had never smoked, the risk of death increased by 20 to 40 percent.
The risks of type 2 diabetes, hypertension, and dyslipidemia increase with a body mass index (BMI) of 21.0 or greater. Other health outcomes of obesity include CVD, osteoarthritis, stroke, gallbladder disease, sleep apnea and some cancers. These diseases reduce life expectancy and increase the economic burden of their related complications (Foreyt, 2004; Olshansky, 2005). Obesity is a universally recognized underlying risk factor for the metabolic syndrome, a clustering of three or more of the major CVD risk factors (Grundy et al., 2005). In 2001, the estimated combined direct and indirect costs of obesity in the U. S. were around $123 billion annually (Hossain, Kawar, & Nahas, 2007). In 2009, the CDC reported the economic burden of obesity in the U. S. to be as high as $147 billion annually.

The Centers for Disease Control and Prevention (CDC) defines adult (20 years old or older) overweight as having a BMI of 25 to 29.9, and adult obesity as having a BMI of 30 or greater. Among the U.S. population, approximately two thirds of adults are overweight with half of those meeting obesity criteria (National Cancer Institute, 2007). The Heart Disease and Stroke statistics-2009 Update (2009) report approximately 68.1 million (60.5%) American females are overweight or obese, with the prevalence among White females at 57.5%, Black females at 77.7%, and Mexican American Females at 73.0%.

According to findings from the CDC’s Behavioral Risk Factor Surveillance Survey, the prevalence of obesity increased 24% over a span of five years (2000 to 2005). It has been predicted that if the present obesity movement persists, 74% of the U.S. population will be overweight or obese by 2010. Furthermore, if trends continue, more
than half of the U.S. adult population will be obese by 2016 (National Cancer Institute, 2007), causing an even greater economic burden on limited U.S. resources.

**Hypertension**

A second major CVD risk factor is hypertension. Using the cutoff value of 140/90 mm Hg as the definition of hypertension, approximately 65 million adult Americans (one fourth of the adult population) meet criteria for the hypertension diagnosis.

Prehypertension is defined as 120-139 mm Hg systolic over 80-89 mm Hg diastolic. One fourth of adult Americans have prehypertension. The AHA reports data from the Framingham Heart Study (Vasan et al., 2002) which suggested that both men and women who did not have a hypertension diagnosis by age 55-65 years still had a 20-year risk of developing hypertension (Rosendorff et al., 2007; Vasan et al., 2002).

These data are significant because hypertension is recognized by the AHA as a major independent risk factor for coronary artery disease, stroke and renal failure (Rosendorff et al., 2007). When diabetes or chronic kidney disease are comorbidities, the target blood pressure goal decreases to < 130/80 mm Hg. Recent studies have shown that treating prehypertension reduces the risk of developing hypertension. Lifestyle modifications consisting of increasing physical activity, losing weight, and making healthier food selections are the first line of treatment with blood pressures in this range, in the absence of diabetes or chronic kidney disease (Grundy et al., 2005; Rosendorff et al., 2007).

Hypertension is associated with shorter overall life expectancy resulting from its link with CVD and from its influence on more years lived with CVD. In 2005, while the overall death rate from hypertension was 18.4 per 100,000, it was 15.1 per 100,000 for
White females and 40.3 per 100,000 for Black females. Total mention mortality from hypertension for 2005 had an overall death rate of 70.0 per 100,000, with a death rate of 52.3 per 100,000 for White females and 128.5 per 100,000 for Black females. Data suggests hypertension is a strong risk factor for CHD in Blacks, especially Black women (The Heart Disease and Stroke statistics-2009 Update, 2009).

The Women’s Health Initiative comprising nearly 100,000 postmenopausal women enrolled from 1994 to 1998 suggested that hypertension prevalence rates among the cohort ranged from 27% among those 50 to 59 years to 41% among those 60 to 69 years to 53% among the 70 to 79 year olds. Although treatment rates were similar among age groups (64%, 65%, and 63%, respectively), only 29% of the 70 to 79 years old group had hypertension control. Among the 50 to 59 year olds, 41% had hypertension control while the 60 to 69 year olds had 37% with hypertension control (The Heart Disease and Stroke statistics-2009 Update, 2009; Wassertheil-Smoller et al., 2000). The prevalence of hypertension is increasing among U. S. women. The fundamental intervention for this CVD risk factor includes TLC (AHA, 2008; NCEP, 2002).

**Type II Diabetes Mellitus**

Type II diabetes mellitus is a third major CVD risk factor. Diabetes is a chronic illness, and of all diagnosed cases, type 2 accounts for 90-95% of the diagnoses. Type II diabetes has a strong association with obesity, physical inactivity, advanced age, family history of diabetes, impaired glucose metabolism and gestational diabetes. It is a major risk factor for the development of macrovascular complications such as peripheral vascular disease, atherosclerosis, stroke and heart attack. In the U.S., those with a
diabetes diagnosis have 2-4 times greater risk of death from heart disease and stroke than those who do not have the disease (Bartels et al., 2007).

Data from the Framingham Study suggest there has been a doubling in the incidence of diabetes over the past 30 years (Fox et al., 2007; The Heart Disease and Stroke Statistics-2009 Update, 2009), and the prevalence of diabetes has increased by nearly one and a half million cases among those 20 years old and older (National Diabetes Statistics Fact Sheet: General Information and National Estimates on Diabetes in the United States, 2005). The International Diabetes Federation (IDF) reports that Type II diabetes mellitus is a global epidemic that affects over 240 million people (5.9% of the worldwide population). Of the 240 million, 46% of those affected are 40 to 59 years old. The Centers for Disease Control and Prevention (2005) reported that roughly 20.8 million people (7%) of the U. S. population have a diabetes diagnosis (Bartels, Davidson, & Gong, 2007).

Data from the 1971-2000 National Health and Nutrition Examination Survey (NHANES) Study suggested a 43% relative reduction in the age-adjusted mortality rate among men with diabetes. On the other hand, among women with diabetes, there was no reduction in mortality rates. This lack of reduction in mortality rate was likely due to the fact there was a two-fold increase in the difference in mortality rates between women with diabetes and those without diabetes (Gregg, Gu, Cheng, Narayan, & Cowie, 2000; The Heart Disease and Stroke statistics-2009 Update, 2009).

The American Diabetes Association (ADA) 2006-2007 Nutrition Recommendations were updated with emphasis placed on delaying, preventing and managing diabetes complications and their effects on targeted body systems (Wylie-
Preventing and controlling diabetes is a first line strategy for decreasing CVD risks. Although genetic susceptibility is an important factor in the development of Type II diabetes, lifestyle habits typified by decreased physical activity and increased energy intake are contributors to the increased incidence and prevalence of this disease (Bantle et al., 2007).

**Hypertriglyceridemia**

Hypertriglyceridemia (high blood levels of triglycerides) is a fourth major CVD risk factor. Triglyceride is the most common type of fat in the body. Whether or not hypertriglyceridemia is an independent risk factor for CVD has been a controversial topic (Bansal et al., 2007; Oh & Lanier, 2007). The controversy involves differentiating the role of elevated triglyceride levels from that of other lipids levels. Until recently, the exact relationship between levels of serum triglyceride and CVD was unclear (McBride, 2007). However, two large recent studies conducted in different populations (Bansal et al., 2007; Nordestgaard, Benn, Schnohr, & Tybjaerg-Hansen, 2007) report that nonfasting triglyceride levels are significant risk factors that influence CVD health outcomes.

Triglyceride levels of <150 mg/dl are considered as normal, 150-199 mg/dl as borderline high, 200-499 mg/dl as high, and 500 mg/dl and greater as very high. The mean triglyceride level among women is 135 mg/dl. The levels by women and race range from 156 mg/dl for Mexican American women, 139 mg/dl for White women, and 105 mg/dl for Black women (The Heart Disease and Stroke Statistics-2009 Update, 2009). Pharmacologic therapy is not indicated for normal and borderline high triglyceride levels.

Guidelines from the National Cholesterol Education Program (NCEP) and the AHA support triglyceride control in the management of dyslipidemia (Oh & Lanier, 2007). It is
estimated that a 30% reduction in the incidence of CVD could be achieved by a 10% population wide decrease in total cholesterol levels (The Heart Disease and Stroke Statistics-2009 Update, 2009).

**Low High Density Lipoprotein Cholesterol**

Low HDL Cholesterol (HDL-C) is a recognized risk factor for CVD (Ashen & Blumenthal, 2005; Crawford & Paden, 2006; Singh et al., 2007). HDL-C levels are considered to be low in males with a value of <40 mg/dl and low in females with values <50 mg/dl. Findings from research studies have suggested that low HDL-C is prevalent in the general population, with 16% to 18% of males and 3% to 6% of females in the U.S. having levels <35 mg/dl. Individuals with HDL-C levels <35 mg/dl are reported to have an increased incidence of CVD that is eight times greater when compared to those having HDL-C levels > 65 mg/dl (Singh et al., 2007).

Low HDL-C is often accompanied by other risks for CVD, such as diabetes and hypertension. Findings from clinical trials and epidemiologic studies have suggested that raising HDL-C may hinder the development of atherosclerosis. No specific cut-point goal of therapy has been established (Ashen & Blumenthal, 2005; Grundy et al., 2005) nor has the exact means by which HDL-C is protective against CVD been characterized (Singh et al., 2007). Although research studies have been conducted, a scarcity of data exists specific to women, HDL-C, and CVD. TLC is a recommendation for reducing cholesterol levels (AHA, 2007).
Tobacco

Tobacco use is the leading preventable cause of death in the world and is a chief public health threat the world is facing today (AHA, 2007; World Health Organization, 2008). CVD is 2–4 times more likely to develop in individuals who smoke cigarettes versus those who do not smoke. Among those with CVD, smokers have about twice the risk of nonsmokers for having a sudden cardiac death event (CDC Fact Sheet: Health Effects of Cigarette Smoking, 2008; Teo et al., 2006). Additionally, when cigarette smoking is combined with other CVD risk factors, the risk for an adverse event is greatly increased. Smoke from cigars or pipes increases the risk of death from CVD and possibly stroke, but the risk is not as great as that of cigarette smokers. Exposure to second hand smoke increases the risk of heart disease, even for nonsmokers (Teo et al., 2006).

The incidence of cigarette smoking among Americans 18 years old or older is 22% among men and 18% among women. The CDC Tobacco Use Among Adults-United States Fact Sheet (2005) reports that approximately 178,000 women in the U.S. die annually from the effects of cigarette smoking, and that CVD is one of the three leading smoke-related causes of death among women. The prevalence of cigarette smoking among women is 21% for those 18–24 years old, 21% among those 25–44 years old, 19% among those 45–64 years old, and 8% among those 65 years or older (The Heart Disease and Stroke Statistics-2009 Update, 2009). The CDC Best Practices for Comprehensive Tobacco Control Programs–2007 recommends a two-pronged approach: 1) to implement evidence based proven tobacco control measures; and, 2) to modify the political landscape to support anti-smoking policy innovations (CDC, 2009).
Physical Inactivity

An inactive lifestyle is a risk factor for CVD. Regular physical activity helps prevent heart and blood vessel disease. In August 2007, the American College of Sports Medicine and the AHA (ACSM/AHA) updated their recommendations for physical activity for adults. For the promotion and maintenance of health, the ACSM/AHA suggests that healthy adults 18 to 65 years old need moderate-intensity aerobic physical activity for at least 30 minutes on five days a week, or vigorous-intensity activity for a minimum of 20 minutes on three days a week. A combination of moderate and vigorous activity levels can be alternated to meet these recommendations. In addition, every adult should engage in physical activities that maintain or increase muscular strength and endurance for a minimum of two days per week. Because of the dose-response of physical activity and health, the ACSM/AHA offers that persons who want to further improve their personal level of fitness may do so by exceeding the recommended levels of activity (Haskell et al., 2007). Physical activity is one of the ingredients of TLC and is a fundamental recommendation for CVD prevention (AHA, 2007).

Nutrition

Nutrition and dietary habits influence CVD. The atherogenic diet comprises eating foods that are high in fat, saturated fat, trans fat, cholesterol, sodium, added sugars, and alcohol, with low consumption of fruits and vegetables. The AHA recommends avoiding atherogenic foods and consuming a dietary pattern similar to that of the Dietary Approaches to Stop Hypertension (DASH) and consumption of oily fish (Crawford, Paden, & Park, 2006).
The DASH diet eating plan includes fruits, vegetables, low fat dairy foods, whole grains, poultry, fish, and nuts. Additionally, it is characterized by reduced amounts of saturated fat, total fat, cholesterol, red meats, sweets, and sugared beverages, accompanied by increased calcium and potassium and fiber (Crawford et al., 2006; Kurtz, Griffin, Bidani, Davissson, & Hall, 2005; Pickering et al., 2005). The DASH diet addresses the specific dietary patterns needed for reducing risks related to the major CVD risk factors. The DASH diet has an association with improvements in individual CVD risks, even when in the presence of global risks (Azadbakht et al., 2005; Crawford et al., 2006; Muzio, Mondazzi, Sommariva, & Branchi, 2005). Nutrition is one of the key ingredients for TLC (AHA, 2007).

Alcohol Consumption

Consumption of excess amounts of alcohol can cause an increase in susceptibility to high blood pressure, heart failure, and stroke. In addition, high triglycerides, cancer, arrhythmias, obesity, alcoholism, suicide, accidents, and other diseases have been associated with high consumption of alcohol (AHA, 2009). The CDC Quick Stats: Excessive Alcohol Use and Risks to Women’s Health (2008) reports findings supporting that women who are heavy drinkers (consuming an average of more than one drink per day) are at a greater risk for damage to the heart muscle when compared to men. Even when women drink at lower levels than men the increased risk persists.

Although it is not recommended that nondrinkers start to drink or that drinkers increase the amount they drink, research has supported that the risk of heart disease in people who drink moderate amounts of alcohol is lower than in nondrinkers. Moderate consumption is defined as an average of one drink for women or two drinks for men per
day. One drink is equal to 1-1/2 fluid ounces (fl oz) of 80-proof spirits, 1 fl oz of 100-proof spirits, 4 fl oz of wine, or 12 fl oz of beer (Baer et al., 2002).

Goals of The National Institute on Alcohol Abuse and Alcoholism (NIAAA), a component of the National Institutes of Health (NIH) (2008), are to gain a better understanding of the reasons for and outcomes of alcohol abuse and addiction and to improve prevention and treatment. Among the questions asked by scientists are why long-term health problems related to alcohol develop at a faster rate among women than men, whether or not alcohol may decrease CVD among some women, and what other components of a woman’s life may increase or decrease her risk of alcohol problems.

**Global CVD Risk Factors**

Although the impact of individual risk factors has been established, emphasis on the management of global CVD has grown. Management of a patient’s global risks requires evaluation and treatment of concomitant, multiple CVD risk factors. Findings from large epidemiologic studies have suggested that CVD risk factors are synergistic and compound the total risk rather than act as simple additions to number of risks (Poulter, 1999; Wilson, Kannel, Silbershatz, & D’Agostino, 1999; Zannad, 2008). Data from the Framingham Heart Study indicated that the 8-year risk for CVD increases 1.5 times with hypertension and 2.3 times with dyslipidemia. However, these two risk factors presenting together increase the CVD risk by 3.5 times. The concomitant presence of glucose intolerance results in a 6.2 times increase in risk. Analysis from the same study suggested that the risk for CHD increased exponentially for any given level of total cholesterol (Kannel, 1990; Poulter, 1999; Wilson, Kannel, Silbershatz, & D’Agostino,
Assessment of the exponential effect of global CVD risk factors should be considered when developing CVD treatment and management therapies.

**Metabolic Syndrome**

An individual who has global risk factors may have a diagnosis of metabolic syndrome (Met-S). Met-S is considered to be a clustering of risk factors that when occurring together increase the likelihood of the development of CVD, and ultimately, morbidity and mortality (Borgman & McErlean, 2006; Despres, 2005; Eckel, Grundy, & Zimmet, 2005; Grundy et al., 2005; National Institutes of Health, 2002; Stone & Saxon, 2005). In 2002, National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III) defined Met-S as having equal to or greater than three of five risk factors: central obesity, low high density lipoprotein cholesterol, hypertriglyceridemia, elevated blood pressure, and elevated fasting glucose. The cluster of risk factors that define Met-S and the number of risk factors present per individual may vary (National Institutes of Health, 2002; Rendell & Gurwitz, 2006; Stone & Saxon, 2005). However, these co-occurring risk factors that interrelate and cause an increased risk of CVD make Met-S a primary concern of clinical significance (Borgman & McErlean, 2006; Eckel, et al., 2005; Grundy et al., 2004; Grundy et al., 2005; Park et al., 2003; Stone & Saxon, 2005).

Although discussion of Met-S has taken place since the early 1920s (Cameron, Shaw, & Zimmet, 2004), the past decade has been inundated with an increase in both the prevalence and incidence of this condition (Borgman & McErlean, 2006; Eckel et al., 2005). Current statistics suggest that approximately one in four adults in developed countries have a Met-S diagnosis. Nearly 55 million Met-S cases live in the U.S. Of the
55 million U.S. cases, about 24% are adult (20 years old or older), and over 40% of the adult cases are age 60 or older (Aude, Mego, & Mehta, 2004; Rendell & Gurwitz, 2006).

Among females, the 2007 age-specific prevalence for MetS was 57.8% for those 70 years old and older, 60.9% for those 60 to 69 years old, and 12.1% among those 20-29 years old. Racially, the female prevalence were Whites 31.5%, Blacks 36.4%, and Mexican American 44.0% (Heart Disease and Stroke Statistics-2009 Update, 2009). Evidence suggests the obesity epidemic is a credible root cause for the increase in Met-S (Aude et al., 2004; Grundy, 2004; National Cholesterol Education Program Expert Panel on Detection Evaluation and Treatment of High Blood Cholesterol in Adults, 2002; Roche, Phillips, & Gibney, 2005). The first approach in treating Met-S is TLC. Over time, TLC is the greatest benefit for decreasing the incidence, prevalence and severity of Met-S (AHA, 2007; Grundy et al., 2005).

**Modifying Risk Factors and CVD**

Modifying factors may have a direct or an indirect influence on health behaviors by affecting perceptions. The modifying factors for this study include age, race, social support, depression, and perceived stress (Glanz et al., 2002; Rosenstock, 1974). Age and race are categorized as uncontrollable risk factors and their influences on CVD have been presented among discussions of the major and contributing CVD risk factors. Discussion of social support, depression and perceived stress will follow.

