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Women's Knowledge of Cardiovascular Risk Factors, Level of Self-Nurturance and Participation in Heart-Healthy Behaviors: A Dissertation

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Women's Knowledge of Cardiovascular Risk Factors, Level of

Self-Nurturance and Participation in

Heart-Healthy Behaviors.

A Dissertation Presented

by

Annette Jakubisin Konicki

Submitted to the Graduate School of Nursing
University of Massachusetts Worcester in partial fulfillment
of the requirements for the degree of

Doctor of Philosophy

Nursing

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"Women's Knowledge of Cardiovascular Risk Factors, Level of Self-Nurturance and Participation in Heart-Health Behavior"

A Dissertation Presented

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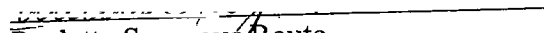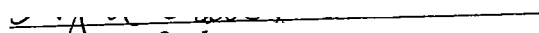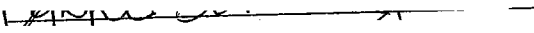
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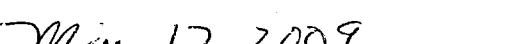
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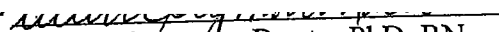
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Dedication

This work is dedicated to my wonderful husband, Lee and our two beautiful daughters, Lauren and Erin Mari, who have walked beside me and at times pushed me forward on this journey. Without their endless love, devotion, encouragement and support the completion of this would not have been possible.

Acknowledgements

Completion of this dissertation would not have been possible without the encouragement, patience and support of many individuals. Thanks and great appreciation are given to my dissertation committee. A special thank you to Dr. Carol Bova, my dissertation chairperson, who's mentoring and expertise in the research process supported me in moving the manuscript forward and achieving completion of this dissertation. Dr. Paulette Seymour-Route, committee member, who offered her experience and knowledge of cardiovascular disease, and her encouragement in obtaining this goal. Dr. Lynne Schilling, committee member, who offered her expertise and steadfast guidance in the process of research and help in refocusing my research question. Dr. Sybil Crawford, committee member, offered me her expertise and knowledge of the statistical process for this research. All four have been excellent mentors in the research process.

Several of my colleagues and friends have been extremely helpful and supportive through the last phase of the dissertation process. Jane Magner, FNP, Lisa Vasile, ANP and Judy Tuori, FNP were extremely generous in their time, moral support and critiques of my work. Fellow classmate Melinda Darrigo, PhD was always the voice of encouragement and invaluable supporter. Maeve Grogan, my dear friend, providing the balance with her "right brain" to my "left brain" way of processing. With their assistance I was able to focus my efforts on the data collection and writing of this dissertation.

My family has provided unending support and made numerous sacrifices to allow me to complete this work. My husband and daughters have served in many different roles. They have been my "proof readers", critiqued my work, served as a sounding board, supported the running of our home and at times kept me grounded with their humor and love.

My in-laws Lee and Marie Konicki have always been available to help with the girls and their various activities. My husband's commitment to supporting my desire to continuously pursue knowledge has been foundational to my efforts since our first years together. I am truly grateful for his unceasing support.

I would like to thank my parents David and Mary Jakubisin for the life principles, conviction and work ethic they instilled in me. They have always told me "you can do whatever you set you mind to" and that I would be the only one that would limit what I could do. With this ingrained in my character I will continue to always strive for my "next" set of goals. A quote from Frank Lloyd Wright best states this: "I know the price of success: dedication, hard work and an unremitting devotion to the things you want to see happen."

I want to also thank all the women over the years that have honored me as their health care provider and served as the inspiration for this research. I will continue to strive to better understand how to empower them in healthy living.

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ABSTRACT

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Directed by Dr. Carol Bova

The number one killer of women in the United States is cardiovascular disease
(CVD). Cardiovascular risk factors (CVRFs) include advancing age, cigarette smoking,
diabetes, dyslipidemia, family history, hypertension, obesity, sedentary lifestyle and high
intake of saturated fats and low dietary fiber. A women's risk for development of CVD
dramatically increases after menopause and with the number of CVRFs. CVD is often
preventable. Evidence supports addressing CVRFs reduction early (in the pre-
menopausal years) through heart-healthy behaviors such as increasing physical activity,
promoting healthy eating, moderate alcohol consumption and not smoking. Therefore,
understanding premenopausal women's CVRFs knowledge is an important area of
inquiry. In addition, the Nemcek Wellness Model suggests that self-nurturance, as well as
knowledge, may be an important factor for explaining women's wellness behaviors.
Thus, the purpose of this study was to investigate knowledge of CVRFs, level of self-
nurturance and the performance of heart-healthy behaviors in women ages 35 to 55 years.