**Social Support**

The concept of social support is broadly used and lacks clarity in meaning. This lack of clarity has led to inconsistencies in measurement and discussion, resulting in unanswered questions (Finfgeld-Connett, 2005; Holt-Lunstad, Smith, & Layton, 2010).
Although there is lack of clarity, agreement among researchers is that within the social support concept lies the understanding of a relationship transaction between individuals. The unclarity is linked to the various ways in which the relationship and the direction of the relationship may be defined (Lett et al., 2005; Zimet et al., 1988) and measured. Social support is used with similar terms of social network, social connectedness (Rutledge et al., 2004), and caring (Finfgeld-Connett, 2005).

Currently, evidence supporting a moderating relationship between social relationships and major health indicators (CVD, mortality, morbidity) is robust. However, evidence specific to women is limited and less consistent when compared to men Lyyra & Heikkinen, 2006; Rutledge et al., 2004). Rutledge et al. (2004) selected women with clinical CVD symptoms from the Women’s Ischemia Syndrome Evaluation (WISE) Study to evaluate social network (support) and increased mortality risk. A subpopulation of 503 women from the WISE Study was selected for this investigation. The findings supported that the women with smaller social networks and higher social isolation had a significantly higher risk for death at follow-up. Among socially isolated women, there was a greater than two-times likelihood of death over the follow-up interval (average 2.3 years) than there was among women reporting larger social networks (Rutledge et al., 2004).

The Perceived Social Support and Mortality in Older People study conducted by Lyyra and Heikkinen (2006) used the Social Provision Scale (SPS) to measure perceived social support in 206 Finnish women (n=145) and men (n=61) aged 80 years old. The SPS consists of six dimensions: attachment, social integration, opportunity for nurturance, reassurance of worth, reliable alliance, and guidance. This study divided
perceived social support into assistance-related and non-assistance-related support. The findings supported that there was an almost 2.5 times greater risk of death among women with the lowest scores in the non-assistance-related social support group, when compared to women with higher scores in the same group.

Literature supports the existence of a relationship between social support and CVD prognosis and that the relationship is independent of clinical markers of disease severity (Ikeda et al., 2008; Rosengren, Wilhelmsen, & Orth-Gomer, 2004). However, gaps in knowledge remain concerning that relationship (Kuper, Adami, Theorell, & Weiderpass, 2004). The contribution social support makes as a modifying factor for CVD risks in general and women specifically, warrants further investigation.

**Depression**

Depressed mood and major depression has an association with lack of adherence to treatment recommendations related to lifestyle changes, pharmacotherapy, and psychosocial therapy (Berra, Klieman & Hinohara, 2009; Mallik et al., 2006). Literature supports both clinical depression and elevated depressive symptoms have a link to increased suboptimal cardiac related outcomes for both men and women (Lett et al., 2004; Pozuelo et al., 2009; Vaccarino et al., 2007) with depressive symptoms are more commonly seen in women (Hasin, Goodwin, Stinson, & Grant, 2005; Mallik et al., 2006; Vaccarino et al., 2007). Mallik et al. (2006) found that younger women (60 years and less) were over 3 times at greater risk for depression than their male compare group. Frasure-Smith and Lesperance (2005) support a two times greater rate of depression among women than among men in both the general population and the cardiac population. Literature reviews support viewing depression as a contributing risk factor for
CVD in general, as well as for those with an existing CVD diagnosis (Berra, Klieman & Hinohara, 2009; Lett et al., 2004; Pozuelo et al., 2009; Vaccarino et al., 2007; Frasure-Smith and Lesperance, 2005). It is a comorbidity that increases risk for suboptimal outcomes and death (Pozuelo et al., 2009).

Van der kooy et al. (2007) conducted a meta-analysis and meta-regression analysis with the aims of estimating the presence of depression as an independent risk factor for CVD, and for investigating the effects of the quality of methodology and heterogeneity on findings. Of the 28 longitudinal cohort and case-control studies reporting depression at baseline and CVD outcomes at follow-up, only 11 were judged as high quality studies. The report of findings from the 11 studies did not distinguish differences between women and men. However, heterogeneity was found to have a substantial presence in most of the cases, and depressed mood was found to increase the risk for CVD, MI, CHD, and other cardiovascular disorders at the same level. The greatest risk for the development of CVD was found to be clinically diagnosed depression. The effects of clinically diagnosed depression are cited as being equal to the effects of diabetes (Tavani et al., 2002; Van der kooy et al., 2007) and smoking (Luoto, 1984; Van der kooy et al., 2007).

Rugulies (2002) conducted a literature review and meta-analysis to examine and quantify the impact of depression on CAD development among initially healthy participants. Exposure to clinical depression or depressed mood and the outcome after a MI or coronary death were criteria used for review inclusion. After abstraction, 11 studies remained. Clinical depression was shown to be a stronger predictor of the outcome than depressed mood. An additional finding was that depression predicts CHD development in
initially healthy people. Although the number of women and men were indicated for most studies, the report of the findings did not separate the implications for the two sub-populations.

In summary, findings suggest depression increases risk for CVD in the general public and for those with a CVD diagnosis (Van der kooy et al., 2007; Tavani et al., 2002; Rugulies 2002). Women seem to have a higher incidence of depression, both with and without a CVD diagnosis. Depression is a modifying variable that needs to be controlled for when examining factors that may influence CVD health promoting behaviors.

**Perceived Stress**

Psychosocial stress has been identified as a contributing factor for increasing the risk and worsening the prognosis of CVD (Dimsdale, 2008; Orth-Gomer et al., 2009). For this study, stress is defined as the feeling of worry, nervousness, impatience, angst, or sleeplessness (Nielsen, 2006) in reaction to the perception of a threatening or demanding situation, and a perception of insufficient resources to cope with the situation (Cohen, Kamarck, & Mermerstein, 1983). The concept of stress has primarily focused on the stress stimulus originating from the sources of extrinsic or environmental conditions, and intrinsic or emotional responses (Fliege et al., 2005). Responses to stress release the corticotrophin-releasing hormone (CRH), promoting release of the adrenocorticotropic hormone (ACTH), signaling the release of cortisol. Although cortisol may help the body to cope with stress, when levels of cortisol are continuously high in response to sustained or chronic stress, physiological changes may occur, including increases in CVD risk (Shively, 2008).
Epidemiological data from cross-sectional and some longitudinal studies have supported that chronic job stress and cardiovascular responses to stress have an association with CVD, hypertension, and stroke. Despite these findings, the amount of CVD risk that can be attributed to sustained stress and the specific mechanisms through which biological and physiological changes occur remain poorly understood (Executive Summary of the NHLIB Working Group on Cardiovascular Consequences of Chronic Stress, 2004). Additionally, the role psychosocial stress plays in participation in health promoting behaviors remains unclear.

**Perceived Severity and CVD**

Perceived severity is the subjective opinion of the seriousness of contracting an illness and its subsequent consequences. The level of the perceived severity of an illness may influence the level of motivation to engage in the related health promoting behaviors. The perception of very low levels of severity may inhibit motivation to act (Becker, 1974; Becker & Maiman, 1975). Consequently, motivation to engage in primary, secondary and tertiary CVD prevention activities may be influenced by the perceived severity of CVD. Although health promoting behaviors are applicable at each disease clinical point, the perception of CVD severity may be at a lower level during the CVD prevention stage than at the CVD tertiary stage. Perceived susceptibility is included to determine whether or not it may offer an explanation for variance in motivation to engage in health promoting behaviors at all CVD clinical points.

**Perceived Susceptibility and CVD**

Perceived susceptibility is related to the belief in the possibility or likelihood of experiencing personal loss or harm related to CVD, especially when no action is taken
toward participating in health promotion behaviors. The process of health promotion
decision making relies on perceived susceptibility to accurately weigh the possible or
potential outcomes of loss or harm (McQueen, Bastian, Swank, & Vernon, 2008). Jacobs
(2000) suggests that susceptibility perception is antecedent to precaution adoption. For
this study, the loss or harm is the contraction of CVD. Janz and Becker (1984) conducted
a literature review of studies that used the Health Belief Model over a decade. Their
findings suggested that 86% of the studies reviewed supported perceived susceptibility as
a positive predictor of preventive health behaviors.

Perceived severity, the subjective opinion of the seriousness of a condition and its
consequences, is influenced by modifying factors. The aforementioned modifying factors
influence the emotions provoked by the thought of CVD and by the perception of the
difficulty contracting CVD will inflict (Rosenstock, 1974). The emotions provoked by
modifying factors and perceived severity influence the decision to engage in CVD health
promoting behaviors. Additionally, perceived severity may moderate the decision-making
process.

Perceived susceptibility, an individual’s subjective opinion about the likelihood of
contracting a disease, is considered by many as a reliable predictor of health promoting
behavior and is believed to serve as a stimulus for an individual to seek information and
take preventive actions (Becker, 1974; Janz & Becker, 1984; Rimal, 2001). However,
research data are inconsistent in supporting a positive correlation between perceived
susceptibility and health promoting behavior. One explanation given for the discrepancies
is the multiplicity of domains investigated that ranged from HIV/AIDS to seatbelt use
(Rimal, 2001).
Chaffee and Roser (1986) reported findings from their research suggesting that perceived susceptibility for CVD had a negative correlation to knowledge-attitude-behavior. In explanation of this finding, they theorized that having a high perceived susceptibility level was associated with fear of CVD, which inhibited appropriate behavior (Chaffee & Roser, 1986; Rimal, 2001). Other researchers suggest that optimistic perceptions of susceptibility, whether through lack of awareness or denial, may protect against the development of negative coping behaviors related to fear. Negative coping behaviors may appear as unhealthy eating, smoking, heavy alcohol consumption, stress, or depression. In addition, these behaviors may serve as triggers to accelerate the onset of CVD events. The benefit of denial and lack of awareness may explain why individuals underestimate their personal susceptibility of experiencing a CVD event (Gramling et al., 2008).

Although data are inconsistent, it is generally accepted that among individuals and groups facing a threat, susceptibility perception impacts health behavior and emotional well-being (Gramling et al., 2008). Preventive actions may require a single event or ongoing behavior. Single event preventive health behaviors (such as vaccinations) reduce the susceptibility perception level when the required action is completed (Becker, 1974; Janz & Becker, 1984; Glanz et al., 2002).

When ongoing health promoting behaviors are required, as with decreasing CVD risks, preventive actions involve multidimensional, continuous, and effort-demanding behaviors. The preventive value of sustained high levels of perceived CVD susceptibility is not clear (Glanz et al., 2002; Gramling et al., 2008). However, failure to initiate and sustain CVD health promoting actions can worsen negative emotions caused by the
perceived susceptibility and lead to dysfunctional coping behaviors (Gramling et al., 2008).

**Women and CVD Susceptibility Perception**

Although heart disease, stroke and other cardiovascular diseases are the leading cause of death for both men and women in the U.S. and Europe, the perceived susceptibility of heart disease among women remains underestimated (AHA, 2007; AHA, 2008; Mosca et al., 2004; Mosca et al., 2007). In the U.S., CVD accounts for 1 in every 2.4 deaths among women (AHA Fact Sheet, 2008; Arslanian-Engoren, 2007), and every year since 1984, more women than men have died from CVD (AHA Fact Sheet, 2008; AHA Heart Disease and Stroke Statistics, 2008). Nevertheless, women continue to have the perception that CVD is a greater threat to obese men who have high stress and smoke than to themselves (Arslanian-Engoren, 2007).

Data from studies led by Mosca in 2004 and 2007 were used to compare the trends in awareness over time since the 1997 national campaign to improve awareness of CVD among women. The findings suggested that since 1997, the level of awareness of CVD as the leading cause of death had increased considerably (from 30% to 55%). Although less than 50% of the participants knew the acceptable levels for CVD risk factors, awareness of unacceptable personal risk levels (severity) were positively associated with action. Additionally, the findings suggested that most women were likely to participate in CVD risk reduction behaviors for their families as well as for themselves (Mosca et al., 2007).

However, the data also suggested that a considerable gap continues to exist between women’s perceived and actual susceptibility of heart disease. This gap is
particularly noticeable among minority women and women of ethnic groups. Among all
groups of women, only about 21% of women perceived that CVD is the most important
health threat they face (AHA, 2007; Correa-de-Araujo, 2006; Mosca et al., 2004; Mosca
et al., 2007).

Using the CVD risk factors identified by the AHA, a study conducted by Oliver-
McNeil and Artinian (2002) supported that women had limited knowledge of their
personal susceptibility. Risk factors documented in their medical records were
inconsistent with what was reported by the participants. Smoking was not considered as a
CVD risk factor by women who smoked or had a history of smoking, and women who
were overweight did not perceive themselves as overweight. Although 93% of the
participants knew they had risk factors for CVD, they did not see themselves as having
multiple risks. In this study, no relationship was found between knowledge of
cardiovascular risk factors and risk-reducing behaviors (Oliver-McNeil & Artinian,
2002).

The inaccurate CVD risk perceptions for women extend to their health care
providers. The AHA released practice guidelines in 2004 to address CVD prevention in
women. The guidelines were designed to assist healthcare providers in making decisions
about optimal care based on a woman’s future risk for CVD. After release, a subsequent
investigation was conducted to assess adherence to the guidelines, variance by sex, and
variance by physician specialty. The findings indicated that primary care physicians were
significantly more likely to assign intermediate-risk women to a lower-risk category than
men with matching profiles. Other physician specialty groups had similar trends.
Physicians did not rate themselves as very effective at helping their patients with CVD
prevention, and less than one in five knew that more women die annually from CVD than do men (Mosca et al., 2005).

The Fourth Annual Report on Women’s Health Outcomes in U.S. Hospitals (2007) contends that while there has been an increased awareness resulting in getting women to seek treatment earlier, more research data are needed to identify and manage CVD specific needs of women within the healthcare system. Current data suggest that the gap between CVD health outcomes for men and women persists. The study findings indicated that an overall risk-adjusted mortality for CVD in women improved by about 8.7% from 2003-2005. The greatest gaps in quality between the best-performing and poor-performing hospitals were related to heart failure and invasive cardiac procedures. Although the poor-performing hospitals improved risk-adjusted mortality rates by 10%, a considerable lag behind the best-performing hospitals persisted (HealthGrades, 2007).

If all of the hospitals (513) performed at the level of best performing, 15,925 CVD related in-hospital deaths could have potentially been prevented. The researchers assert that a national number would be much higher. Stroke and heart attack offer the greatest opportunities for reducing in-patient CVD mortality among women in that combined, they represent 60% of the potentially preventable deaths. Variations in outcomes across the states were wide (HealthGrades, 2007).

**Perceived Susceptibility Outcomes**

Perceived susceptibility outcomes are affected by both women and their care providers. When perceived susceptibility for CVD is low among women and their providers, the likelihood for inaccurate diagnosis, less aggressive treatment, and suboptimal outcomes increase (AHA, 2008; Mosca et al., 2004; Mosca et al., 2005).
Additionally, the lack of accurate awareness and perception of the more subtle symptoms of CVD in women versus the more classic symptoms publicized for men, have been known to result in delays in women seeking medical care (AHA, 2008; Schroetter & Peck; 2008).

Furthermore, lack of awareness of CVD risk factors and low perceived susceptibility on the part of women may negatively influence willingness to adhere to recommendations for risk reduction behaviors. The perception that susceptibility and the need for adherence is low may impact the decision making related to cost versus benefit of adopting health promoting behaviors (Becker, 1974; Erhardt, 2005).

Despite wide dissemination of practice guidelines, a guidelines gap persists with the implementation of CVD related knowledge into clinical practice. Recommendations for TLC and pharmacologic interventions have been poor. Lack of awareness, familiarity, and agreement on the part of the provider contribute to less than optimal outcomes for CVD management of the patient (Erhardt, 2005).

The perception of susceptibility and clinical expertise on the part of the practitioner also influence CVD outcomes. Merz et al. (2009) developed a statement with recommendations for attaining and maintaining knowledge and skills related to performance of specific cardiovascular services, procedures and technologies. The ACCF/AHA/ACP 2009 Competency and Training Statement: A Curriculum on Prevention of Cardiovascular Disease was developed by the Task Force on Clinical Competence. The statement was evidence based. In cases where evidence was not available, expert opinion was used to guide recommendations. This task force recognized the challenges of the primary care provider in primary and secondary prevention of CVD.
The challenges include the rate of new knowledge development and lack of adherence to recommendations. New knowledge in advances in primary prevention (preclinical disease detection) has identified the need for additional risk stratification and more aggressive medical management. Additionally, the population of CVD survivors with complex and comorbid conditions is increasing, creating scenarios where decision making for risk factor management and clinical rehabilitation extend beyond the expertise of the traditional primary care and cardiology practitioners. An aim of the guidelines is to cultivate an environment where new knowledge advancements are readily integrated to improve clinical outcomes and patient care.

**Health Promoting Behaviors and CVD**

Health promoting behaviors of healthy food choices and physical activity are the outcome variables for this study. The U.S. Department of Health and Human Services (HHS) is the chief U.S. government agency concerned with the health protection of all Americans. A priority of the HHS is disease prevention through promoting physical activity, fitness, healthy food choices and a therapeutic lifestyle. Even with evidence of poor health outcomes related to some health behaviors, many Americans continue to participate in health behaviors that increase their risks for developing chronic disease and disability (CDC, 2010).

The emphasis during the 1970s and 1980s for the disciplines of health education and health behavior was on the behavior of the individual as the determinant of health status. The need for system level changes to improve health status subsequently gained attention. The system level changes were identified from within social, economic, and political arenas, and a case was made for health education to change its course toward the
discipline of health promotion (Minkler, 1989). The discipline of health promotion needs to conduct more research with the aim of gaining a greater understanding of the gap between information and education delivery and participation in health promotion behaviors.

O’Donnell (1989) described health promotion as an art and science geared toward helping individuals recognize the interrelatedness of their core passions and optimal health. Optimal health is described as a balance among the dynamic components of health: physical, emotional, social, spiritual, and intellectual. A lifestyle of health promotion takes place when interactions within environments support increased motivation to achieve and maintain optimal health. These environments are conducive to heightening awareness of activities and tactics that facilitate health promoting behaviors.