This study used a cross sectional survey design and venue sampling. The survey
included demographic questions, the Self Nurturance Survey, the Heart Disease Facts
Questionnaire, the Physical Activity Questionnaire, Prime Screen, and questions about
financial strain, cigarette smoking, and alcohol use. The sample included 136 women

(survey response rate = 57%), the majority of whom were white (94.9%), married (80.1%), did not smoke (80.1%) and rarely drank alcohol (57.4%).

Results indicated that study participants were very knowledgeable about CVRFs. (Mean knowledge score = 19.53, possible range = 0 to 25 with higher scores indicating greater knowledge). Knowledge did not predict physical activity (p = .07), diet (p = .08) or smoking status (p = .11) in this sample. Self-nurturance was moderately correlated (r = .33) with consuming a heart-healthy diet. Hypotheses derived from the Nemcek Wellness Model were not supported in this study. More research is needed to identify factors that will help women translate knowledge into heart-healthy behaviors.

Chapter 1

Background and Significance

Introduction

The number one killer of women in the United States (US) is cardiovascular

disease (CVD). In 2004 more than 460,000 women died from CVD (American Heart

Association, 2005). It is important to note that CVD does not only affect older women.

Mortality data from early 2000 (reviewed the preceding 10 years) showed a 10% increase

of sudden cardiac death in women under the age of 35 (Center for Disease Control and

Prevention, 2001). In addition, women experiencing their first myocardial infarction

before the age of 50 were twice as likely to have a fatal outcome as compared to their

male counterparts (Rosamond et al., 2007). When women survived the initial insult from

the infarction, 42% of them eventually died within one year, compared to only 24% of

men (Center for Disease Control and Prevention, 2001). Comparing CVD to breast

cancer, 1 in 30 women will die from breast cancer each year, while 1 in 2.5 women will

die annually from CVD (American Heart Association, 2005). In fact, ischemic heart

disease "has a higher annual mortality rate for more women under the ages of 35, 45 and

55 than breast cancer" (Shaw, et. al. 2006; p 5S). National media campaigns sponsored

by the American Heart Association (AHA) were launched in 1997 to raise women's

awareness of the risk factors for CVD. In spite of these campaigns, more than 40 % of

women were still unaware of their cardiovascular risk factor (CVRF) status (Mosca,

Ferris, Fabunmi, Robertson & American Heart Association, 2004). In addition, surveys

report women continue to be more concerned with the risk of breast cancer than heart

disease (American Heart Association, 2005). Therefore, research is urgently needed to

help women become knowledgeable about CVRFs in an attempt to reduce their risk of developing CVD through heart-healthy behaviors.

Cardiovascular Risk

In 1997, the initial Guide to the Primary Prevention of Cardiovascular Disease was published and has since been augmented by the AHA and the American College of Cardiology (ACC) Guidelines for Preventing Heart Attack and Death in Patients with Atherosclerotic Cardiovascular Disease (Christian, Rosamond, White, & Mosca, 2007; Mosca, Appel et al., 2004). Current recommendations for assessment and management of cardiovascular risk factors are based on these scientific reports (Greenland, Smith, & Grundy, 2001).

In 2000, the AHA's Prevention V conference addressed the need for cardiovascular risk assessment as the first step in preventing CVD. This need for cardiovascular risk assessment was consistent with the recommendations put forth by the National Cholesterol Education Program (NCEP) Adult Treatment Panel (ATPIII) (Greenland, Smith & Grundy, 2001; Mosca, Appel et al., 2004; Mosca et al., 1999). Major risk factors for CVD consistently identified across the scientific reports were: advancing age, cigarette smoking, diabetes mellitus, dyslipidemia, family history, hypertension, obesity, sedentary lifestyle, and intake of saturated fats and low dietary fiber (Wilson et al., 1998). Of the identified major risk factors, the only non-modifiable or non-controllable risk factors were age and family history, leaving multiple opportunities for women to address the remaining modifiable risk factors.

Data from the Framingham Heart Study were used to develop a predictive algorithm to assess CVD risk in patients without overt CVD (Lloyd-Jones et al., 2004).

Estimating an individual's chance of developing CVD is done by compiling the presence of CVRFs and factoring for the individual's age and sex, resulting in a calculated global risk score predicting an individual's risk of developing CVD within a 10 year period (Expert Panel on Detection Evaluation and Treatment of High Blood Cholesterol in Adults, 2001).

Empiric evidence supports that CVD is partially preventable and treatable with primary and secondary preventative measures (Shaw et al., 2006). Primary preventative measures target health promotion activities that protect against the development of a disease, whereas secondary preventative measures target early detection, diagnosis and treatment of a pathologic process. Primary prevention of CVD may be accomplished through supporting healthy lifestyle choices and activities that include:

- moderate intense physical activity on at least five days

- following ADA nutritional guidelines

- not smoking

- limiting daily alcohol intake to not more than one alcoholic beverage per day.

Secondary prevention methods include the identification of known risk factors for the development of CVD as well as early treatment and modification of these risk factors. Secondary prevention would target CVRFs such as hyperlipidemia and obesity.

CVRFs can also be classified into three categories: biologic, behavioral or psychosocial (Krummel et al., 2001). Psychosocial risk factors include mental health issues, socioeconomic status and personality type. Behavioral risk factors, all modifiable,

include smoking status, sedentary lifestyle, and dietary practices. Biologic risk factors include family history, age, diabetes mellitus, dyslipemia, hypertension and obesity. Modification of CVRFs in men and women has been linked to reduction of CVD by as much as 31% (Hu & Manson, 2000). Despite knowing modification of CVRFs will reduce CVD, national surveys such as the Behavioral Risk Factor Surveillance System (BRFSS), that annually review rates of health risk behaviors and health risk factors by state, showed increased rates of metabolic syndrome, obesity, inactivity, smoking and hypertension in populations younger than previously seen (under age 35) (Centers for Disease Control and Prevention, 2007).

<div align="center">Cardiovascular Risk among Women</div>

American Heart Association (2005) statistics estimate that 8,000,000 women in the US are living with heart disease and 6,000,000 women have had a heart attack or experienced angina. Evidence based guidelines for the prevention of cardiovascular disease in women (Mosca, Appel et al., 2004) attempt to delineate the focus of addressing CVRFs in women. The assessment, screening, recognition and treatment of CVD in women continue to differ as well as lag behind that of their male counterparts (Polk & Naqvi, 2005; Rosenfeld, 2006). Previously, heart disease onset in women developed during the sixth decade of life compared to the fifth decade of life in men; on average women were being diagnosed 10 years later than men (Kim, Alley, Seeman, Karlamangla, & Crimmins, 2006). Researchers speculate that the reasons for this discrepancy included: (1) the atypical symptom presentation among women with coronary artery disease (CAD) (Mosca, Manson, Sutherland, Langer, Manolio & Barrett-Connor, 1997) and (2) the lack of critical stenosis (a quantifiable obstruction of one of the

coronary arteries) which has been used extensively as diagnostic criteria for CAD (Shaw et al., 2006). Cardiac symptom presentation in women may differ from that in men (Canto et al., 2007; McSweeney, Cody, O'Sullivan, Elberson, Moser, & Garvin, 2003). For example, women with acute coronary syndrome may describe symptoms of unusual fatigue, shortness of breath and sleep disturbance as opposed to chest pain (McSweeney et al., 2003). Women are also more likely to present with "atypical" chest pain. Atypical chest pain has been described as being less severe, less prolonged and often not perceived as cardiac-type chest pain (Canto et al., 2007), as well as more subtle than the usual cardiac-type chest pain (McSweeney et al., 2003). In a study of younger women (< 50 years of age) experiencing sudden cardiac death, autopsy results indicated they were more likely to experience an acute coronary thrombosis from a plaque erosion than from a coronary artery stenotic plaque rupture (Burke, Farb, Malcom, Liang, Smialek, & Virmani, 1998). The autopsy reports of these younger women demonstrated minimal coronary artery stenosis and little plaque calcium.

Gender differences exist in CAD-related treatment and outcomes as well as in presentation and diagnosis (Polk & Naqvi, 2005; Shaw et al., 2006). More women than men will (1) die within one year of their first myocardial infarction (23 vs. 18 %), (2) have another MI within five years of the first one (43% vs. 33%) and (3) be disabled with heart failure within six years of having an MI (46 % vs. 22 %) (Rosamond, Flegal, Furie, Go, Greenlund, Haase, et al., 2008).

In 2005, an estimated 1,265,000 percutaneous coronary interventions were performed, 69% of those receiving the procedure were men and only 31% were women (Rosamond et al., 2008). More women die of heart disease each year but women receive

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only 33% of angioplasties, stents or bypass surgeries, 28% of implantable defibrillators and 36% of open heart surgeries and finally women comprise only 25% of research participants in cardiac-related research studies (WomenHeart, 2008).