Health promoting behaviors result in the movement toward optimal health, enhanced functionality, and improved quality of life throughout the lifespan. The two outcome measures for the variable health promoting behaviors, physical activity and nutrition, have been previously discussed. Health promoting behaviors are triggered by the desire for both optimal health and actualization of human potential. Health promotion is noted to have theoretical characteristics of absence of specificity related to an illness or injury, attendance to an approach to meet a desired state; and lack of concern with disease threats, but with the expansion of optimal health potential (Pender, Murdaugh, & Parsons, 2006). These behaviors are influenced by the experiences and characteristics of the individual, along with cognitions, affect, and competing demands and preferences. While there is the assumption individuals desire positive changes, positive is individually defined (Pender, Murdaugh, & Parsons, 2006; Zurakowski, 2004).
Healthy Food Choices

Akesson, Weismayer, Newby, and Wolk (2007) conducted a prospective study to identify a low-risk behavior dietary pattern among 24,444 postmenopausal women in the Swedish Mammography Cohort. At baseline (September, 1997), participants were absent of a cancer, CVD, or DM diagnosis. High scores indicated a healthy dietary pattern, or low CVD risk diet. The healthy diet pattern was identified as one with a high intake of fruit, vegetables, whole grains, fish, and legumes. Moderate alcohol consumption of 5 g per day, nonsmoker, physically active (at least 40 minutes of daily walking), and waist-hip ratio less than 75 percentile were included as cardio protective behaviors. These lifestyle patterns were associated with a 92% decreased CVD risk when compared with women who did not have low-risk dietary and lifestyle factors.

Stampfer, Hu, Mason, Rimm, and Willett (2000) investigated the effects of CVD risks on disease when they were combined together. Participants were women (84,129) participating in the Nurses’ Health Study. At baseline (1980), the women were free of CVD, cancer and DM. Participants found at low risk were those who were currently non smokers, a BMI < 25, participated in moderate to vigorous physical activity at least 30 minutes per day, and had high consumption of foods high in fiber, marine n-3 fatty acids, folate, low saturated and trans fat, and low glycemic load. Consumption of about half a drink of an alcoholic beverage (around 5 g) per day was also considered as low CVD risk. The findings indicated that 82% of coronary events in the study cohort had an association with lack of adherence to the low-risk lifestyle pattern. These finding suggest a low risk CVD lifestyle includes participation in physical activity and making healthy food choices.
Physical Activity

The American Heart Association (2010) recognizes physical activity as fundamental behavior for primary, secondary and tertiary (when possible) prevention of CVD. Health Behaviors of Adults: United States, 2005-2007 (CDC, 2010) reported leisure-time physical activity among U.S. adults. Although 60% of adults surveyed reported engagement in some leisure-time physical activity, less than 38% were engaged in frequency to be classified as regular. Around 40% adults engaged in no leisure-time physical activity. Women were slightly less likely than men to engage in at least some leisure-time physical activity (58.9% vs. 61.9%, respectively), but they were both equally likely to engage in regular light-moderate leisure-time physical activity. As age increased, the percentage of adults who engaged in at least some leisure-time physical activity decreased. White and Asian adults were more likely than black adults to engage in at least some leisure time physical activity. Additional research is needed to gain a greater understanding of factors that influence adoption of healthy behaviors related to physical activity.

Buchowski et al. (2010) examined the differences between black (22,984) and white (7830) women in relation to sedentary and active behaviors and BMI. Cross-sectional data collection was done from 2002 to 2006 at enrollment in the Southern Community Cohort Study in the southeastern U.S. Their findings suggested time spent in active behaviors such as moderate and vigorous physical activity had an inverse relationship to BMI, whereas the more time spent with sedentary behaviors the higher the BMI. BMI has an association with CVD.
Gaps in the Literature

An electronic search of the literature using several databases (MEDLINE, CINAHL, PsycINFO, OVID, and GoogleScholar) was conducted. Key terms of interest in various combinations were cardiovascular disease, heart disease, the Health Belief Model, perceived susceptibility, health promotion, health promoting behaviors, and women. All years available were included in the search, and articles were retrieved from English-language journals. No articles were retrieved that were quantitative studies examining the relationship between health beliefs related to perceived CVD severity, and whether health promoting behaviors differ in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility. A gap in the literature exists for this topic.

It remains difficult for researchers and clinicians to draw conclusions about the impact of studies on women because three-fourths of CVD trials do not report sex specific results (AHA Fact Sheet, 2008; Blauwet et al., 2007). In many clinical settings, it has been characteristic for CVD data collection to record race and ethnicity in combination, which does not allow for the examination of them as separate characteristics. Among women, there are cultural and geographic differences in CVD incidence and outcomes. More research and theoretical models are needed to better describe and predict population behaviors, targeting minorities and diverse cultural groups of women, including rural women (Gholizadeh & Davidson, 2008; Perry, Rosenfeld, & Kendall, 2007).

The trend toward recognizing the prevalence of CVD and its sequela among women resulted from increased CVD awareness campaigns and other interventions.
(Mosca et al., 2004; Mosca et al., 2007). Although there has been an increased awareness of CVD among women, mortality from CVD among women has not declined in the past 20 years, as it has among men (AHA Heart Disease and Stroke Statistics, 2007; Wenger, 2008). Research continues to support that a considerable gap exists between women’s perceived and actual susceptibility of heart disease. More work is needed to increase women’s awareness about CVD.

Although the same is true for men, data from recent research indicate that the number of women likely to develop CVD today is similar to that of 15 years ago. This is an indication that current risk reduction interventions have barriers to successful implementation, and that efforts to reduce CVD need improvement for both men and women (Ajani & Ford, 2006; Wenger, 2008). A more concerning trend related to women and CVD is that younger women (ages 35 to 44) had an annual increased CVD death rate from 1997 to 2002 (AHA Fact Sheet, 2008; Ford & Capewell, 2007).

There is a gap in the literature regarding the impact of perception and other psychosocial variables and their relationship to CVD morbidity, mortality, and health promoting behaviors among women. Further investigation is needed to understand the impact of these and other variables on CVD incidence, prevalence, and sequela among women.

**Summary**

This chapter presents a review of the literature to support the need for this study to examine cardiovascular related perceptions, beliefs, and related health promoting behaviors among women. The focus is to determine if health beliefs related to perceived CVD severity and health promoting behaviors are different in women with high self
perception of CVD susceptibility versus women with low self perception of CVD susceptibility. The RN population was selected as the sub-population of women to control for knowledge and to increase homogeneity. Data presented in this chapter support that despite the number of CVD related studies, women are underrepresented as study participants. These data also support the fact that disparities exist between men and women in the treatment, diagnosis, and outcomes of CVD, and that gaps exist in the literature examining women, CVD, and the Health Belief Model.
Chapter III
Methodology

This chapter will provide the details for the methods and procedures used to conduct this study. A description of the design will be presented, followed by the research questions, a description of the setting and sample, the measurement instruments, study procedure, and considerations for protection of human subjects. The intent of this research was to build on previous work by 1) examining the variables of interest from the unique perspective of the moderating variable, perceived susceptibility for CVD, and 2) developing targeted interventions aimed at increasing health promoting behaviors among women.

The key variables and their relationships included modifying factors (age, race, social support, depression and stress), perceived susceptibility, perceived severity, and cardiovascular disease (CVD) health promoting behaviors. Perceived susceptibility may moderate the relationship between perceived severity and CVD health promoting behaviors, nutrition and physical activity. The CVD health promoting behaviors for nutrition and physical activity were dependent/outcome variables. Modifying factors, perceived susceptibility, and perceived severity were used to describe the relationship among the independent and dependent variables.
Research Design

A descriptive, correlational study was conducted to examine whether or not the relationship between health beliefs related to perceived severity of CVD and CVD health promoting behaviors (nutrition, physical activity) are different in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility. This design was appropriate for this study because the primary interest was to describe relationships among the variables. Primary self-reported data were collected using a computer-administered survey method.

The computer administered survey method had several advantages. One advantage was that all respondents were exposed to uniform stimuli because of the impersonal and standardized format. This advantage increased reliability and eliminated threats to validity from interviewer bias. A second advantage was the feature of complete anonymity for the respondent. When questions are sensitive or personal, anonymity is thought to increase the validity of the responses. Other advantages of the computer administered survey were time and cost efficiency, convenience (Waltz, Strickland, & Lenz, 2005), and ability to structure the format to force an answer to each question.

Purpose

The purpose of this study was to examine whether or not the relationship between health beliefs related to perceived CVD severity and health promoting behaviors were different in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility.
Sample Selection

Participants were selected by convenience sampling. Although convenience sampling is the most common sampling method in many disciplines, it is considered to be the weakest. For this reason, factors that may have affected the dependent variables were accounted for by including them as demographic variables and personal characteristics.

Inclusion criteria were the following: 1) Female RNs who are currently licensed to practice as a RN in the U.S. and 2) RNs who have worked as a RN in the U.S. for at least six months. Exclusion criteria were: 1) RNs with less than six months of clinical experience as a RN in the U.S., and 2) male RNs. Male RNs were excluded because the focus of this study was the health beliefs of women and CVD health promoting behaviors.

Sample Size

After receiving IRB approval from Georgia State University and the research oversight boards of each participating hospital (Emory Healthcare, Grady Healthcare, Piedmont Healthcare, Saint Joseph’s Hospital of Atlanta, and Atlanta VA Medical Center), the sample for this study was derived from female RNs who currently practice as a RN in the metropolitan Atlanta area. Participating hospitals were randomly selected. One hospital invited to participate chose not to participate.

The RNs represented varied ethnic groups representative of the population of nurses in the metropolitan Atlanta area. RNs were selected as the target population because they are a homogenous group of women with respect to some knowledge and education about cardiovascular disease and health promoting behaviors for cardiovascular risk reduction. In addition, these nurses have been exposed to similar
media health promotion programs and advertisements within the greater Atlanta area. The total population of RNs for the combined hospitals was estimated at 1,200.

Nurses from all specialty backgrounds were included, and their clinical practice settings included five acute care hospital settings. The intensity of their knowledge of CVD may vary due to clinical practice, personal experience, and prior contact. As with the Nurses’ Health Study (Nurses’ Health Study, 2008), it was anticipated that because of their nursing education, RNs would be able to answer the CVD risk factor questions with a high degree of accuracy.

Recruitment

Recruitment measures varied per hospital (see Table 3-1) but included email notification, posting of flyers, announcements at staff meetings and other hospital based meetings. Snowball sampling, and other announcements via venues used by the hospitals to communicate with their staff were also used. Of the five hospitals, only one allowed the researcher to recruit directly on the units and post flyers. Chief Nursing Officers sent announcements to staff to encourage participation in the study at all of the hospitals. The system wide nursing newsletter was used by three. One of the hospitals had a surprise visit by The Joint Commission during recruitment which caused a shift in priorities such that recruitment efforts had to cease.

Recruitment took place within five urban hospital systems in Atlanta, GA. All hospitals required the researcher to have an inhouse sponsor to conduct the research. These key individuals associated with the hospitals were required to ensure policies and procedures were followed to obtain permission to conduct research in their respective hospitals. They approved methods of recruitment, served as the inhouse person to oversee
the activities of the researcher, and were the contact person for communications and
care. They were also key contacts for their hospital’s recruitment and RNs exposure
to the study. One hospital did not have anyone willing to sponsor this research study, so
their RNs were unable to participate.

Table 3-1

Reinforcement Recruitment Methods by Hospital

<table>
<thead>
<tr>
<th>Hospital</th>
<th>E-Email</th>
<th>Flyer posting</th>
<th>Nursing meetings</th>
<th>Number participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Available to all RN staff. *CNO support</td>
<td>Posted by unit director and e-mailed to all RNs</td>
<td>Nursing Research Council, systemwide meetings</td>
<td>118</td>
</tr>
<tr>
<td>B</td>
<td>Not available to all RN staff, but each unit director. CNO support</td>
<td>Posted on units</td>
<td>The Joint Commission visit during survey interrupted recruitment</td>
<td>4</td>
</tr>
<tr>
<td>C</td>
<td>Not available to all RN staff, but each unit director. CNO support</td>
<td>Posted by unit director</td>
<td>Nursing Research Council, nursing newsletter</td>
<td>20</td>
</tr>
<tr>
<td>D</td>
<td>Not available to all RN staff, but each unit director. CNO support</td>
<td>Posted by unit director</td>
<td>Nursing Research Council, nursing newsletter</td>
<td>68</td>
</tr>
<tr>
<td>E</td>
<td>Yes. Not available to all RN staff, but each unit director. CNO support.</td>
<td>Posted by unit director</td>
<td>Yes</td>
<td>10</td>
</tr>
</tbody>
</table>

*CNO – Chief Nursing Officer
Instruments

Independent variables for this study included health beliefs as related to perceived CVD severity, perceived CVD susceptibility and modifying factors (age, race, social support, depression, and stress). Health promoting behaviors related to healthy food choices and physical activity were the dependent variables. Perceived severity and perceived susceptibility were operationalized using the perceived severity and perceived susceptibility subscales of the Health Belief Model Questionnaire-Revised (HBMQR). Age, race and other demographic information were collected using the Demographics Questionnaire. Social support was operationalized using The Multidimensional Scale of Perceived Social Support (MSPSS), and depression was measured using the Centers for Epidemiological Studies Depression Scale (CES-D). Stress was operationalized using the Perceived Stress Scale (PSS).

Healthy food choices was operationalized using the nutrition subscale of the Health Promoting Lifestyle Profile II (HPLP-II). In addition, it was operationalized using the MEDFICTS Dietary Assessment Questionnaire. MEDFICTS was used to quantify healthy food choices. Physical activity was operationalized using the exercise subscale of the HPLP-II.

Health Belief Model Questionnaire: Perceived Severity and Perceived Susceptibility

The Health Belief Model Questionnaire (HBMQ) was developed to test the internal consistency and stability across populations of the scales used to measure the HBM variables. HBM psychological variables associated with health behaviors on the individual level are severity, susceptibility, general health motivation, benefits and barriers. For this study, severity and susceptibility were the variables of interest. The
HBM-Q is a 32-item questionnaire with assigned theoretical dimensions of the HBM. The questionnaire is a closed Likert-type format (no middle category for some items). Each item has four to six ordinally scaled options. Exploratory and confirmatory factor analysis supported the existence of six factors closely related to the constructs of the HBM: General Health Motivation/Concern, General Health Threat, Susceptibility, Severity, Benefit of Medical Care, and Self-help Benefit (benefit of self-help behaviors). The model’s fit appears reliable, independent of age, race, and gender. These findings suggest the scales are internally consistent measures with the HBM theory. In addition, the scales are consistent with similar psychological measures of the constructs across different age subgroups, races, and genders (Kirscht, 1988; Mirotznik, Feldman, & Stein, 1995). See Appendix C for the HBMQ.

**Perceived Severity**: Perceived severity was measured using the HBM-Q Perceived Severity Subscale. The Perceived Severity Subscale (measuring likelihood of hypertension, myocardial infarction, stroke, kidney disease, and cancer) was adapted for this study. Specifically, disease orientation was changed to measure perceived severity of CVD, diabetes, hypertension, overweight, obesity, low HDL, and high LDL. Since research has supported the perception of cancer as more serious than CVD to women, perceived severity of cancer was also measured to use as a comparison between cancer and CVD and related CVD chronic diseases. Internal consistency for this subscale has been reported from .88 to .90 among different age groups (18 to > 59 years), races (Whites and Blacks), and genders. This scale is scored by standardizing each item against its mean and standard deviation, then summing the items. The Perceived Severity Subscale had 5 items with scores ranging from 1 to 4. The range of possible scores was 5
to 20 with higher scores representing higher perceived severity. See Appendix D. Cronbach’s alpha in this sample was 0.89.

**Perceived Susceptibility:** Perceived susceptibility was measured using the HBM-Q Perceived Susceptibility Subscale. The Perceived Susceptibility Subscale (measuring likelihood of hypertension, myocardial infarction, stroke, kidney disease, and cancer) was adapted for this study. The disease orientation was changed to measure perceived susceptibility to CVD, diabetes, hypertension, overweight, obesity, low HDL, and high LDL. Perceived susceptibility of cancer was also added to use as a comparison of perceived susceptibility between cancer and CVD and related CVD chronic diseases. The Perceived Susceptibility Subscale is scored by standardizing each item against its mean and standard deviation, then summing the items. The original subscale has 5 items with scores ranging from 1 to 4. The adapted subscale specific to this study had 14 items with a range of possible scores is 14 to 56 with higher scores representing higher perceived susceptibility. Internal consistency for this subscale ranged from .76 to .82 among different age groups (18 to > 59 years), races (Whites and Blacks), and genders. See Appendix E. Cronbach’s alpha for this sample was 0.90.

**Modifying Factors**

**Race, Age, and Other Demographic Information:** Age, race and other demographic data were collected using the self-report Demographics Questionnaire. Information regarding age, race, number of children, city of residence, income, education, foreign birth, health history, smoking status, alcohol intake, weight, family history of early-onset of CHD, medication history (current use of lipid-lowering agents, antihypertensive medications, diabetic medications, weight loss medications, and HRT,
etc.), chronic disease assessment, and personal health characteristics were collected. Foreign birth was included to get more information about childhood and environmental socioeconomic status. See Appendix F.

**Social Support:** Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS). The MSPSS was developed by Zimet, Dahlem, Zimet, and Farley (1988) as a subjective, self-report appraisal of adequacy of social support from three sources: family, friends, and significant others. The questionnaire consists of 12 items with ratings using a 7-point Likert scale. The ratings range from very strongly disagree (1 point) to very strongly agree (7 points). The total and subscale scores range from one to seven. For the total score, items are summed, then, divided by 12. The four items for each subscale are added and divided by four. The higher the score, the greater the likelihood of perceived presence of social support. The internal reliability of the total scale was reported at .88; the reliability of the subscales was Family (.87), Friends (.85), and Significant Other (.91). Test-retest reliability at two to three months was .85 for the total scale and .85 (Family), .75 (Friends), and .72 (Significant Other) for the subscales. See Appendix G. Cronbach’s alpha in this sample was 0.88.

**Depression:** Depression was measured using the Center for Epidemiological Studies Depression Scale (CES-D). The CES-D is a 20-item self-administered instrument originally designed for conducting research and to measure symptoms and severity of depression among the general population. It measures the components of depression symptomatology by asking the respondent to describe depressive feelings and behaviors over the past week. Scoring ranges from 0-60 points on a 4-point frequency scale (none of the time/rarely (less than 1 day) equals 0 points; little/some of the time (1-2 days)
equals 1 point; occasionally/moderate amount of the time (3-4 days) equals 2 points; and most/all of the time (5-7 days) equals 3 points. The higher the score (16 or greater), the greater the indication of the presence of clinically significant depression. Convergence validity was demonstrated to be good. Psychometric properties of the CES-D from reliability and validity studies support good internal consistency ($\alpha > .84$), moderate stability over several weeks (.57) and months (.50) (Radloff, 1977). See Appendix H. Cronbach’s alpha for this sample was 0.77.