Two thirds of women dying from sudden cardiac death had no previously recognized symptoms of CVD (Albert et al., 2003). Data from the National Health and Nutrition Examination (NHANES) III ($n = 11,448$) and IV ($n = 6,671$) demonstrated an increased prevalence of high blood pressure (2.9%, $p = 0.0001$), obesity (7.3%, $p = 0.0001$), and smoking (2%, $p = 0.05$) among women. These changes in CVRFs were demonstrated in women aged 40, which is 10 years earlier than had been previously documented (Kim et al., 2006).

Coronary artery disease develops over time, with most CAD in women being diagnosed around the time of menopause (American Heart Association, 2005). Nichols et al. (2006), reviewed trends of age at onset of menopause in women born between 1912 – 1969 and reported the median age of menopause as 51 years of age. The years before menopause present an opportunity for preventive measures, yet Manson (2006) when addressing the North American Menopausal Society, noted that prevention strategies for women continue to lag behind those implemented for men. Therefore, it is important to understand the modifiable behaviors that place women at risk for CVD.

A woman's risk for development of CVD dramatically increases with the greater number of CVRFs. Major risk factors for CVD are: advancing age, cigarette smoking, diabetes mellitus, dyslipemia, family history, hypertension, obesity, sedentary lifestyle, and intake of saturated fats and low dietary fiber (Wilson, 1998). Knowledge of these risk factors is an important area of research attention.

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Women's Knowledge of CVRFs

Knowledge of CVRFs among women has been associated with implementation of preventative and healthy lifestyle activities (King & Mosca, 2000). Knowledge of modifiable CVRFs such as smoking, sedentary lifestyle, obesity and diets high in saturated fats, are a prerequisite for change in behavior and are key to the prevention of CVD. In the past, women's health needs have been viewed "through the lens of reproductive issues" (Tabloski, 2004, p. 631) and yet with life expectancy for females in the United States at 77 years (Center for Disease Control and Prevention, 2007), women will spend one-third of their lives in post-menopausal, non-reproductive years. Women are entering their older years facing key health issues such as life-threatening cardiovascular conditions, cancer, and disabling conditions such as osteoporosis (Program for Appropriate Technology in Health, 2005). Proactive primary and preventive care, through knowledge of CVRFs and their implications, would reduce the incidence of CVD. Strategies focusing on prioritizing and addressing women's risk factors for CVD before they are menopausal, through primary and secondary preventive methods, may prove the most efficacious way of combating the CVD epidemic.

Mieres' (2006) review of the prevention guidelines for cardiovascular disease in women by the AHA and the National Heart, Lung and Blood Institute (NHLBI) described the educational initiatives developed by these organizations to target CVD in women. The primary focus of these educational endeavors was to address women's knowledge about CVD.

The priorities for the AHA heart healthy educational endeavors were identified from studies of women with known CVD and the assessment of their knowledge of CVD.

From 1996 - 1999 women undergoing coronary angiography ($N = 450$) with known CVD were surveyed. The age range of these women was $32 – 92$ years of age, only 35% ($n = 157$) of these women knew they were at risk for CVD and yet 83 % ($n = 376$) had three or more CVRFs (King et al., 2002). A random digit national phone survey queried women ($N = 1008$) (Mosca, Mochari et al., 2006) about their knowledge of CVRFs and prevalence of CVD. Of the women surveyed, only 55% identified CVD as the leading cause of death in women. These findings demonstrated a 25% increase in knowledge compared with Mosca and colleagues' 1997 awareness survey data, where 30% identified CVD as the leading cause of death in women.

Modest success has been achieved with the AHA educational outreach programs. Reviewing identification of CVRFs among the women studied, only 48% correctly identified elevated blood pressure, 37% identified low High Density Lipids (HDL), 21% identified elevated Low Density Lipids (LDL) and 31% identified elevated blood sugars as risk factors (Mosca, Mochari et al., 2006). Ethnic minorities were significantly less aware of CVRFs than white women (OR, 0.40; 95% CI, $0.29 – 0.56$). The small cohort of women that were of racial and ethnic minorities (Black, $n = 210$; Hispanic, $n = 171$) and who were also unemployed ($n = 50$), showed decreased levels of awareness of CVD and were lowest in the Hispanic women (Hispanic, 34%; Black, 38%; White, 62%)

Christian and colleagues (2007) evaluated the change in women's ($N = 1005$) knowledge since the inception of the national educational programs began and found a significant increase in women's awareness from 30 % to 46% aware ($p < 0.001$) of the presence of CVD in women and its associated risk factors. Two ethnic groups, African-American women (31%) and Hispanic women (29%), had significantly lower awareness

compared with white women (68%) ($p < 0.05$). The most significant change in knowledge of CVD and CVRFs was found in white urban females when compared to other racial, ethnic and geographic minorities (Christian, Rosamond, White, & Mosca, 2007; Mosca et al, 2006). Limitations across these studies were that the majority of each sample was white, employed and had higher levels of education.