**Stress:** Stress was measured using the Perceived Stress Scale-Abbreviated (PSS). The PSS was designed for use in community samples where the participants had at least a junior high school education. It was a 10-item self-report instrument using a 5-point Likert scale with scores ranging from 0 (never) to 4 (very often). The scores were obtained by reversing the responses to the four positively stated items, then summing across all scale items. Higher scores indicated higher stress. Internal consistency has been reported to range from .84 to .86 (Cohen, Kamarck, & Mermelstein, 1983). See Appendix I. Cronbach’s alpha for this sample was 0.88.

**Health Promoting Behaviors: Nutrition and Exercise.** The HPLP-II is a 52-item instrument consisting of 6 subscales that measure the major components of the Health Promotion Model (HPM). The scale measures six dimensions of the health promoting lifestyle (see Appendix J). Health promoting behaviors of healthy food choices and physical activity were the dependent variables and were measured using the HPLP-II Nutrition Subscale (9 items) (see Appendix K) and the HPLP-II Exercise Subscale (8 items) (Appendix L). The respondent was asked to indicate the frequency of engagement in behaviors; scores ranged from never (0 points) to routinely (4 points). An overall score
for health promoting lifestyle was obtained by looking at the mean of the responses on all 52 items. The subscale scores were obtained by calculating a mean of the responses of the subscale items. Content validity of the total instrument was established by the evaluations from content experts and literature reviews. Factor analysis confirmed a six-dimensional structure of health promoting lifestyle. Criterion validity was supported by significant correlations with concurrent measures of perceived health status and quality of life ($r$ ranges: .27 to .50). Cronbach’s alpha for internal consistency for the total instrument was .94, and test-retest reliability for the total instrument at three weeks was .89. Cronbach’s alpha for the subscales ranged from .79 to .87 (Walker & Hill-Polerecky, 1996). The alpha coefficient for the exercise subscale was reported as .81 (Walker, Sechrist, & Pender, 1987). Cronbach’s alpha for the Nutrition and Exercise subscales in this sample were 0.72 and 0.82 respectively.

**Nutrition:** The MEDFICTS Dietary Assessment Questionnaire was also used to measure healthy food choices. This questionnaire was included because food consumption pattern is of interest and would identify healthy food choices. MEDFICTS is an 8-item self-report dietary assessment instrument designed to evaluate patient adherence to the AHA adopted National Cholesterol Education Program NCEP Step 1 and Step 2 diets (Ammerman et al., 1991). Participants select their weekly consumption and serving size of eight categories of foods considered to be primary sources of total fat, saturated fat, and cholesterol. The questionnaire is scored by summing the quality-adjusted intake quantity. The possible range of scores is from 0 to 216 points. Lower scores indicate diets containing less dietary fat. A score of less than 40 points is consistent with a Step 2 diet (saturated fat < 7%, cholesterol < 200 mg/day), a score
between 40 to 69 is consistent with a Step 1 diet (total fat \( \leq 30\% \) of total calories, saturated fat \( \leq 30\% \), cholesterol < 300 mg/day), and a score greater than 70 is consistent with a high fat diet. MEDFICTS was validated by comparison with randomly selected food records collected in the Diet Modification Clinic (DMC) at Baylor College of Medicine, Houston, TX. All diet types (Step 1, Step 2, and the average American diet) were correctly identified. MEDFICTS is suitable for use in cardiovascular health screening, clinical practice, and research related to assessment of Step 1 or Step 2 diet adherence. Evidence for validity was demonstrated by its correlation with percent of energy from total fat \( (r=0.81, P<.0002) \), saturated fat \( (r=0.79, P<.0003) \), and cholesterol \( (r=0.52, P<.039) \). See Appendix M. Cronbach’s alpha for this sample was 0.82.

**Procedure**

Access to female RNs in the research study varied by hospital. Flyers, posters, emails, nursing newsletters, etc. were used to invite the RNs to participate in the study. Flyers, posters, and nursing newsletters included a brief description of the study and an invitation to the RN to contact the researcher for information about study, or to link to the url site for more information. When email was the mechanism for contact, the study was described briefly and the RN was invited to participate by clicking on the attached url. When a personal invitation was extended, a brief discussion took place to explain the study and written information for accessing the URL was provided to the participant, if interested. When a RN heard about the study in a public setting or through someone else, she was instructed to contact the researcher for more information and to obtain access to survey. The e-mail site was checked by the investigator daily.
Once RNs accessed the URL, they were presented with informed consent information that included a brief description of the study and their participation, confidentiality assurances, right to refuse or withdraw from the study, the volunteer nature of the study, risks and benefits, and contact information for questions. The women were advised that participation was purely voluntary and were provided the opportunity to download the consent form information. Those women willing to participate clicked onto the “START” icon. Completion of the survey indicated consent to participate. Participants then completed questionnaires on perceived severity, perceived susceptibility, CVD health promoting behaviors related to nutrition and physical activity, and modifying factors (age, race, social support, depression, and stress). Primary self-reported data was collected using a web-based computer survey method. Completion of the survey took about 30-40 minutes. The data collection period for each site varied from 4 to 12 weeks. The initial e-mail requested a response within two weeks. Subsequent reminder e-mails were sent to the hospital’s contact person. Specific dates for data collection were determined by the Principal Investigator and the hospital system.

The investigator responded to communications from potential study participants via telephone, e-mail, or in person. When face-to-face, verbal and written information were given about the details of the study. The study was explained and questions were answered. Interested RNs were given printed information to access the study, or an e-mail was sent with the information and a link to the study.

Confidentiality and Security of Data

All questionnaires were completed online. To protect the participant’s confidentiality in the completion of the questionnaires, the reminder to complete the
forms were sent by email. In that email, the participant was directed to a website (URL) that allowed the participant to complete and submit the questionnaires. Only the members of the research team (principal investigator (PI) and student PI) and the web-master had identity access for the purposes of downloading and entering information for analysis and for sending out reminders to complete the questionnaires. To protect participant privacy, the database that contains identifying information (email addresses) was stored separately from the modified database that contains no personal identifiers; the modified database was used for data analysis. Responses were assigned a code number and data were stored on password- and firewall-protected computers. Code sheets that identify were stored separately from the data to protect privacy. Code sheets that identify participant email addresses were destroyed when the study concluded. Names and other facts that might point to the participant will not appear when study findings are presented or published. The findings of this project will be summarized and reported in group form. Participants were not identified personally.

Protection of Human Subjects

Approval from the Georgia State University Internal Review Board committee was obtained using an expedited review. This was possible because of minimal risk to the participants. Completing the questionnaire served as consent for participation in the study. The participant was able to revoke consent for participation by exiting or not submitting the survey. Three ethical principles were followed throughout the study. First, the participants were informed about the purpose and procedures related to the study as an effort to ensure they are knowledgeable. Second, study activities caused minimal risk and no psychological harm to the participants. Third, confidentiality was maintained at all
levels. Only the principal investigator, the research team and the webmaster had access to the data. Names or other identifying markers were not collected, as it was necessary for the participants to identify themselves. Email addresses that accompany the responses on Zoomerang software were stored on a separate firewall and password-protected computer. Email addresses were removed from the database that was used for analysis.

**Data Analysis**

Statistical analyses to address the research questions involved descriptive statistics, Spearman product moment correlations, multiple linear regressions and a multivariable analysis of covariance (MANCOVA). The power analysis was based on questions 3 and 4, which were the most complex research questions. The dependent variable for research question 3 was the score for the lifestyle behavior of healthy food choices and for research question 4 was the score for the lifestyle behavior of physical activity. There were seven independent variables for both research questions. With an alpha of .05 and a beta of .20 (power .80), the sample size of 500 participants would provide sufficient power to detect a small effect ($R^2=.12$). The actual sample size was 220.

Zoomerang, an online survey software, was used for data collection. Once data collection was completed, the responses were downloaded into an Excel spreadsheet. Data were then uploaded into SAS software (version 9.1, SAS Institute, Cary, NC).

**Assumptions of the Study**

Assumptions of this study are conditions that were presumed to be true and can lead to invalid findings if violated. One assumption was that the variables in the study exist among women and are measurable. A second assumption was that the sample
population was representative of the general population of women. A third assumption was that the survey responses were reliable. A fourth assumption was that the meaning of the survey items was clear. A fifth assumption was that having a homogeneous group with respect to CVD knowledge would help delineate the role of personal perception of CVD risk. A final assumption is that the instruments used to measure the variables were appropriate for this study.

Summary

This section described the methodology of the study, a descriptive, correlational analysis involving women and CVD. Primary self-reported data were collected using the computer-administered survey method. The purpose of the study was to examine whether or not the relationship between health beliefs related to perceived severity of CVD and CVD health promoting behaviors (nutrition and physical activity) are different in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility. The study sample was hospital based female RNs. The independent variables (perceived severity, perceived susceptibility, age, race, social support, depression, and stress) and the dependent variable (health promoting behaviors-healthy food choices and physical activity) were measured using identified instruments. Statistical analyses involved descriptive statistics and multiple linear regression.
Chapter IV

Results

This chapter reports the results of the data analysis. The data analysis included descriptive statistics regarding the sample and the study variables and Pearson product moment correlations. A multivariable analysis of covariance (MANCOVA) addressed research questions about the two outcome health promotion behaviors of interest: physical activity and healthy food choices.

Overview of the Data Analysis

The purpose of this study was to examine whether or not the relationship between health beliefs related to perceived CVD severity and CVD health promoting behaviors were different in women with high self-perception of CVD susceptibility versus women with low self-perception of CVD susceptibility. Female Registered Nurses (RNs) were selected as the target population because they are thought to be a reliable and homogeneous group of women who have knowledge of CVD. Recruitment took place at five (5) metropolitan hospitals in Atlanta, Georgia. Of a possible sampling pool of around 1,200 nurses, 220 participated in the study. Of the 220 participants, 68 participants had missing data for at least one (1) question, particularly for the variable healthy food choices (MEDFICTS), making the total number of cases in the data analysis for model testing less than 220 women.
Key study variables, the instruments by which they were measured, and scoring ranges are presented in Table 4-1 below. Additionally, the indices of internal consistency of the tools used for measuring the outcome and main predictor variables are listed. These findings support the appropriateness of use for these instruments in this study.

Table 4-1  
*Key Study Variables, Instruments, and Internal Consistency Reliability for RNs and CVD Study*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Instrument</th>
<th>Score Range</th>
<th>Observed Range</th>
<th>Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social support</td>
<td>Multidimensional Scale of Perceived Social Support</td>
<td>1.0-70</td>
<td>1.0 3-7.0</td>
<td>0.88</td>
</tr>
<tr>
<td>Depression</td>
<td>Center for Epidemiological Studies Depression Scale</td>
<td>0.0-60.0</td>
<td>3-0-44.0</td>
<td>0.77</td>
</tr>
<tr>
<td>Perceived stress</td>
<td>Health Belief Model Questionnaire-Revised</td>
<td>0.0-4.0</td>
<td>0.0-38.0</td>
<td>0.88</td>
</tr>
<tr>
<td>Perceived severity</td>
<td>Health Belief Model Questionnaire-Revised</td>
<td>5.0-20.0</td>
<td>5.0-20.0</td>
<td>0.89</td>
</tr>
<tr>
<td>Preventive health behaviors</td>
<td>HPLP II Nutrition Subscale</td>
<td>0.0-36.0</td>
<td>1.5-4.0</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>MEDFICTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HPLP II Physical Activity Subscale</td>
<td>0.0-216.0</td>
<td>0.0-163.0</td>
<td>0.82</td>
</tr>
<tr>
<td>RNs and CVD Perceived susceptibility</td>
<td>Health Belief Model Questionnaire-Revised</td>
<td>14.0-56.0</td>
<td>14.0-56.0</td>
<td>0.90</td>
</tr>
</tbody>
</table>
Moderate evidence for convergent validity was established in this study between the two healthy food choice measurements: the HPLP II Nutrition subscale and MEDFICTS. A correlation analysis indicated the two variables were inversely related (p = -0.27) and their correlation was statistically significant with a p-value of p < .01. Higher scores on the HPLP II Nutrition subscale indicated healthier eating behaviors. Lower scores on MEDFICTS indicated diets containing less dietary fat (healthier foods). The inverse relationship between the two variables was in the conceptually appropriate direction.

**Sample Characteristics**

Table 4-2 reports the demographic characteristics of the sample. The RNs were primarily English speaking, white, and had a bachelors degree. The mean age was 47.7 (SD 9.7) years. On average, the sample had been nurses for approximately 20 years and were working 40 hours per week. The majority were staff nurses, married or living with a partner, and had a personal income ranging between $75,000 to $99,000.

Table 4-2

*Characteristics of Sample*

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
<th>Range</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary language</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>200.0</td>
<td>93.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spanish</td>
<td>01.0</td>
<td>00.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>14.0</td>
<td>06.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Table 4-2 Continues)
(Table 4-2 Continued)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
<th>Range</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>143.0</td>
<td>65.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>56.0</td>
<td>25.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>20.0</td>
<td>09.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Highest level education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Associate-diploma</td>
<td>49.0</td>
<td>22.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bachelor</td>
<td>97.0</td>
<td>44.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters/Doctorate</td>
<td>68.0</td>
<td>31.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>216.0</td>
<td></td>
<td>23.0-66.0</td>
<td>47.74 (9.7)</td>
</tr>
<tr>
<td>Years in nursing</td>
<td>215.0</td>
<td></td>
<td>0.5-43.0</td>
<td>21.36 (11.3)</td>
</tr>
<tr>
<td>Working hours per week</td>
<td>215.0</td>
<td></td>
<td>9.0-80.0</td>
<td>41.60 (10.3)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never married/other</td>
<td>21.0</td>
<td>93.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married/partner</td>
<td>152.0</td>
<td>00.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced/widowed</td>
<td>44.0</td>
<td>06.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual income</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$10,000-$24,999</td>
<td>02.0</td>
<td>65.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$25,000-$49,000</td>
<td>24.0</td>
<td>25.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$50,000-$74,999</td>
<td>74.0</td>
<td>09.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$75,000-$99,999</td>
<td>83.0</td>
<td>38.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>$100,000-125,000</td>
<td>24.0/11.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Over $125,000</td>
<td>07.0/03.3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Table 4-2 Continues)
Preparing the Data for Analysis

Prior to beginning the data analysis, the variables were examined. The variable race was collapsed and classified into white, black and other because of the low number of subjects in the race groups other than white and black. The initial ten categories for highest level of education were regrouped into four classes: associate degree and diploma, bachelor, master, and doctoral levels of educations.

The study participants had an age distribution that was not normally distributed and skewed to the left; thus, the values of age were log transformed after reflection. When conducting the analyses the results were similar using actual age versus the transformed age variable. Consequently, the actual age was used in the final analyses to address the research questions.

Nominal and numerical variables were analyzed descriptively using frequency tables for proportion and univariate analysis of interval and ratio level variables for measures of central tendency and dispersion. Specifically, the main variables to be used
to address the research questions were examined. Table 4-3 presents a summary of these analyses.

Table 4-3

*Measures of Central Tendency for Main Outcome and Predictor Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Median</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>216.0</td>
<td>47.7</td>
<td>9.7</td>
<td>50.0</td>
<td>23.0</td>
<td>66.0</td>
</tr>
<tr>
<td>Social Stress</td>
<td>212.0</td>
<td>55.9</td>
<td>1.2</td>
<td>66.2</td>
<td>0.13</td>
<td>07.0</td>
</tr>
<tr>
<td>Stress</td>
<td>206.0</td>
<td>14.8</td>
<td>7.4</td>
<td>15.0</td>
<td>0.0</td>
<td>07.0</td>
</tr>
<tr>
<td>Depression</td>
<td>204.0</td>
<td>18.0</td>
<td>07.0</td>
<td>16.0</td>
<td>03.0</td>
<td>38.0</td>
</tr>
<tr>
<td>Severity Now</td>
<td>209.0</td>
<td>15.3</td>
<td>03.6</td>
<td>15.0</td>
<td>05.0</td>
<td>44.0</td>
</tr>
<tr>
<td>Susceptibility</td>
<td>213.0</td>
<td>10.5</td>
<td>04.0</td>
<td>10.0</td>
<td>05.0</td>
<td>25.0</td>
</tr>
<tr>
<td>Healthy Food Choice (MEDFICTS)</td>
<td>159.0</td>
<td>39.2</td>
<td>32.3</td>
<td>27.0</td>
<td>00.0</td>
<td>163.0</td>
</tr>
<tr>
<td>Exercise</td>
<td>210.0</td>
<td>11.0</td>
<td>04.4</td>
<td>10.0</td>
<td>05.0</td>
<td>20.0</td>
</tr>
<tr>
<td>Healthy Food Choice (HPLP)</td>
<td>219.0</td>
<td>02.8</td>
<td>0.5</td>
<td>02.8</td>
<td>01.5</td>
<td>04.0</td>
</tr>
<tr>
<td>Years in Nursing</td>
<td>212.0</td>
<td>21.4</td>
<td>11.3</td>
<td>24.0</td>
<td>00.5</td>
<td>43.0</td>
</tr>
<tr>
<td>Total Working Hours per Week</td>
<td>215.0</td>
<td>41.6</td>
<td>10.3</td>
<td>40.0</td>
<td>09.0</td>
<td>80.0</td>
</tr>
</tbody>
</table>
Outcome and Predictor Variables

Univariable regression was performed to assess the impact of possible explanatory variables on healthy behaviors for each variable one at a time. Only three variables – marital status, average sleep hours per day, and total household income – had a statistically significant association with the health promotion behaviors. Marital status and average sleep hours per day were significantly associated (p < .05) with physical activity and total household income was significantly associated (p < .05) with healthy food choice. However, on multivariable regression analysis with other predictors including the perception of severity and susceptibility, none of the three variables retained their statistically significant relationship with the dependent variables and thus were not retained in the final model.

Correlation coefficients using the Spearman Correlation Coefficients were computed to assess the relationships among the main predictor and outcome variables. Spearman’s rho was chosen for this analysis because many of the variables had Likert scales. The variables were age, social support, stress, depression, susceptibility, severity now, healthy food choice HPLP, healthy food choice MEDFICTS, and exercise. See Table 4-4 for the results of the correlation analysis.
Table 4-4

*Spearman Correlation Coefficients Among Main Predictor and Outcome Variables*

<table>
<thead>
<tr>
<th>Variables</th>
<th>Age</th>
<th>Social Support</th>
<th>Stress</th>
<th>Depression</th>
<th>Susceptibility</th>
<th>Severity now</th>
<th>Healthy food HLP</th>
<th>Healthy food MEDFICTS</th>
<th>Exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.00000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social support</td>
<td>-0.07</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td>-0.42**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>-0.20*</td>
<td>-0.37**</td>
<td>0.61**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Susceptibility</td>
<td>0.24**</td>
<td>-0.17</td>
<td>0.20*</td>
<td>0.10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severity now</td>
<td>-0.13</td>
<td>0.05*</td>
<td>0.03*</td>
<td>0.03*</td>
<td>-0.16</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy food HLP</td>
<td>-0.03*</td>
<td>0.24**</td>
<td>-0.27**</td>
<td>-0.27**</td>
<td>-0.37**</td>
<td>0.26**</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healthy food MEDFICTS</td>
<td>-0.00**</td>
<td>-0.16</td>
<td>0.12</td>
<td>0.19*</td>
<td>0.19*</td>
<td>-0.14</td>
<td>-0.27**</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td>-0.25**</td>
<td>0.27**</td>
<td>-0.21*</td>
<td>-0.25**</td>
<td>-0.44**</td>
<td>0.10</td>
<td>0.39**</td>
<td>-0.23**</td>
<td>1.00</td>
</tr>
</tbody>
</table>

*P-value ≤ 0.05; **P-value ≤ 0.01; ***P-value ≤ 0.001
Analyses Addressing the Research Questions

Multiple linear regressions using a generalized linear model (GLM) were performed to answer the study questions. The regression models for the first two questions had perceived level of susceptibility, perceived level of severity (seriousness) and their interaction terms as predictors. Other socio-demographic predictors including age, race, social support, stress, and depression were added to address Questions 3 and 4.

Research Questions 1 and 2 were concerned with whether the relationship between perceived CVD severity and health promoting behaviors of healthy food choices and physical activity were different in women with high perceived CVD susceptibility versus women with low perceived CVD susceptibility. Perceived levels of susceptibility and severity were categorized into three groups based on the tertiles to increase efficiency of the study and simplify the interpretation of the results. The first and third tertiles were used to classify subjects into low and high levels of perceived susceptibility and perceived severity groups respectively. These classifications were expected to simplify the interpretation by comparing those having a higher score with those having a lower score. However, this approach did not improve the model. An alternative approach was used which involved standardizing scores on susceptibility and severity using techniques recommended by the instrument authors. The process of standardization assists in comparing results across studies. In the final model, the standardized scores for susceptibility and severity were used.

The Fisher F-test was used to assess if the overall model was significant and a fit for the data. The importance of the model in explaining the behavior was assessed using the coefficient of determination ($R^2$). Identification of study variables significantly
associated with the outcome behavior was explained by the coefficient of regression and their p-values on the F-test. The contribution of each predictor variable to the variance of outcome behavior or the strength of association between a predictor and the outcome was assessed with partial–R².

Finally, a multivariable analysis of covariance (MANCOVA) was run using the two outcome behaviors of interest—physical activity and healthy food choices—as dependent variables contemporaneously to increase efficiency of the data accounting for multiple testing. A hierarchical backward stepwise elimination was applied to arrive at the best final model while assessing for confounding and estimate precision. All statistical tests were considered significant if the p-values were less than 0.05. Because of the exploratory nature of the study, predictors with p values less than 0.10, but higher than 0.05, were also examined. SAS software (version 9.1, SAS Institute, Cary, NC) was utilized for this analysis.

Multivariable analyses indicated that perceived levels of susceptibility and severity had an association with health promotion behaviors related to MEDFICSTS healthy food choice (see Table 4-5). However, there was no statistically significant evidence supporting the interaction between the two predictors.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>SE</th>
<th>t-value</th>
<th>p value</th>
<th>Squared semi-partial corr type II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.27</td>
<td>0.29</td>
<td>-0.94</td>
<td>0.35</td>
<td>0.01</td>
</tr>
<tr>
<td>Race black</td>
<td>0.54</td>
<td>7.01</td>
<td>0.08</td>
<td>0.94</td>
<td>0.00</td>
</tr>
<tr>
<td>Race other</td>
<td>0.85</td>
<td>10.38</td>
<td>0.08</td>
<td>0.94</td>
<td>0.00</td>
</tr>
<tr>
<td>Social support</td>
<td>-3.31</td>
<td>2.93</td>
<td>-1.13</td>
<td>0.26</td>
<td>0.00</td>
</tr>
<tr>
<td>Stress</td>
<td>-0.28</td>
<td>0.58</td>
<td>-0.48</td>
<td>0.64</td>
<td>0.00</td>
</tr>
<tr>
<td>Depression</td>
<td>0.46</td>
<td>0.53</td>
<td>0.87</td>
<td>0.39</td>
<td>0.00</td>
</tr>
<tr>
<td>Susceptibility</td>
<td>1.95</td>
<td>0.80</td>
<td>2.44</td>
<td>0.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Severity</td>
<td>-1.38</td>
<td>0.71</td>
<td>-1.93</td>
<td>0.05</td>
<td>0.03</td>
</tr>
<tr>
<td>Interaction term</td>
<td>-0.04</td>
<td>0.19</td>
<td>-0.40</td>
<td>0.70</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Multivariable analyses indicated that perceived levels of susceptibility and severity were associated with health promotion behaviors related to the HPLP II Physical Activity Subscale (see Table 4-6). There was no statistically significant evidence supporting the interaction between the two predictors.

Table 4-6

*Multivariable Analysis Estimates for Predictors of HPLP II Physical Activity Among RNs at Five Atlanta Hospitals (n = 177)*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>SE</th>
<th>t-value</th>
<th>p value</th>
<th>Squared semi-partial corr type II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.10</td>
<td>0.03</td>
<td>-3.00</td>
<td>0.00</td>
<td>0.04</td>
</tr>
<tr>
<td>Race black</td>
<td>-0.77</td>
<td>0.76</td>
<td>-1.02</td>
<td>0.31</td>
<td>0.01</td>
</tr>
<tr>
<td>Race other</td>
<td>0.39</td>
<td>1.08</td>
<td>0.36</td>
<td>0.72</td>
<td>0.00</td>
</tr>
<tr>
<td>Social support</td>
<td>0.22</td>
<td>0.30</td>
<td>0.71</td>
<td>0.48</td>
<td>0.00</td>
</tr>
<tr>
<td>Stress</td>
<td>0.01</td>
<td>0.06</td>
<td>0.22</td>
<td>0.82</td>
<td>0.00</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.14</td>
<td>0.06</td>
<td>-2.35</td>
<td>0.02</td>
<td>0.03</td>
</tr>
<tr>
<td>Susceptibility</td>
<td>-0.28</td>
<td>0.08</td>
<td>-3.36</td>
<td>0.00</td>
<td>0.05</td>
</tr>
<tr>
<td>Severity</td>
<td>0.10</td>
<td>0.07</td>
<td>1.34</td>
<td>0.18</td>
<td>0.01</td>
</tr>
<tr>
<td>Interaction term</td>
<td>0.00</td>
<td>0.01</td>
<td>0.01</td>
<td>0.99</td>
<td>6.35</td>
</tr>
</tbody>
</table>
The overall models were statistically significant with Fisher F-test p-values of 0.0003 and <0.0001 for the healthy food choice and physical activity behaviors respectively. The model for MEDFICTS healthy food choice behavior explained 14.60% of its variance while the four variables included in the model explained 20.63% of the variance in the HPLP II physical activity behavior.

The two predictors of main interest (perceived severity and perceived susceptibility) showed opposite effects on the outcome behaviors of healthy food choice and physical activity. The higher the nurses’ perceived level of severity of contracting cardiovascular disease, the more likely they were to make healthy food choices and participate in physical activity. In other words, those nurses whose perception of the severity of CVD was high were more likely to make healthy food choices and participate in physical activity.

This relationship, however, did not hold true with perceived level of susceptibility, which had an inverse relationship with the two health promotion behaviors. The higher the nurses’ perceived level of susceptibility of contracting CVD, the less likely they were to make healthy food choices and participate in physical activity. Nurses whose perception of the level of susceptibility to CVD was high were less likely to make healthy food choices or engage in physical activity.

Research Questions 3 and 4 examined the contribution of personal characteristics (age, race, social support, depression, and perceived stress), perceived severity, and perceived susceptibility to variance in CVD health promoting behaviors of healthy food choices (see Table 4-7) and physical activity (see Table 4-8). The inclusion of outcome predictors with perceived susceptibility and perceived seriousness in the regression model
did not change the results. Rather, the multivariable regression indicated that age and status of depression had a significant association with physical activity behavior. Specifically, greater age and greater depression predicted lower physical activity. Thus, the hierarchical backward elimination resulted in a model that contained these two variables (age and depression) besides the perceived level of susceptibility and severity. A multivariable regression with this model confirmed the results observed in the multiple linear regression models described above.

**MEDFICTS Healthy Food Choice**

Based on the final MANCOVA model (see Table 4-7), for every standardized unit increase in the perceived severity of CVD, the participants had a 1.26 (95% CI: 0.02, 2.50) unit reduction in their MEDFICTS healthy food choice score. Additionally, for every standardized unit increase in the level of perceived susceptibility, there was an increase in the MEDFICTS healthy food choice score by 2.37 (95% CI: 1.09, 3.65) unit.

Table 4-7

*Parameter Estimates for Predictors Included in the Final Models* of Healthy Behavior

**MEDFICTS Healthy Food Choice**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>SE</th>
<th>t-value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>-0.22</td>
<td>0.26</td>
<td>-0.85</td>
<td>0.40</td>
</tr>
<tr>
<td>Depression</td>
<td>0.50</td>
<td>0.35</td>
<td>1.45</td>
<td>0.15</td>
</tr>
<tr>
<td>Susceptibility</td>
<td>2.37</td>
<td>0.65</td>
<td>3.64</td>
<td>0.00</td>
</tr>
<tr>
<td>Severity</td>
<td>-1.26</td>
<td>0.63</td>
<td>-2.00</td>
<td>0.06</td>
</tr>
</tbody>
</table>

*Note: The model is based on multivariate analysis of variance (MANOVA)*
For every year of increase in age, the nurses involved in this study had a standardized unit decrease in MEDFICTS healthy food choice score by 0.22 units. For every year of increase in age, there was a decrease in healthy food choice. Additionally, for every standardized unit increase in depression, the nurses in this study had an increase in the MEDFICTS healthy food choice score by 0.50 units. More depression correlated with less healthy food choices.

**HPLP II Physical Activity**

For every standardized unit increase in the perceived severity of CVD the nurses involved in this study had an increase in their physical activity score by 0.12 (90% CI: 0.01, 0.23) unit. On the other hand, for every standardized unit increase in the level of perceived susceptibility there was a reduction in the physical activity score by 0.27 (0.12, 0.41) unit.

Table 4-8

*Parameter Estimates for Predictors Included in the Final Models* of Healthy Behavior

**HPLP II Physical Activity**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Parameter estimate</th>
<th>SE</th>
<th>t-value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (yrs)</td>
<td>-0.08</td>
<td>0.03</td>
<td>-2.51</td>
<td>0.01</td>
</tr>
<tr>
<td>Depression</td>
<td>-0.15</td>
<td>0.04</td>
<td>-3.50</td>
<td>0.00</td>
</tr>
<tr>
<td>Susceptibility</td>
<td>0.27</td>
<td>0.07</td>
<td>-3.66</td>
<td>0.00</td>
</tr>
<tr>
<td>Severity</td>
<td>0.12</td>
<td>0.07</td>
<td>1.82</td>
<td>0.07</td>
</tr>
</tbody>
</table>

*Note: The model is based on multivariate analysis of variance (MANOVA)*
For every year increase in age, the participants had a standardized unit reduction in HPLP II Physical Activity score by 0.08 units. As age increased, the participants were less likely to participate in physical activity. In addition, for every standardized unit increase in depression, the participants had a 0.15 unit decrease in physical activity. The older and more depressed, the less physical activity.

Summary

The target population for this study was female RNs employed in five hospitals in Metropolitan Atlanta. Data analysis was conducted using SAS software 9.1. In this study, participants who had a higher perception of CVD severity were more likely to engage in physical activity and make healthy food choices. Conversely, those who had a higher perception of CVD susceptibility were less likely to participate in physical activity and healthy food choices. Additionally, age and depression influenced physical activity. Chapter 5 presents the discussion, interpretation, and significant findings of this study.
Chapter V

Discussion

In Chapter V, a discussion of the usefulness of the HBM constructs as predictors of health promoting behaviors (healthy food choices and physical activity) and a summary of the major findings of the study will be presented. Perceived susceptibility was examined as a moderator. Implications for research and practice will also be described.

The HBM was adapted for this study and measurement of the constructs perceived benefits, perceived barriers, and cues to action were not included. An underlying assumption was that hospital based RNs had knowledge of the aforementioned constructs. The need for their measurement among this group was underestimated. Retrospectively, inclusion of these constructs would have given a more accurate account of the usefulness of the HBM in this study. Furthermore, it is unclear whether or how these constructs affected perceived susceptibility in this population.

Of primary interest were the HBM constructs modifying variables (age, race, social support, depression, and perceived stress), and perceived severity. The HBM construct perceived susceptibility was examined to see if it moderated the relationship between the aforementioned variables and CVD health promoting behaviors of healthy food choices and physical activity. Examining perceived susceptibility as a moderator of CVD related health promoting behaviors of healthy food choices and physical activity
among women and female RNs is unique to this study. These findings provide support for the need to design more research studies to examine the role of perceived susceptibility in CVD health promotion among women, and the need for the development of additional instruments to improve the measurement and understanding of susceptibility perception.

The target population of women was female RNs employed at five (5) metropolitan Atlanta hospitals. Nurses from all specialty backgrounds were included. As with the Nurses’ Health Study (Nurses’ Health Study, 2008), it was anticipated that because of their nursing education, RNs would be able to answer the CVD risk factor questions with a high degree of accuracy. Additionally, this population of hospital based RNs was selected because of their homogeneity and self report reliability.

Summary of Findings

This was an exploratory study to determine what variables were key factors in CVD health promotion and the direction of their roles. Nevertheless, it was unexpected that among this population of women, the higher the level of perceived susceptibility to CVD the less likely they were to participate in physical activity or make healthy food choices. Previous literature has supported perceived susceptibility as a predictor of health promotion behavior, and behavior as the result of the perceived value of an outcome (Glanz et al., 2002; Maiman & Becker, 1974). Higher level awareness along with a higher perception of susceptibility to disease contraction were expected to increase health promotion behaviors (Weinstein & Sandman, 2002).

The studies using the HBM among women and supporting susceptibility as a precursor to behavior have mainly been related to breast cancer. These findings from this
study suggest the need to conduct studies using the HBM for predicting CVD health promotion behaviors among women, and examining mechanisms for how beliefs impact behavior. An additional note, when comparing this study’s findings regarding CVD with other studies using the HBM and cancer it is clear that cancer is overwhelmingly viewed as an undesired condition of great severity (Janz & Becker, 1984; McQueen, Bastian, Swank, & Vernon, 2008). One might suggest that the diagnosis of cancer is more tangible and potentially lethal, demanding immediate consideration. CVD, on the other hand, is more subtle and silent, thus not demanding the immediate attention. Another possibility may be that since most of the patients these nurses see in the hospital are susceptible (no matter the specialty) and have at least one of the CVD risk factors, the threat of susceptibility may be lessened.

When examining the role of perceived susceptibility among studies, inconsistencies in results have been attributed to the use of different measures of susceptibility. Measures of susceptibility include a) own absolute risk (compares personal risk without reference group), b) comparative risk (compares personal risk with reference group), c) direct comparative risk (compares own risk and risk of others at same time), and d) indirect comparative risk (separate judgment of personal absolute risk and referent absolute risk). In this study, both absolute and comparative risks were measured. Findings from other studies support the belief that the inconsistencies may be attributed to the susceptibility measures, the varying pathways by which they are processed (general risk versus personal risk), and the computation method (Ranby, Aiken, Gerend, & Erchull, 2010).
Finally, anecdotal information from several RNs after participation in this study indicated they did not realize the extent of their susceptibility until taking the survey. The interactive BMI calculator showed them their weight categories. This low perception of their personal BMI and its correlation to CVD susceptibility would affect their level of participation in the health promoting behaviors.

Body size misperception, a failure to recognize the need to lose weight, has been identified as an obstacle to weight reduction and as a target for intervention for CVD risk reduction among the general public (Powell et al., 2010). This study’s findings support that these RNs did not have a real view of their own susceptibility. Therefore, they did not perceive a need to use the CVD health promoting behaviors. Interventions targeting RNs regarding their CVD risks and related CVD risk reduction are needed. Personal misperceptions of CVD risks will influence perceptions about CVD risks for their patients and the education they give to their patients about risks.

The perception of high CVD risk is associated with treatment for diabetes, hypertension and dislipidemia. Low perceived risk is associated with high educational level and leisure-time exercise (Alwan, William, Viswanathan, Paccaud, & Bovet, 2009). Not having an accurate perception of susceptibility may have influenced the participants’ processes of precaution adoption for CVD health promotion behaviors (McQueen, Bastian, Swank, and Vernon, 2008). Gerend, Aiken, West, & Erchull (2004) contend that models in which perceived susceptibility is a construct do not account for how perceptions of susceptibility accrue. It was thought that knowledge of CVD risks coupled with exposure to those afflicted would serve as cues to action to participate in health promotion behaviors. This was not the case for these study participants.
In this study, the RNs who had the perception that developing CVD would be severe were more likely to participate in the health promotion behaviors of physical activity and healthy food choices. These behaviors were viewed as activities for avoiding or reducing CVD severity. Therefore, they were willing to be physically active and eat healthy foods. Over the past several years, health promotion campaigns have appeared in the media, general consumer publications, and even in some of the social media communications. These communication efforts may have stimulated healthy lifestyle behaviors. Additionally, it may be that the experiences of family, friends, and patients cued these nurses to implement healthy lifestyles.

Among the general public, increased awareness of the severity of CVD among women has raised knowledge levels over time (Mosca et al., 2007). For some reason, these RNs were stimulated to engage in healthy lifestyle behaviors to avoid CVD. The health promotion behaviors of increased physical activity and healthy food choices constitute therapeutic lifestyle change (TLC), the fundamental recommendation for heart disease protection and prevention (Grundy et al., 2005).

The contributions of personal characteristics (age, race, social support, depression, and perceived stress), perceived severity, and perceived susceptibility to the variance in CVD health promoting behaviors of healthy food choices and physical activity were examined. The data analysis included determining whether or not when controlling for perceived severity and susceptibility, their relationships would remain the same with health promoting behaviors. There was no statistically significant evidence supporting an interaction between the two predictors (severity and susceptibility) and the direction of their relationships to the outcome remained the same.
Of the personal characteristics examined, age and depression had statistically significant contributions to engagement in physical activity. The older RN was less likely to participate in physical activity. This finding is supported by studies using the general public as its population. The report Health Behaviors of Adults: United States, 2005-2007, reported data from the National Health Interview Survey. The findings showed that the percentage of adults who participated in at least some and regular leisure-time physical activities, and strengthening leisure-time physical activities decreased with age (Schoenborn & Adams, 2010).