Thanavaro, Moore, Anthony, Narsavage and Delicath's (2006) study of predictors of health promotion behaviors in women ($N = 119$) between the ages of 35 and 60 years found 60% of the women had low levels of knowledge of CVRFs but 90% of the women had high perception of the benefits of CVRF modification. Women with a higher level of knowledge of CAD reported more health promotion and CVRFs reducing behaviors ($r = 0.28$; $p< .05$) (Thanavaro et al., 2006).

Contrary to these findings, a small descriptive study ($N = 33$) of women with CVD, aged 36 – 85 year-old ($M = 65.54$ years) did not find a relationship between CVRFs knowledge and risk-reducing behaviors ($r = - 0.001$, $p = .95$) (Oliver-McNeil & Artinian, 2002). Interpretation and application of these results are viewed cautiously because of the small non-random sample and the white, suburban middleclass cohort that was recruited for this study.

A prospective CVRF survey of urban women ($N = 224$) found only three of the traditional cardiac risk factors (hypercholesterolemia (56%), hypertension (54%) and smoking (52%)) to be correctly identified by at least half of the study participants (Pendergast, Bunney, Roberson, & Davis, 2004). Only 13% of the participants in this study were able to identify CVD as the number one cause of death in women.

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It is clear from these studies that women need to become active participants in managing their health by becoming informed about CVRFs and the development of CVD. Since research of CVD in women has been comprised of mostly urban, white women (Christian et al. 2007; Mosca, Mochari et al., 2006; Thanavaro et al., 2006) additional research that includes women living outside of urban settings and racial/ethnic minorities may provide a more comprehensive picture of women's knowledge and risk behaviors associated with CVD.

Modifiable CVRFs

Modifiable CVRF behaviors include inactivity, poor dietary intake, cigarette smoking and excessive alcohol consumption. To be considered heart-healthy, these behaviors must be modified to include: participation in moderately intense physical activity (US Department of Health and Human Services, 1996), a heart-healthy diet (Krauss et al., 2000), non-smoking status (Ambrose & Barua, 2004) and no more than one alcoholic beverage per day (Frieberg & Samet, 2005).

Physical Activity

Physical activity is an important component of heart healthy behavior. Current recommendations suggest that women should engage in at least 150 minutes of moderate intensity physical activity per week such as walking briskly (> 3 miles per hour), bicycling or running at a moderate pace (> 4 miles per hour) most days of week (US Department of Health and Human Services, 1996). The 2007 update on the physical activity and public health clarified that this activity should be at least five days per week (Haskell et al., 2007) no other changes were made to the 1996 recommendations. Studies have been conducted to explore the relationship of physical activity to CVD. The Nurses

Health Study ($N = 121,700$) found an inverse relationship between physical activity and cardiovascular events among women (aged 30-55 years) (Manson et al., 1999). Multivariate analysis comparing CVD risk with quintiles of physical activities (expressed as metabolic-equivalent (METs) demonstrated decreased relative risk as quintile of METs increased (0.77, 0.65, 0.54, and 0.46 as compared with the risk in the lowest quintile group; p for trend <0.001). Likewise, Gulati and colleagues (2003) measured exercise capacity of asymptomatic women (> 35 years of age) ($N = 5721$) and risk of death and confirmed that exercise capacity was an independent predictor of death. An inverse relationship was noted between the METs (measured here categorically) and risk of death. The calculated hazard ratio (CI 95%) for exercise capacity was 0.83 ($p < 0.001$) reflecting a 17% decrease in risk of death for each increase of $1 - $ MET in activity, that is the more MET expenditure, the greater the reduction in risk of death. Data from these studies support the recommendation that 30 or more minutes of moderately intense activity on most days of the week helps promote cardiovascular health.

Heart-Healthy Diet and Obesity

A heart-healthy diet is based on the ADA recommendation (Krauss, 2000) that women should consume five or more servings of fruits and vegetables per day; six or more servings per day of grains and whole grains, saturated fat intake less than ten percent of daily caloric need and limited intake of high cholesterol foods. The ADA recommendations are based on randomized trials evaluating the effects of dietary intake on the development or modification of CVRFs. Several examples of these trials are presented below.

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Estruch et al. (2006) evaluated 772 asymptomatic individuals between the ages of 55 and 80 years. Subjects were assigned to one of three groups with modification of their fat intake by following a Mediterranean-style diet, a diet typically low in saturated fat and high dietary fiber. The three dietary categories were: American style diet, Mediterranean-style with olive oil and Mediterranean-style with nuts. Outcomes monitored were weight, blood glucose, serum lipid levels and blood pressure. Reductions were seen in systolic and diastolic blood pressure readings in subjects with hypertension and, serum insulin and serum cholesterol-HDL ratio levels when compared to the American style diet. Significant reductions were seen in those subjects with hypertension for Mediterranean-style diet with olive oil (-6.2 mm Hg; CI, -8.4 to -4.0 mm Hg) and for nuts (-7.4 mm Hg; CI, -9.9 to -5.0 mm Hg; $p <0.001$). For those subjects with normal blood pressure a significant reduction in systolic blood pressure for Mediterranean-style diet with olive oil (-1.8 mm Hg; CI, -6.7 to 3.0 mm Hg) and with nuts (-2.2 mm Hg; CI, -4.5 to 0.1 mm Hg; $p< 0.001$) , was also demonstrated. However, the decline in systolic blood pressure was not as dramatic for the normotensive subjects. Serum insulin levels decreased significantly when comparing the Mediterranean-style diet with nuts (-20.4) to an American style diet ($- 31.9$ to -9.7; $p< 0.001$). A significant decrease in the serum cholesterol-HDL ratio was demonstrated when comparing the Mediterranean-style diet with olive oil (-0.38) and the American style diet (-0.55 to -0.22; $p < 0.001$).

Mozaffarian and colleagues (2006) conducted a meta-analysis of the influence of dietary fat intake on CAD and noted a 23% increase in the incidence of CAD for each 2 percent increase of energy from trans fatty acids (pooled relative risk, 1.23; 95 percent confidence interval, 1.11 to 1.37; $p < 0.001$). Dietary sodium and its affect on blood

pressure was evaluated in a randomized trial ($N = 412$) (Sachs et al, 2001). Results

demonstrated a significant reduction ($p < 0.001$) in systolic blood pressure (2.1mmHG) in

subjects who reduced their sodium intake from high to intermediate intake. Additionally,

a significant reduction of 4.6 mmHg in systolic blood pressure was noted when sodium

intake was decreased from intermediate to low intake.

Eating a heart healthy diet is an important factor in reducing obesity. Obesity is a

strong predictor of cardiovascular disease and has been associated with other

cardiovascular risk factors such as diabetes, hypertension and hyperlipidemia (Haskell et

al., 2007). Obesity does not occur in isolation but is seen in conjunction with a variety of

metabolic alterations of lipid and non-lipid factors. These metabolic alterations are then

often associated with insulin resistance which is key in increasing the risk of the

development of cardiovascular disease in women (Shaw et al., 2004). Several studies

have demonstrated the risk of obesity and CVD among women. For example the Study of

Women's Health Across the Nation (SWAN) ($n = 3,064$), a cohort of ethnically diverse

women aged 42 to 52 years, documented over a three year period a significant increase in

mean weight ($M = 2.06$ kg, $p < 0.01$) and waist circumference ($M = 2.24$ cm, $p < 0.05$)

with age. These findings demonstrated that 40 to 50 year old women may expect to gain

1.5 pounds per year during their mid-life years regardless of their initial weight, ethnicity

or race (Sternfeld et al., 2004). This study also demonstrated a significant correlation

between waist circumference and number of cardiometabolic risk factors. In a similar

study, Mosca, Edelman et al. (2006) noted an increased clustering of risk factors with a

waist circumference ≥ 35 inches ($n = 6327$; $r = 0.24$, $p < 0.001$). The study findings

showed waist circumference also correlated with diabetes (OR 2.0, $p < 0.0001$),

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established cardiovascular disease (OR 1.94, p < 0.0001) and Framingham risk scores ≥

10% ($r = 0.24$, $p < 0.0001$) (Mosca, Edelman et al., 2006). In addition, a secondary data

analysis of the Women's Ischemia Syndrome Evaluation (WISE) study ($n = 780$)

demonstrated the effect of obesity on CVD (Kip et al., 2004). Women from WISE who

were referred for coronary angiography were classified by body mass index (BMI). There

was a significant difference in the prevalence of a dysmetabolic state in normal weight

(28%), overweight (55%) and obese (75%) women ($p<0.0001$). The metabolic syndrome,

a dysmetabolic state, is characterized by the presence of atherogenic dyslipidemia, insulin

resistance, central obesity, elevated blood pressure, prothrombic and proinflammatory

states. In contrast, Kip et al (2004) did not find support for obesity as an independent

cardiovascular risk, but found that obesity was correlated with the heterogeneity of

metabolic abnormalities in obese individuals, which increased their risk for the

development of cardiovascular disease ($n = 327$, 97.2% with dysmetabolic verses 91.5%

without, $p = 0.003$). Obesity, either as an independent risk factor or as part of a syndrome

associated with metabolic abnormalities that increases risk for CVD, has implications for

interventions targeting CVRF reduction.