The personal characteristic depression made a statistically significant contribution to physical activity. The more depressed participants were, the less likely they were to participate in physical activity. It is concerning that depression was intense enough to be statistically significant among RNs. This finding raise questions about the impact depression has on patient care and safety. Nonetheless, this finding is supported in the literature. The Morbidity and Mortality Weekly Report (MMWR) (2010) cites the commonality of depressive disorders among those with chronic diseases and unhealthy behaviors, including physical inactivity. The study also indicated the location of highest concentration of depression was in the southeastern region of the United States, the location of this study.

In addition, women were significantly more likely to report major depression than men (MMWR, 2010). Although some women in this study had depression, they remained able to work and give care to others. More research is needed to understand depression among women, women in the southeastern region, and specifically among RNs in this region. A comparison of the level of depression among these RNs with depression among
other RNs and with women in the general public is needed.

Although not a research question, women in this sample reported job stress. Job stress among these RNs should be explored further. Identifying possible confounders among stress, healthy food choices and physical activity may have implications for future research.

Limitations

There were several limitations to this study. The HBM variables “barriers” and “benefits” were not used in this study. The rationale was to keep the variables of interest as narrow as possible. Those exclusions may have hampered the results. A second limitation was the use of a convenience sample. Although recruitment took place at several local hospitals, generalizability is limited due to geographics and nonrandom sample selection. The use of a self report survey could be an issue as self-report has an association with biases of recall and response (Waltz, Strickland, & Lenz, 2005). A final limitation may have been the length of the survey (15 to 60 minutes). Participants were unable to save answers and finish the survey at a later time. The survey had to be completed in its entirety or restarted at the beginning.

Implications for Practice

The findings from this study suggest more research is needed that use RNs as the target population of interest to examine health promotion and risk reduction practices for CVD among women. RNs are the primary educators for patients with CVD and other chronic diseases. Their personal perceptions and practices may impact education and training provided to patients. For example, some of these RNs became aware they were more susceptible to CVD by filling out a survey. This new self awareness could enlighten
them to implement healthy lifestyle behaviors. In addition, they may be able to help patients recognize their susceptibility. Interventions to stimulate healthy lifestyle behaviors in the workplace could create or improve cultures of wellness for both RNs and patients.

**Recommendations for Future Research**

Identifying women specific factors that influence participation in health promotion behaviors is paramount. The HBM has been useful in understanding health behaviors among women in various settings. However, HBM studies are limited that include RNs and CVD. There is a need for the development of strategies that guide nurses in identifying their actual susceptibility to CVD. Thus, they could determine what would be needed for appropriate lifestyle modification. Evidence-based research that uses a robust theoretical model and the specified target population of RNs could aid practitioners when making recommendations to reduce risks.

Although there was no significant interaction between susceptibility and severity in this study, the roles of personal characteristics need illumination. Research that explores depression among RNs may guide interventions to diminish its presence and sequela. Understanding the inverse findings of higher perceived susceptibility and lower likelihood of participating in the health promoting behaviors of healthy food choices and physical activity need further investigation. Future use of the HBM as the theoretical framework to build on the findings from this study will include all of the constructs.

This study explored the health beliefs and some modifying factors that impact cardiovascular disease health promoting behaviors among RNs. These data will be used to contribute to future research to guide interventions that support participation in healthy
lifestyles and creation of healthy workplace environments for RNs. Health promotion among RNs may have a positive impact on health promotion among their patient populations and the general public.
References


Appendix A

Health Belief Model
Appendix A

Health Belief Model

Individual Perceptions      Modifying Factors   Likelihood of Action

Demographic variables (age, sex, race, ethnicity, etc.)
Sociopsychological variables (personality, social class, peer and reference group pressure, etc.)
Structural variables (knowledge about the disease, prior contact with the disease, etc.)

Perceived Susceptibility to Disease “X”
Perceived Seriousness (Severity) of Disease “X”

Perceived Threat of Disease “X”

Cues of Action
Mass media campaigns
Advice from others
Reminder postcard from physician or dentist
Illness of family member or friend
Newspaper or magazine article

Perceived benefits of preventive action

Minus

Perceived barriers to preventive action

Likelihood of Taking Recommended Preventive Health Action

The “Health Belief Model” as predictor of preventive health, Rosenstock & Becker, 1974
Appendix B

Health Belief Model for Cardiovascular Disease
Appendix B

Health Belief Model for Cardiovascular Disease

CVD Modifying Factors
- Age
- Race
- Social support
- Depression
- Perceived stress

Perceived CVD Severity

CVD Health Promoting Behaviors
- Nutrition
- Exercise

Perceived CVD Susceptibility

(Adapted from the Health Belief Model, Rosenstock and Becker, 1974)
Appendix C

Health Belief Model Questionnaire Items
### Appendix C
Health Belief Model Questionnaire Items

<table>
<thead>
<tr>
<th>Items</th>
<th>Theoretical Construct</th>
<th>Empirical Construct</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you think about your health?</td>
<td>Motivation</td>
<td>Motivation/Concern</td>
</tr>
<tr>
<td>2. How concerned are you about your health?</td>
<td>Motivation</td>
<td>Motivation/Concern</td>
</tr>
<tr>
<td>3. How important do you think it is that people take special care of their health?</td>
<td>Motivation</td>
<td>Motivation/Concern</td>
</tr>
<tr>
<td>4. How concerned are you about the possible future effects of high blood pressure on your health? How concerned are you about health problems that high blood pressure could cause for you?</td>
<td>Motivation</td>
<td>Motivation/Concern</td>
</tr>
<tr>
<td>5. Compared to other people your age, would you say that you get sick much more often, more often, as often, less often, or much less often?</td>
<td>Susceptibility</td>
<td>General Health Threat</td>
</tr>
<tr>
<td>6. Compared to other people your age, when you do get sick, would you say you get much more sick, more sick, as sick, less sick, or much less sick?</td>
<td>Severity</td>
<td>General Health Threat</td>
</tr>
<tr>
<td>7. How likely do you think it is that you will get high blood pressure sometime in your life? One year from now, how likely do you think it is that you will have elevated blood pressure levels where your pressure is not in good control?*</td>
<td>Susceptibility</td>
<td>Susceptibility</td>
</tr>
<tr>
<td>8. How likely is it that you will have a heart attack in the future?</td>
<td>Susceptibility</td>
<td>Susceptibility</td>
</tr>
<tr>
<td>9. How likely is it that you ill have a stroke in the future</td>
<td>Susceptibility</td>
<td>Susceptibility</td>
</tr>
<tr>
<td>10. How likely is it that you will have kidney disease in the future?</td>
<td>Susceptibility</td>
<td>Susceptibility</td>
</tr>
<tr>
<td>11. How likely is it that you will have cancer in the future?</td>
<td>Severity</td>
<td>Susceptibility</td>
</tr>
<tr>
<td>12. How serious a health problem would high blood pressure be for you? How serious a health problem do you think high blood pressure will be for you in the future?</td>
<td>Severity</td>
<td>Severity</td>
</tr>
<tr>
<td>Question</td>
<td>Benefit</td>
<td>Self-help</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>13. How serious a health problem would having a heart attack be for you?</td>
<td>Severity</td>
<td>Severity</td>
</tr>
<tr>
<td>14. How serious a health problem would having a stroke be for you?</td>
<td>Severity</td>
<td>Severity</td>
</tr>
<tr>
<td>15. How serious a health problem would having kidney disease be for you?</td>
<td>Severity</td>
<td>Severity</td>
</tr>
<tr>
<td>16. How serious a health problem would having cancer be for you?</td>
<td>Severity</td>
<td>Severity</td>
</tr>
<tr>
<td>17. Overall, how helpful are doctors when you are ill?</td>
<td>Benefit</td>
<td>Benefit of Medical Care</td>
</tr>
<tr>
<td>18. Overall, how effective do you think medical treatment is in preventing illness from the effects of high blood pressure?</td>
<td>Benefit</td>
<td>Benefit of Medical Care</td>
</tr>
<tr>
<td>19. More specifically, how effective do you think blood pressure medicines are in preventing illness from the effects of high blood pressure?</td>
<td>Benefit</td>
<td>Benefit of Medical Care</td>
</tr>
<tr>
<td>20. What about special diets?</td>
<td>Benefit</td>
<td>Benefit of Medical Care</td>
</tr>
<tr>
<td>21. What about exercise programs for high blood pressure?</td>
<td>Benefit</td>
<td>Benefit of Medical Care</td>
</tr>
<tr>
<td>22. How important do you think controlling high blood pressure is?</td>
<td>Benefit</td>
<td>Benefit of Medical Care</td>
</tr>
<tr>
<td>23. Overall, how easy or difficult is it to get medical care when you want it?</td>
<td>Barrier</td>
<td>Benefit of Medical Care</td>
</tr>
<tr>
<td>24. …eating a balanced diet?</td>
<td>Benefit</td>
<td>Self-help Benefit</td>
</tr>
<tr>
<td>25. …getting regular physical activity?</td>
<td>Benefit</td>
<td>Self-help Benefit</td>
</tr>
<tr>
<td>26. …being at the ideal weight for a person’s height?</td>
<td>Benefit</td>
<td>Self-help Benefit</td>
</tr>
<tr>
<td>27. …avoiding getting tense and anxious?</td>
<td>Benefit</td>
<td>Self-help Benefit</td>
</tr>
<tr>
<td>28. …getting regular medical checkups?</td>
<td>Benefit</td>
<td>Self-help Benefit</td>
</tr>
<tr>
<td>Question</td>
<td>Benefit</td>
<td>Self-help</td>
</tr>
<tr>
<td>----------------------------------------------------</td>
<td>---------</td>
<td>-----------</td>
</tr>
<tr>
<td>29. …getting the right amount of sleep?</td>
<td>Benefit</td>
<td>Self-help</td>
</tr>
<tr>
<td>30. …avoiding cigarettes?</td>
<td>Benefit</td>
<td>Self-help</td>
</tr>
<tr>
<td>31. …avoiding alcohol?</td>
<td>Benefit</td>
<td>Self-help</td>
</tr>
<tr>
<td>32. …leading a spiritually good life?</td>
<td>Benefit</td>
<td>Self-help</td>
</tr>
</tbody>
</table>

*Alternative questionnaire item for respondents reporting a history of high blood pressure.*
Appendix D

Health Belief Model Questionnaire:
Perceived Severity Subscale Items Adapted for Cardiovascular Disease
Appendix D

Health Belief Model Questionnaire:
Perceived Severity Subscale Items Adapted for Cardiovascular Disease

[Note: All instruments will be adapted for online presentation via Zoomerang.]

DIRECTIONS: Please respond to each item as accurately as possible. Indicate your perceived likelihood of getting the specified condition. Select one of the following:

Not Likely
Somewhat Likely
Likely
Very Likely

1. Compared to other people your age, when you do get sick, would you say you get much more sick, more sick, as sick, less sick, or much less sick?

2. How likely is it that you will have cardiovascular disease in the future?

3. How likely is it that you will have cancer in the future?

DIRECTIONS: Please respond to each item as accurately as possible. Indicate your perceived seriousness of getting the specified condition. Select one of the following:

Not Serious
Somewhat Serious
Serious
Very Serious

4. How serious a health problem would high blood pressure be for you?

5. How serious a health problem do you think high blood pressure will be for you in the future?

6. How serious a health problem would diabetes be for you?

7. How serious a health problem do you think diabetes will be for you in the future?

8. How serious a health problem would overweight/obesity be for you?

9. How serious a health problem do you think overweight/obesity will be for you in the future?
10. How serious a health problem would low HDL be for you?

11. How serious a health problem do you think low HDL will be for you in the future?

12. How serious a health problem would high LDL be for you?

13. How serious a health problem do you think high LDL will be for you in the future?

14. How serious a health problem would having a heart attack be for you?
Appendix E

Health Belief Model Questionnaire:
Perceived Susceptibility Subscale Adapted for Cardiovascular Disease
Appendix E

Health Belief Model Questionnaire:
Perceived Susceptibility Subscale Adapted for Cardiovascular Disease

DIRECTIONS: Please respond to this item as accurately as possible. Select one of the following:

1. Compared to other people your age, would you say that you get sick
   Much Less Often
   Less Often
   As Often
   More Often
   Much More Often

DIRECTIONS: Please respond to each item as accurately as possible. Select one of the following for each of the items:

   Not At All Likely
   Not Likely
   Likely
   Somewhat Likely
   Very Likely

2. How likely do you think it is that you will get cardiovascular disease sometime in your life?

3. One year from now, how likely do you think it is that you will have CVD?

4. How likely do you think it is that you will get high blood pressure sometime in your life?

5. One year from now, how likely do you think it is that you will have elevated blood pressure levels where your pressure is not in good control?

6. How likely do you think it is that you will get diabetes sometime in your life?

7. One year from now, how likely do you think it is that you will have blood glucose levels where your diabetes is not in good control?

8. How likely do you think it is that you will get overweight/obese sometime in your life?
9. One year from now, how likely do you think it is that you will have weight gain where your overweight/obesity is not in good control?

10. How likely do you think it is that you will get low HDL sometime in your life?

11. One year from now, how likely do you think it is that you will have low HDL levels where your HDL is not in good control?

12. How likely do you think it is that you will get high LDL sometime in your life?

13. One year from now, how likely do you think it is that you will have high LDL levels where your LDL is not in good control?

14. How likely is it that you will have a heart attack in the future?
Appendix F

Demographics Questionnaire
Appendix F

Demographics Questionnaire

Instructions: Please answer the following questions by clicking on the response or typing in your answer.

1. Age: ______ years
2. Which of the following categories best describe your race?
   a. Asian/Pacific Islander
   b. Black African American
   c. Black
   d. Caucasian/White
   e. Hispanic
   f. Indigenous or Aboriginal
   g. Latino
   h. Middle Eastern
   i. Multiracial
   j. Other: ___________
3. What is your primary language?
   a. English
   b. Spanish
   c. Other: ___________
4. Where do you live right now?
   a. In a metropolitan area
   b. In a city
   c. In a suburb
   d. In a rural area
   e. Other
5. What is your religion?
   a. Catholic
   b. Islam
   c. Jewish
   d. Protestant
   e. None
   f. Other: ___________
6. What was your entry level for your RN education?
   a. Associate Degree
   b. Diploma
   c. Bachelor Degree
   d. Other. Please indicate: __________________
7. What is your highest level of formal education?
   a. No other formal education
   b. Associate Degree
   c. Bachelor’s Degree in Nursing
d. Bachelor’s Degree in other discipline  
e. Master’s Degree in Nursing  
f. Master’s Degree in other discipline  
g. Doctorate in Nursing Practice (DNP)  
h. PhD in Nursing  
i. PhD in other discipline  
j. Other. Please indicate: ____________________

8. How many years have you been a RN? ________ years
9. What is your position?  
   a. Staff nurse  
   b. Nurse educator  
   c. Clinical nurse specialist  
   d. Nurse manager  
   e. Nurse supervisor  
   f. Nurse executive  
   g. Other: Please indicate: ____________________
10. What is your nursing specialty? Choose all that apply.  
   a. Medical/surgical  
   b. Oncology  
   c. Critical care  
   d. Orthopedics  
   e. Cardiology  
   f. OR  
   g. ER  
   h. OB  
   i. Psych/mental health  
   j. Geriatrics  
   k. Pediatrics  
   l. Other: ____________
11. Where are you employed? Select all that apply.  
   a. Atlanta Medical Hospital  
   b. Emory Healthcare System  
   c. Grady Memorial Healthcare  
   d. Piedmont Hospital  
   e. Saint Joseph’s Hospital  
   f. Other: ____________
12. If you work at more than one hospital, select your primary employer.  
   a. Atlanta Medical Hospital  
   b. Emory Healthcare System  
   c. Grady Memorial Healthcare  
   d. Piedmont Hospital  
   e. Saint Joseph’s Hospital  
   f. Other: ____________
13. About how many hours per week do you work (total hours at all workplaces)? ______ hours
14. What is your personal annual income, before taxes?
   a. $10,000 to $24,999
   b. $25,000 to $49,999
   c. $50,000 to $74,999
   d. $75,000 to $99,999
   e. $100,000 to $125,000
   f. Over $125,000

15. What is your total household income, including all earners in your household?
   a. $10,000 to $24,999
   b. $25,000 to $49,999
   c. $50,000 to $74,999
   d. $75,000 to $99,999
   e. $100,000 to $125,000
   f. Over $125,000

16. What is your current marital status?
   a. Never Married
   b. Married
   c. Divorced
   d. Separated
   e. Widowed
   f. Living with someone
   g. Other. Please indicate: ____________________

17. Other than you, how many people live in your household who are financially dependent upon you? ______ persons

18. How do you feel about being a nurse?
   a. I do not like being a nurse and am planning on changing professions.
   b. I do not like being a nurse most of the time.
   c. I like being a nurse.
   d. I like being a nurse most of the time.
   e. I like being a nurse and would not want to change my profession.

19. How stressful would you say your job is?
   a. Not at all stressful
   b. Slightly stressful
   c. Somewhat stressful
   d. Stressful
   e. Very stressful

Personal Health Practices

The following questions relate to personal health patterns or habits. Please select your response to each question.

20. Do you smoke cigarettes?
   a. No
   b. Yes
20a. Did you ever smoke?
   a. No
   b. Yes

20b. If “yes”, how long did you smoke? _______ years

21. Do you take any of the following drugs (check all that apply)? If yes, please indicate how often.

<table>
<thead>
<tr>
<th>Drug</th>
<th>None</th>
<th>Less than 2 times/week</th>
<th>2-4 times a week</th>
<th>Weekly</th>
<th>Daily</th>
<th>Amount (e.g. number of drinks, times, etc.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caffeine</td>
<td></td>
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</tr>
<tr>
<td>Alcohol</td>
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<tr>
<td>Marijuana</td>
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<tr>
<td>Barbiturates</td>
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<tr>
<td>Sedatives</td>
<td></td>
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<td></td>
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<tr>
<td>Oxycodone</td>
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<tr>
<td>Cocaine/crack</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Amphetamines</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Heroin</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Opiates</td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Hallucinogens</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecstasy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other: Please indicate:</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

22. When did you have your last physical exam?
   a. Less than 12 months ago
   b. Within the last 12 months
   c. More than 12 months ago
   d. More than 2 years ago
   e. Other. Please indicate: ____________

23. How many hours of sleep do you get on the average each night?
   a. Less than 6
   b. About 8
   c. About 9 to 10
   d. Other. Please indicate ____________

Please answer only 1 of the next two questions. If you lost weight in the last two years, please answer #24; if you gained weight in the last two years please answer #25.
24. During the past 2 years, how much weight did you lose (excluding illness and pregnancy)?
   a. No change
   b. 2-4 lbs.
   c. 5-9 lbs.
   d. 10-14 lbs.
   e. 15-29 lbs.
   f. 30-49 lbs.
   g. 50+ lbs.

25. During the past 2 years, how much weight did you gain (excluding illness and pregnancy)?
   a. No change
   b. 2-4 lbs.
   c. 5-9 lbs.
   d. 10-14 lbs.
   e. 15-29 lbs.
   f. 30-49 lbs.
   g. 50+ lbs.

26. Have you ever been told by your primary care provider (PCP) that you have any of the following?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Weight</th>
<th>Hypertension</th>
<th>Diabetes</th>
<th>High LDL</th>
<th>Low HDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Under weight</td>
<td>Normal weight</td>
<td>Overweight</td>
<td>Obese</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>Low B/P</td>
<td>Normal B/P</td>
<td>Pre-HTN</td>
<td>HTN</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>Low Blood Glucose</td>
<td>Normal Blood Glucose</td>
<td>Pre-diabetes</td>
<td>Diabetes</td>
<td></td>
</tr>
<tr>
<td>High LDL</td>
<td>Normal</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low HDL</td>
<td>Normal</td>
<td>High</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27. Have you ever diagnosed yourself with any of the following and have not confirmed with your PCP?

<table>
<thead>
<tr>
<th>Condition</th>
<th>Weight</th>
<th>Hypertension</th>
<th>Diabetes</th>
<th>High LDL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Under weight</td>
<td>Normal weight</td>
<td>Overweight</td>
<td>Obese</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Low B/P</td>
<td>Normal B/P</td>
<td>Pre HTN</td>
<td>HTN</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Low BSL</td>
<td>Normal BSL</td>
<td>Pre diabetes</td>
<td>Diabetes</td>
</tr>
<tr>
<td>High LDL</td>
<td>Normal</td>
<td>High</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
28. For each condition, please click on the category that best describes your condition; then indicate the number of medications you take to manage that condition. When answering, please reflect on your most recent fasting blood glucose, hemoglobin A1c, etc. [If you do not know your BMI, click link BMI http://www.quitehealthy.com/bmi-calculator/index.php .]

<table>
<thead>
<tr>
<th>Condition</th>
<th>Select one answer from each category.</th>
<th>Number of Medications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>BMI &lt; 18.5</td>
<td>BMI 18.5-24.9</td>
</tr>
<tr>
<td></td>
<td>Under weight</td>
<td>Normal weight</td>
</tr>
<tr>
<td>Blood Pressure</td>
<td>Low B/P</td>
<td>Normal B/P</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Low Blood Glucose</td>
<td>Normal Blood Glucose</td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td>&lt; 6 %</td>
<td>6-7 %</td>
</tr>
<tr>
<td>LDL</td>
<td>&lt; 100 mg/dL (Optimal)</td>
<td>130-159 mg/dL (Borderline High)</td>
</tr>
<tr>
<td>HDL</td>
<td>&lt; 40 mg/dL (Low)</td>
<td>40-59 (Medium)</td>
</tr>
</tbody>
</table>
29. If you currently take medication for any of the following, are your levels controlled as listed in the normal ranges presented below.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Controlled with Meds</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>BMI 18.5-24.9</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>&lt; 120/80 mm/ Hg</td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td>80-100 mg/dL</td>
<td></td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td>&lt; 7 %</td>
<td></td>
</tr>
<tr>
<td>LDL</td>
<td>&lt; 100 mg/dL</td>
<td></td>
</tr>
<tr>
<td>HDL</td>
<td>&gt; 40 mg/dL</td>
<td></td>
</tr>
</tbody>
</table>

30. Do you have a family history of any of the following?

<table>
<thead>
<tr>
<th>Condition</th>
<th>No</th>
<th>Yes</th>
<th>Don’t Know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obesity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemoglobin A1c</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 or &gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High LDL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low HDL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atherosclerosis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heart Attack</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

31. If you are taking medication/s, is your blood pressure controlled at 120/80 or less?
   a. Never
   b. Some of the time
   c. Most of the time
   d. All of the time
32. How would you describe yourself in relation to menopause?
   a. Premenopause
   b. Perimenopause
   c. Postmenopause
   d. Don’t know
33. If postmenopausal, do you take hormone replacement therapy?
   a. No
   b. Yes
34. Do you have any of the following conditions? Click on all that apply.
   a. HIV/AIDS
   b. Alcoholism
   c. Allergies
   d. Arthritis
   e. Asthma
   f. Blood clots
   g. Cancer
   h. Chronic fatigue syndrome
   i. Eating disorder
   j. Gall stones
   k. Kidney problems
   l. Joint pains
   m. Migraines
   n. Peptic ulcer disease
   o. Shortness of breath with minimal exertion
   p. Sleep apnea
   q. Stroke
   r. Other: Specify____________
35. Please share any other information that you would like us to know about your health.
Appendix G

Multidimensional Scale of Perceived Social Support
Appendix G

Multidimensional Scale of Perceived Social Support

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

Circle the “1” if you **Very Strongly Disagree**  
Circle the “2” if you **Strongly Disagree**  
Circle the “3” if you **Mildly Disagree**  
Circle the “4” if you are **Neutral**  
Circle the “5” if you **Mildly Agree**  
Circle the “6” if you **Strongly Agree**  
Circle the “7” if you **Very Strongly Agree**

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. There is a special person who is around when I am in need.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>2. There is a special person with whom I can share my joys and sorrows.</td>
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<td></td>
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<tr>
<td>3. My family really tries to help me.</td>
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<tr>
<td>4. I get the emotional help and support I need from my family.</td>
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</tr>
<tr>
<td>5. I have a special person who is a real source of comfort to me.</td>
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<tr>
<td>6. My friends really try to help me.</td>
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</tr>
<tr>
<td>7. I can count on my friends when things go wrong.</td>
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<tr>
<td>8. I can talk about my problems with my family.</td>
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<tr>
<td>9. I have friends with whom I can share my joys and sorrows.</td>
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<tr>
<td>10. There is a special person in my life who cares about my feelings.</td>
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<tr>
<td>11. My family is willing to help me make decisions.</td>
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</tr>
<tr>
<td>12. I can talk about my problems with my friends.</td>
<td></td>
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</tr>
</tbody>
</table>

**Multidimensional Scale of Perceived Social Support** (Zimet, Dahlem, Zimet & Farley, 1988)
Appendix H

Center for Epidemiological Studies Depression Scale
Appendix H

Center for Epidemiological Studies Depression Scale

Below is a list of some ways you may have felt or behaved. Please indicate how often you have felt this way **during the last week** by clicking the appropriate answer. Please only provide one answer to each question.

**Rarely** or none of the time (less than 1 day)
**Some** or a little of the time (1-2 days)
**Occasionally** or a moderate amount of time (3-4 days)
**Most** or all of the time (5-7 days)

1. I was bothered by things that usually don't bother me.
2. I did not feel like eating; my appetite was poor.
3. I felt that I could not shake off the blues even with help from my family or friends.
4. I felt I was just as good as other people.
5. I had trouble keeping my mind on what I was doing.
6. I felt depressed.
7. I felt that everything I did was an effort.
8. I felt hopeful about the future.
9. I thought my life had been a failure.
10. I felt fearful.
11. My sleep was restless.
12. I was happy.
13. I talked less than usual.
15. People were unfriendly.
16. I enjoyed life.
17. I had crying spells.
18. I felt sad.
19. I felt that people disliked me.
20. I could not get going.
Appendix I

Perceived Stress Scale
Appendix I

Perceived Stress Scale

Instructions: The questions in this scale ask you about your feelings and thoughts during the last month. In each case, please click how often you felt or thought a certain way.

0 = Never
1 = Almost never
2 = Sometimes
3 = Fairly often
4 = Very often

1. In the last month, how often have you been upset because of something that happened unexpectedly?

2. In the last month, how often have you felt that you were unable to control the important things in your life?

3. In the last month, how often have you felt nervous and "stressed"?

4. In the last month, how often have you felt confident about your ability to handle your personal problems?

5. In the last month, how often have you felt that things were going your way?

6. In the last month, how often have you found that you could not cope with all the things that you had to do?

7. In the last month, how often have you been able to control irritations in your life?

8. In the last month, how often have you felt that you were on top of things?

9. In the last month, how often have you been angered because of things that were outside of your control?

10. In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?
Appendix J

Health Promoting Lifestyle Profile II
Appendix J

Health Promoting Lifestyle Profile II

DIRECTIONS: This questionnaire contains statements about your present way of life or personal habits. Please respond to each item as accurately as possible. Indicate the frequency with which you engage in each behavior by selecting one of the following:

NEVER
SOMETIMES
OFTEN
ROUTINELY

1. Discuss my problems and concerns with people close to me.
2. Choose a diet low in fat, saturated fat, and cholesterol.
3. Report any unusual signs or symptoms to a physician or other health professional.
4. Follow a planned exercise program.
5. Get enough sleep.
6. Feel I am growing and changing in positive ways.
7. Praise other people easily for their achievements.
8. Limit use of sugars and food containing sugar (sweets).
9. Read or watch TV programs about improving health.
10. Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).
11. Take some time for relaxation each day.
12. Believe that my life has purpose.
13. Maintain meaningful and fulfilling relationships with others.
14. Eat 6-11 servings of bread, cereal, rice and pasta each day.
15. Question health professionals in order to understand their instructions.
16. Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).
17. Accept those things in my life which I cannot change.
18. Look forward to the future.
19. Spend time with close friends.
20. Eat 2-4 servings of fruit each day.
21. Get a second opinion when I question my health care provider’s advice.
22. Take part in leisure-time (recreational) physical activities (such as swimming, dancing, bicycling).
23. Concentrate on pleasant thoughts at bedtime.
24. Feel content and at peace with myself.
25. Find it easy to show concern, love and warmth to others.
26. Eat 3-5 servings of vegetables each day.
27. Discuss my health concerns with health professionals.
28. Do stretching exercises at least 3 times per week.
29. Use specific methods to control my stress.
30. Work toward long-term goals in my life.
31. Touch and am touched by people I care about.
32. Eat 2-3 servings of milk, yogurt or cheese each day.
33. Inspect my body at least monthly for physical changes/danger signs.
34. Get exercise during usual daily activities (such as walking during lunch, using stairs instead of elevators, parking car away from destination and walking).
35. Balance time between work and play.
36. Find each day interesting and challenging.
37. Find ways to meet my needs for intimacy.
38. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.
39. Ask for information from health professionals about how to take good care of myself.
40. Check my pulse rate when exercising.
41. Practice relaxation or meditation for 15-20 minutes daily.
42. Am aware of what is important to me in life.
43. Get support from a network of caring people.
44. Read labels to identify nutrients, fats, and sodium content in packaged food.
45. Attend educational programs on personal health care.
46. Reach my target heart rate when exercising.
47. Pace myself to prevent tiredness.
48. Fell connected with some force greater than myself.
49. Settle conflicts with others through discussion and compromise.
50. Eat breakfast.
51. Seek guidance or counseling when necessary.
52. Expose myself to new experiences and challenges.

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For information about this scale go to www.unmc.edu/nursing/.
Appendix K

HPLP-II Nutrition Subscale
Appendix K

HPLP-II Nutrition Subscale

DIRECTIONS: This questionnaire contains statements about your present way of life or personal habits about nutrition. Please respond to each item as accurately as possible. Indicate the frequency with which you engage in each behavior by selecting one of the following:

NEVER
SOMETIMES
OFTEN
ROUTINELY

1. Choose a diet low in fat, saturated fat, and cholesterol.
2. Limit use of sugars and food containing sugar (sweets).
3. Eat 6-11 servings of bread, cereal, rice and pasta each day.
4. Eat 2-4 servings of fruit each day.
5. Eat 3-5 servings of vegetables each day.
6. Eat 2-3 servings of milk, yogurt or cheese each day.
7. Eat only 2-3 servings from the meat, poultry, fish, dried beans, eggs, and nuts group each day.
8. Eat breakfast.
Appendix L

HPLP-II Exercise Subscale
Appendix L

HPLP-II Exercise Subscale

DIRECTIONS: This questionnaire contains statements about your present way of life or personal habits about exercise. Please respond to each item as accurately as possible. Indicate the frequency with which you engage in each behavior by selecting one of the following:

NEVER
SOMETIMES
OFTEN
ROUTINELY

1. Exercise vigorously for 20 or more minutes at least three times a week (such as brisk walking, bicycling, aerobic dancing, using a stair climber).
2. Take part in light to moderate physical activity (such as sustained walking 30-40 minutes 5 or more times a week).
3. Do stretching exercises at least 3 times per week.
4. Check my pulse rate when exercising.
5. Reach my target heart rate when exercising.
Appendix M

MEDFICTS Dietary Assessment Questionnaire
Appendix M
MEDFICTS Dietary Assessment Questionnaire

Client Name: ____________________________
Last Name, First Name

Date: ____________________________

To fill out the MEDFICTS nutrition questionnaire, you will make two check marks for each row. Check one of the blank boxes under the “weekly consumption” category indicating how often per week you eat those foods listed to the left. Then check one box under the “serving size” category indicating the typical serving size, or amount of that food you eat at a time. That’s all there is to it! Don’t worry about the scoring or anything else on the form, just hand it back to the people at the front desk.

<table>
<thead>
<tr>
<th>Food Category</th>
<th>Weekly Consumption</th>
<th>Serving Size</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rarely/Never</td>
<td>3 or less</td>
<td>4 or more</td>
</tr>
</tbody>
</table>

Meats:
- Recommended amount per day: 1/2 oz (equal in size to 2 decks of playing cards)
- Base your estimate on the food you consume most often
- Beef and lamb selections are trimmed to 1/8" fat

Group 1: 110g of more total fat in 3oz cooked portion
- Beef – Ground beef, ribs, steak (T-bone, flank, porterhouse, tenderloin), chuck roast, brisket, meatloaf (with ground beef), corned beef
- Processed meats – ¼ lb burger or hot, sandwich, bacon, lunch meat, sausage/knockwurst, hot dogs, ham (bone-in), ground turkey
- Other meats, poultry, seafood – pork chops (center loin), pork roast (blade, Boston, sirloin), pork spare ribs, ground pork, lamb chops, lamb (ribs), organ meats, chicken skin, eel, mackerel, pompano

<table>
<thead>
<tr>
<th></th>
<th>Weekly Consumption</th>
<th>Serving Size</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rarely/Never (X)</td>
<td>3 pts</td>
<td>7 pts</td>
</tr>
</tbody>
</table>

Group 2: Less than 10 g total fat in 3oz cooked portion
- Lean Beef – Round steak (eye of round, top round), sirloin, tip & bottom round, chuck arm pot roast, top loin
- Low fat processed meats – Low fat lunch meat, Canadian bacon, “lean” fast food sandwich, boneless ham
- Other meats, poultry, seafood – chicken, turkey (without skin), most seafood, lamb leg Shank, pork tenderloin, sirloin top loin, veal cutlets, sirloin, shoulder, ground veal, venison, veal chops and ribs, lamb (shoulder, leg, loin, fore-shank, sirloin)

<table>
<thead>
<tr>
<th></th>
<th>Weekly Consumption</th>
<th>Serving Size</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rarely/Never (x)</td>
<td>n/a</td>
<td>n/a</td>
</tr>
</tbody>
</table>

Eggs – Weekly consumption is the number of times you eat eggs each week.

Check the number of eggs eaten each time.

<table>
<thead>
<tr>
<th></th>
<th>Weekly Consumption</th>
<th>Serving Size</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rarely/never</td>
<td>1 egg</td>
<td>2 eggs</td>
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</table>

Group 1: whole eggs, yolks

<table>
<thead>
<tr>
<th></th>
<th>Weekly Consumption</th>
<th>Serving Size</th>
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<tbody>
<tr>
<td></td>
<td>0 pts</td>
<td>3 pts</td>
<td>7 pts</td>
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</table>

Group 2: Egg whites, Egg substitutes (1/2 cup)

Dairy
### Milk — Average serving 1 cup

| Group 1: Whole milk, 2% milk, 2% buttermilk, Yogurt (whole milk) | 0 pts | 3 pts | 7 pts | X | 1 pt | 2 pts | 3 pts |
| Group 2: Fat-free milk, 1% milk, Fat-free buttermilk, Yogurt (Fat-free, 1% low fat) |   |   |   |   | X |   |   |

### Cheese — Average serving 1 oz.

| Group 1: Cream cheese, cheddar, Monterey Jack, Colby, Swiss, American processed, blue cheese, Regular cottage cheese (1/2 Cup), and Ricotta (1/4 cup) |   |   |   |   |   |   |   |
| Group 2: Low-fat and fat-free cheeses, fat-free milk mozzarella, string cheese, low-fat, fat-free milk, and fat-free cottage cheese (1/2 cup) and ricotta (1/4 cup) |   |   |   |   |   |   | X |

### Frozen Desserts — Average serving 1/4 cup

| Group 1: Ice cream, milk shakes | 0 pts | 3 pts | 7 pts | X | 1 pt | 2 pts | 3 pts |
| Group 2: Low-fat ice cream, frozen yogurt |   |   |   |   | X |   |   |

### Frying foods — Average servings: see below. This section refers to method of preparation for vegetables and meat.

| Group 1: French fries, fried vegetables (1/2 cup), fried chicken, fish, meat (3 oz) | 0 pts | 3 pts | 7 pts | X | 1 pt | 2 pts | 3 pts |
| Group 2: Vegetables not deep fried (1/2 cup), meat, Poultry, or fish — prepared by boiling, broiling, grilling, poaching, roasting, stewing; (3 oz) |   |   |   |   | X |   |   |

### In Baked Goods — 1 Average Serving

| Group 1: Doughnuts, biscuits, butter rolls, muffins, croissants, sweet rolls, Danish, cakes, pies, coffee cakes, cookies | 0 pts | 3 pts | 7 pts | X | 1 pt | 2 pts | 3 pts |
| Group 2: Fruit bars, low-fat cookies/cakes/pastries, angel food cake, homemade baked goods with vegetable oils, breads, bagels |   |   |   |   | X |   |   |