Smoking

Smoking status is identified as a modifiable risk factor for CVD. Cigarette

smoking is associated with an increased incidence of cardiovascular events and is a

known cause of atherosclerosis from endothelial dysfunction affecting all areas of the

vascular system (Ambrose & Barua, 2004). Cigarette smoking's affect on the vascular

system is on various levels from endothelial dysfunction and injury (Barua, et al. 2001),

increased systemic vascular inflammation (Bermudez, Raffia, Buring, Manson & Ridker,

2002) to prothrombolic states and acute thrombic events (Burke et al., 1997). Though not clearly understood, cigarette smoking is known to increase serum cholesterol levels, low density cholesterol and triglyceride levels (Benowitz, 2003; Craig, 1989).

Barua et al., (2001) attempted to explain endothelial dysfunction and injury associated with cigarette smoking status ($N = 23$) by evaluating the effect of the endothelium-dependent vasodilatation (EDV) and nitric oxide (NO) biosynthesis, a byproduct of cigarette smoking. EDV was lower in smokers when compared to non-smokers (p <0.001). Cigarette smoking was associated with increased NO production and reduced EDV which is the basis for endothelial dysfunction and injury. This study was the first to demonstrate, in vivo, a near-physiological model of the link between increased NO production and increased endothelial dysfunction.

Elevations of five systemic inflammatory makers were associated with smoking status in women (Bermudez, Rifai, Buring, Manson & Ridker, 2002), suggesting an increased systemic inflammatory response in women who smoke. Inflammatory makers associated with primary and secondary coronary events are: C - reactive protein (hs-CRP), interleukin 6 (IL-6), soluble intercellular adhesion molecule type 1 (sICAM-1), E-selectin and P-selectin. Serum levels of the five inflammatory markers were compared between smoking and non-smoking women. Significant increases were seen in hs-CRP ($p = 0.041$), IL-6 ($p = 0.008$), sICAM-1 ($p = 0.001$), E-selectin ($p = 0.004$), and P-selectin ($p < 0.037$). The increased inflammatory response was suggested to increase the risk of arthrothombosis and cardiovascular events.

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Alcohol

Cardioprotective factors have been attributed to moderate alcohol ingestion (Frieberg & Samet, 2005). These protective factors are believed to act by elevating HDL and increasing insulin sensitivity. Alcohol ingestion was found to be causally related to lower cardiovascular risk. Rimm, William, Fosher, Criqui and Stampfer (1999) conducted a meta-anaylsis of studies evaluating the effects of moderate alcohol ingestion (30 grams/ day – no specified type) and its affect on cardiovascular risk factors. Studies were reviewed for alcohol's effect on lipids, coagulation factors and other biologic markers associated with cardiovascular disease. Moderate alcohol consumption resulted in a positive change in high density lipoprotein (HDL) (95% confidence interval 3.25 to 4.73) and levels of triglycerides (95% confidence interval 2.49 – 8.89). The increase in HDL was greatest in those initially presenting with levels < 40 mg/dl (b = 0.138) than for those with HDL > 48 (*b* = 0.110). Several factors associated with thrombolic and coagulation factors were assessed with use of 30 grams/day of alcohol for at least one week. Regression models were used to evaluate the association of alcohol use with those hemostatic factors linked to cardiovascular health. Some of the favorable hemostatic factor levels were shown as an increase in plasminogen activator antigen concentration of 1.2 ng/nl (-0.31 to 2.81), 1.47% increase in plasminogen concentration (-1.18 to 4.42) and a decrease of 7.5 mg/dl in fibrinogen concentrations (-17.7 to 32.7). Based on review of this and other data, the authors calculated a 24.7 % reduction in coronary heart disease due to the causal relationship of moderate alcohol intake and various biological makers of cardiovascular disease (Rimm, William, Fosher, Criqui & Stampfer, 1999).