### Convenience Foods

| Group 1: Canned, packaged, or Frozen dinners: e.g., Pizza (1 slice),Macaroni & cheese, (1 cup), Pot pie (1), Cream soups (1 cup), Potato, rice & pasta dishes with cream/cheese sauces (1/2 cup) | 0 pts | 3 pts | 7 pts | X | 1 pt | 2 pts | 3 pts |
| Group 2: Reduced calorie or reduced fat dinners (1), Potato, rice & pasta dishes without cream/cheese sauces (1/2 cup). |   |   |   |   |   |   | X |

### Table Fats — Average serving 1 tbsp

| Group 1: butter, stick margarine, regular salad dressing, mayonnaise, sour cream (2 Tbsp) | 0 pts | 3 pts | 7 pts | X | 1 pt | 2 pts | 3 pts |
### Group 2: Diet and tub margarine, low-fat and fat-free salad dressing, low-fat and fat-free mayonnaise

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### Snacks

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<tr>
<th>Group 1: Chips, potato, corn, taco, cheese puffs, snack mix, nuts (1 oz), regular crackers (1/2 oz), candy (milk chocolate, caramel, coconut) about 1 1/5 oz, regular popcorn (3 cups).</th>
<th>9 pts</th>
<th>3 pts</th>
<th>7 pts</th>
<th>X</th>
<th>1 pt</th>
<th>2 pts</th>
<th>3 pts</th>
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<tbody>
<tr>
<td>Group 2: Pretzels, fat-free chips (1 oz), low-fat crackers (1/2 oz), fruit rolls, licorice, hard candy (1 med piece), bread sticks (1-2 pts), Air-popped or low-fat pop corn (3 cups)</td>
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<td>X</td>
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</tbody>
</table>

*MEDFICTS = Meats, Eggs, Dairy, Frying Foods, In baked goods, Convenience foods, Table fats, Snacks*

The Campus Recreation Department Fitness & Wellness Program MEDFICTS Dietary Assessment Questionnaire
Contact: jonesdm3@sfasu.edu Office: 468-5835
Appendix N

Informed Consent Information
Appendix N
Informed Consent Information

Georgia State University
College of Health and Human Sciences
Informed Consent

Title: Perceived Susceptibility and Perceived Severity of Cardiovascular Disease and Cardiovascular Health Promoting Behaviors Among Female Registered Nurses

Principal Investigator: Dr. Cecelia Grindel, PI
Deborah A. McClendon, student PI

I. Purpose:

The participant will receive an invitation to participate in the research study. Inclusion criteria will be: Registered Nurses who work at one of five acute care hospital systems in the Metropolitan Atlanta area, are currently licensed to practice as a Registered Nurse (RN) in the State of Georgia, have worked as a RN in Georgia for at least six months, are 18 years old or older, and currently work at least 16 hours per week in one of five hospitals. The purpose of this study is to examine whether or not the relationship between health beliefs related to perceived cardiovascular disease (CVD) severity and health promoting behaviors is moderated in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility. In this study, we will examine the perceptions of RNs about CVD and whether or not there is a difference in health promoting behaviors in RNs who think they are highly likely to develop CVD versus those who think they are not likely to develop CVD.

II. Procedures:

If the decision is made to participate, the participant will be asked to click on a specified link to the study surveys. The participant will then be provided additional information about the study and directions on accessing the surveys. A total of approximately 500 participants from five Metropolitan area acute care healthcare systems will be recruited for this study. Completion time will require 45 to 60 minutes of your time. The survey will be available until August 15th, 2009. For participation, RNs at each site will have an opportunity to receive a $100 gift certificate; 10 $100 gift certificates will be purchased.

III. Risks:

In this study, the participant will not have any more risks than in a normal day of life. However, it is possible that some of the questions in this study may make participants more aware of current health issues and potential ones. The questions asked are not a part of a medical examination nor are they used as an attempt to make a diagnosis about health.
IV. Benefits:

Participation in this study may be of personal benefit. The participant may become more aware of health issues. Participation will present healthcare providers with a better understanding of women’s perceptions of CVD and what kinds of factors influence women’s likelihood to participate in CVD health-promoting behaviors. Overall, we hope to gain information about women and CVD.

V. Voluntary Participation and Withdrawal:

Participation in research is voluntary. It is not mandatory to be in this study. The participant has the right to drop out of this study at any time without penalty or maltreatment from the researcher or hospital. Participants will not lose any benefits to which they are otherwise entitled.

VI. Confidentiality:

Participants’ records will be kept private to the extent allowed by law. Name will not be on study records. Only Zoomerang personnel and the researcher will have access to the information provided. All questionnaire results are anonymous, and names will not appear anywhere on the document. As with all electronic surveys, there is a slight risk of loss of confidentiality when data are downloaded from the survey site. Data will be stored under security provisions of Georgia State University and firewall-protected computers. Name and other facts that might point to the participant will not appear when the study is presented or results published. The findings will be summarized and reported in group form.

VII.

Contact Persons: If questions about this study should arise, contact the following: Deborah McClendon, student PI, (deborah.mcclendon@emoryhealthcare.org; 404-686-2262) or Cecelia Gatson Grindel, PhD, RN, FAAN (cgrindel@gsu.edu, 404-413-1167). If there are questions or concerns about rights as a participant in this research study, contact Susan Vogtner in the Office of Research Integrity at 404-413-3513 or svogtner1@gsu.edu.

VIII. Copy of Consent Form to Subject:

A copy of this consent form may be obtained by clicking “Informed Consent”. Completion of the survey will indicate consent to participate in this research.
Appendix O

IRB GSU Approval Letters
Georgia State University
Department of Health and Human Sciences
Informed Consent: Phase 1

Title: Perceived Susceptibility and Perceived Severity of Cardiovascular Disease and Cardiovascular Health Promoting Behaviors Among Female Registered Nurses

Principal Investigator: Dr. Cecelia Grindel, PI
Deborah A. McClendon, student PI

I. Purpose:

You are invited to participate in a research study because you are a nurse working in the greater Atlanta area. The purpose of this study is to examine whether or not the relationship between health beliefs related to perceived cardiovascular disease (CVD) severity and health promoting behaviors is moderated in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility. In this study, we will examine the perceptions of RNs about CVD and whether or not there is a difference in health promoting behaviors in RNs who think they are highly likely to develop CVD versus those who think they are not likely to develop CVD. You are invited to participate because you are a RN who works at one of five acute care hospital systems in the Metropolitan Atlanta area, are currently licensed to practice as a RN in the State of Georgia, have worked as a RN in Georgia for at least six months, are 18 years old or older, and currently work at least 16 hours per week in one of five hospitals. A total of 20 participants will be recruited for this study. Participation will require approximately 45 minutes of your time.

II. Procedures:

If you decide to participate, you will be asked to click on a specified link to the study’s survey. You will then be provided additional information about the study and directions on accessing the survey. You will be asked to complete questions regarding your perceptions of your risk for cardiovascular disease, exercise and nutrition patterns, your health status, and medications you take to manage your health. A total of approximately 20 participants from five Metropolitan area acute care healthcare systems will be recruited for this study. Completion time will require approximately 45 minutes of your time.

III. Risks:

In this study, you will not have any more risks than you would in a normal day of life. However, it is possible that some of the questions in this study may make you more aware of current and potential health issues. The questions asked are not a part of a medical examination nor are they used as an attempt to make a diagnosis about your health.

IV. Benefits:

Participation in this study may benefit you personally. You may become more aware of health issues. Participation will present healthcare providers with a better understanding of women’s perceptions of CVD and what kinds of factors influence women’s likelihood to participate in CVD.

CONSENT FORM APPROVED by Georgia State University IRB November 24, 2009 - November 23, 2010
health promoting behaviors. Overall, we hope to gain information about women and CVD.

V. **Voluntary Participation and Withdrawal:**

Participation in research is voluntary. You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time without penalty or maltreatment from the researcher or hospital. You may skip questions or stop participating at any time. Whatever you decide, you will not lose any benefits to which you are otherwise entitled.

VI. **Confidentiality:**

We will keep your records private to the extent allowed by law. Your name and e-mail address will not be on study records. Only Zoomerang personnel and the research team will have access to the information you provide. All questionnaire results are anonymous, and names will not appear anywhere on the document. Information may also be shared with those who make sure the study is done correctly (GSU Institutional Review Board and the Office for Human Research Protection (OHRP)). As with all electronic surveys, there is a slight risk of loss of confidentiality when data are downloaded from the survey site. The information you provide will be stored under security provisions of Georgia State University and firewall-protected computers. Your name and other facts that might point to you will not appear when we present this study or publish its results. The findings will be summarized and reported in group form. You will not be identified personally.

VII. **Contact Persons:**

For questions about this study contact Deborah McClendon, student PI, at deborah.mcclendon@emoryhealthcare.org or 404-686-2262 or Cecelia Gatson Grindel, PhD, faculty advisor, at cgrindel@gsu.edu, 404-413-1167. If you have questions or concerns about your rights as a participant in this research study, you may contact Susan Vogtner in the Office of Research Integrity at 404-413-3513 or svogtner1@gsu.edu.

VIII. **Copy of Consent Form to Subject:**

A copy of this consent form may be obtained by clicking the link below. Completion of the survey will indicate consent to participate in this research.

*Click here for
Copy of Consent Information.*

*Click here to begin
the survey.*

Consent Form Approved by Georgia State University IRB November 24, 2009 - November 23, 2010
Georgia State University  
Department of Health and Human Sciences  
Informed Consent: Phase 2

Title: Perceived Susceptibility and Perceived Severity of Cardiovascular Disease and Cardiovascular Health Promoting Behaviors Among Female Registered Nurses

Principal Investigator: Dr. Cecelia Grindel, PI  
Deborah A. McClendon, student PI

I. Purpose:

You are invited to participate in a research study because you are a nurse who works in the greater Atlanta area. The purpose of this study is to examine whether or not the relationship between health beliefs related to perceived cardiovascular disease (CVD) severity and health promoting behaviors is moderated in women with high self perception of CVD susceptibility versus women with low self perception of CVD susceptibility. In this study, we will examine the perceptions of RNs about CVD and whether or not there is a difference in health promoting behaviors in RNs who think they are highly likely to develop CVD versus those who think they are not likely to develop CVD. You are invited to participate because you are a RN who works at one of five acute care hospital systems in the Metropolitan Atlanta area, are currently licensed to practice as a RN in the State of Georgia, have worked as a RN in Georgia for at least six months, are 18 years old or older, and currently work at least 16 hours per week in one of five hospitals. A total of 500 participants will be recruited for this study. Participation will require approximately 45 minutes of your time.

II. Procedures:

If you decide to participate, you will be asked to click on a specified link to the study’s survey. You will then be provided additional information about the study and directions on accessing the survey. You will be asked to complete questions regarding your perceptions of your risk for cardiovascular disease, exercise and nutrition patterns, your health status, and medications you take to manage your health. A total of approximately 500 participants from five Metropolitan area acute care healthcare systems will be recruited for this study. Completion time will require approximately 45 minutes of your time.

III. Risks:

In this study, you will not have any more risks than you would in a normal day of life. However, it is possible that some of the questions in this study may make you more aware of current and potential health issues. The questions asked are not a part of a medical examination nor are they used as an attempt to make a diagnosis about your health.

IV. Benefits:

Consent Form Approved by Georgia State University IRB November 24, 2009 - November 23, 2010
Participation in this study may benefit you personally. You may become more aware of health issues. Participation will present healthcare providers with a better understanding of women’s perceptions of CVD and what kinds of factors influence women’s likelihood to participate in CVD health promoting behaviors. Overall, we hope to gain information about women and CVD.

V. Voluntary Participation and Withdrawal:

Participation in research is voluntary. You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time without penalty or maltreatment from the researcher or hospital. You may skip questions or stop participating at any time. Whatever you decide, you will not lose any benefits to which you are otherwise entitled.

VI. Confidentiality:

We will keep your records private to the extent allowed by law. Your name and e-mail address will not be on study records. Only Zoomerang personnel and the research team will have access to the information you provide. All questionnaire results are anonymous, and names will not appear anywhere on the document. Information may also be shared with those who make sure the study is done correctly (GSU Institutional Review Board and the Office for Human Research Protection (OHRP). As with all electronic surveys, there is a slight risk of loss of confidentiality when data are downloaded from the survey site. The information you provide will be stored under security provisions of Georgia State University and firewall-protected computers. Your name and other facts that might point to you will not appear when we present this study or publish its results. The findings will be summarized and reported in group form. You will not be identified personally.

VII. Contact Persons:

If you have questions about this study, please contact Deborah McClendon, student PI, at deborah.mcclendon@emoryhealthcare.org or 404-686-2262 or Cecelia Gatson Grindel, PhD, faculty advisor, at egrindel@gsu.edu, 404-413-1167. If you have questions or concerns about your rights as a participant in this research study, you may contact Susan Vogtner in the Office of Research Integrity at 404-413-3513 or svogtner1@gsu.edu.

VIII. Copy of Consent Form to Subject:

A copy of this consent form may be obtained by clicking the link below. Completion of the survey will indicate consent to participate in this research.

Click here for copy of consent information.

Click here to begin the survey.

[Consent Form Approved by Georgia State University IRB November 24, 2009 - November 23, 2010]
Appendix P

IRB Hospital Approval Letters
July 15, 2009

Cecelia Gaston Grindel, PhD, RN, CMSRN, FAAN
Associate Director for Graduate Nursing Programs
Georgia State University
Atlanta, GA

Deborah McClendon, PhDc, RN
Georgia State University
Atlanta, GA

Dear Dr. Grindel and Ms. McClendon,

I am writing to inform you of approval by the Emory Healthcare Nursing Research Council and Nursing Administration to conduct Deborah McClendon’s dissertation research project, Perceived Susceptibility and Perceived Severity of Cardiovascular Disease and Cardiovascular Health Promoting Behaviors Among Female Registered Nurses, at the Emory hospitals. Prior to implementing this study at Emory University Hospital, Emory University Hospital Midtown, Emory University Orthopedic and Spine Hospital, and Wesley Woods Hospital, please provide a copy of the Emory University IRB approval letter for filing with the Nursing Research Council.

Thank you for the opportunity to include Emory nurses in your study. Emory nursing is committed to advancing scientific knowledge related to nursing practice. At the completion of your study, we invite you to present your findings to the Emory Healthcare nursing staff.

If you need assistance with implementation of your research study at the Emory Hospitals, please contact Sharlene Toney, PhD, RN, Executive Director, Professional Nursing Practice for Emory Healthcare, at 404-686-3717 or by email at Sharlene.Toney@EmoryHealthcare.org.

Sincerely,

Susan M. Grant, MS, RN, NEA-BC
Chief Nursing Officer
Emory Healthcare
CONFIDENTIAL INSTITUTIONAL REVIEW BOARD CORRESPONDENCE FOR HUMAN SUBJECTS PROTECTION ACTIVITIES

DATE: February 24, 2010

TO: Deborah McClendon
FROM: Piedmont Healthcare Institutional Review Board

STUDY TITLE: [158080-1] Perceived Susceptibility and Perceived Severity of CVD and CV Health Promoting Behaviors Among Female Registered Nurses
IRB REFERENCE #: P10-08
SUBMISSION TYPE: New Project

ACTION: ACKNOWLEDGED
EFFECTIVE DATE: February 24, 2010

Thank you for submitting the New Project materials for the above research study. The Piedmont Healthcare Institutional Review Board has ACKNOWLEDGED your submission. No further action on submission 158080-1 is required at this time.

The following items are acknowledged in this submission:

Notice of project categorized as Piedmont-associated research per policy 6252

If you have any questions, please contact Jeffrey Rollins at (404) 605-3638 or jeff.rollins@piedmont.org. Please include your study title and reference number in all correspondence with this office.

Best regards,

Jeffrey Rollins, CIP, IRB Manager
Piedmont Healthcare Institutional Review Board

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within our records.
TO: Ursula Kelly  
Principal Investigator

CC: Hunt Lauric Office of Research  
McClendon Deborah EHM Medical Oncology-71

DATE: April 28, 2010

RE: Notification of Expedited Approval  
IRB0038736
Perceived Susceptibility and Perceived Severity of Cardiovascular Disease and  
Cardiovascular Health Promoting Behaviors Among Female Registered Nurses

This is your notification that your above referenced study was reviewed and APPROVED under the  
Expedited review process per 45 CFR 46.110F(7) and 21 CFR 56.110. The approval is valid from  
4/28/2010 until 4/27/2011. Thereafter, continued approval is contingent upon the submission of a  
continuing review request that must be reviewed and approved by the IRB prior to the expiration date  
of this study.

This study involves the VA; therefore, this protocol MUST receive final approval from the VA  
Research & Development Committee prior to commencing the VA portion of the study. For further  
information contact the VA Science Information Office at 404 728-4827.

A waiver of documentation of written consent has been granted.

Any reportable events (serious adverse events, breaches of confidentiality, protocol deviation or  
protocol violations) or issues resulting from this study should be reported immediately to the IRB  
and to the sponsoring agency (if any). Any amendments (changes to any portion of this research  
study including but not limited to protocol or informed consent changes) must have IRB approval  
before being implemented.

All correspondence and inquiries concerning this research study must include the IRB ID, the name  
of the Principal Investigator and the Study Title.

Sincerely,

Jim Henderson, MA, CIP  
Sr. Research Protocol Analyst  
VA-Emory IRB Liaison

This letter has been digitally signed
PI Name: McCLENDON, DEBORAH
C/O: TOOMER, LINDA
Organization: GSU
Department: PATIENT CARE QME
Office: (404) 616-5806
IRB#: H09-556
IRB Expires: 11/23/2010
ROC Expires: 11/23/2010

Protocol Title: Perceived susceptibility of cardiovascular disease as a moderator of relationships between perceived severity and cardiovascular health promoting behaviors among female registered nurses

Re: Research Protocol: NEW

The Grady Research Oversight Committee (ROC) has reviewed and APPROVED the documents submitted for your research protocol.

Please note the ROC Expiration date listed above. Thereafter, continued approval is contingent upon the submission of a renewal form that must be reviewed and approved by the ROC prior to the expiration date of this study.

Please note the clinical trial insurance plan code assigned to your study, IF APPLICABLE. You will need to use this code when registering patients for Grady services related to this research protocol.

Also, please notify the ROC when this proposal has been terminated or completed. All inquiries and correspondence concerning this protocol must include the IRB # and the name of the Principal Investigator. Any further reviews by the IRB pertaining to this proposal should be submitted to the ROC. This includes: Approved IRB Renewals, Modifications (Protocol, Informed Consent, Personnel, etc.) and any Adverse Events.

The committee would be interested in receiving the report of your research results and copies of any publications or presentations resulting from this research.

Sincerely,

Curtis A. Lewis, MD
Sr. Vice President and Chief of Staff
Chairman, Research Oversight Committee