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The protective benefit of alcohol ingestion on cardiovascular risk is dose dependent. Moderate ingestion (< 2 drinks/per day for women) has associated with reduced myocardial events and improved survival (de Lorgerel, Salen, Martin, Boucher, Paillard & de Leiris, 2002). This must be balanced however with the risks associated with increased alcohol use. Chronic alcohol use in large doses (greater than 2 alcoholic beverages per day) may precipitate other associated cardiovascular system effects such as left ventricular dysfunction or alcohol-induced cardiomyopathy (Aguilar, Skali, Moyé, Lewis, Gaziano & Rutherford, 2004).

Large doses of alcohol may also be associated with alcoholism, obesity, suicides and accidents but moderate alcohol use may be used as part of a healthy diet (King, D., Mainous & Geesey, 2008). Recommendations for levels of alcohol ingestion have been put forth by the AHA. These guidelines recommend moderate alcohol ingestion for women as being no more than one drink per day (AHA, 2006).

Other Potential Factors Influencing Women's Risks for CVD

There are several other factors discussed in the literature that potentially influence women's risk for developing CVD. These factors include education, socioeconomic status (SES), race/ethnicity and geographical location. Many of these factors are linked and will be discussed accordingly. For example, higher levels of educational attainment are often connected with higher SES levels (Poduri & Grisso, 1998; Taylor, Hughes, & Garrison, 2002). Taylor et al. (2002) reviewed epidemiologic data on CVD in rural-residing American women and noted the highest levels of CVD mortality were seen in rural economically disadvantaged African-American women after removing non-modifiable risk factors.

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Choiniere, Lafontaine & Edwards (2000) conducted a cross-sectional survey of CVRFs by SES (N = 29,855). The authors cite complex sampling methods used for the study that did not allow for the using of standardized statistic packages for the calculation of test statistics. Instead a SAS module was written to produce variance estimates for this study. An inverse relationship was seen between the number of CVRFs and SES, those in the lowest SES group had the highest number of CVRFs. Smoking was the strongest factor and was present in 42% (SE = 4.3) of women with high school diplomas, but only 13% (SE, 0.9) of women with university degrees. Physical inactivity was present in 43% (SE, 2.4) of women with high school diplomas, but only 35% (SE, 2.6) of women with university degrees. These findings were supported by Appel et al.'s (2002) study evaluating racial and economic differences in CVRFs in southern white and black women (N = 1100). These data demonstrated a significant difference in SES level (x^2 = 131.5, p < 0.001) and education level (x^2 = 33.6, p < 0.001). Higher levels of CVRFs were found in black women (M = 2.70, SE = 0.06) when compared to white women (M = 2.56, SE = 0.05) (f = 3.08, p = 0.0489).

Lower socioeconomic status has been correlated with lower levels of CVD knowledge and poor access to preventive care. Poduri & Grisso (1998) reported that the highest CAD morbidity was seen in economically disadvantaged African American women (n = 52). The subjects of this study had a mean of 2.6 (SD = 1.4) CVRFs per person. The CVRFs with greatest prevalence in this cohort were insufficient exercise (85%) followed by obesity (48%).

In the Women's Health Study (N = 39,876), results demonstrated that self-reported cholesterol levels significantly correlated with actual cholesterol levels among

women with higher education and household incomes (Huang, Buring, Ridker, & Glynn, 2007). Sixty-eight percent of those with the lowest income level were aware of their cholesterol levels as compared to 86.6% with the highest level of income ($p < 0.001$, no test statistic given). Cholesterol awareness varied by educational level; subjects with less than two years education were the least aware (78.5%), and those with graduate degrees had higher levels of awareness (86.7%) ($p < 0.001$, no test statistic given).

Reviewing United States mortality by region, Taylor, Hughes and Garrison (2002) found that women living in rural areas were especially vulnerable to poorly developed health infrastructures, socioeconomic hardships and access barriers to healthcare. Researchers evaluated national health survey data ($N = 4,391$) for differences in women's rate of obesity by rural, urban or suburban residence. Rural white women demonstrated greater mortality from coronary and cerebrovascular disease, and higher rates of obesity ($\beta = .043$, $p < 0.013$) than their urban counterparts (Ramsey & Glenn, 2002). Rural African-American women had distinctly elevated cardiovascular mortality (124 − 1275 per 100,000) with the highest rates in the lowest population-dense locations (Taylor et al., 2002). Rural living, not just geographic location, was shown to influence obesity levels in women (Ramsey & Glenn, 2002).

Of interest to this research is the historic influence of the economic strain at this time (2008-2009). With bank foreclosures, high consumer debt and an unstable national economy, financial strain may be an influence on women's heart-healthy behaviors. SES brackets may provide an objective measure of income, but the adequacy of that income to meet the financial obligations of the family unit is more difficult to measure. Financial strain is the influence of financial hardship and the difficulty an individual has in meeting

their financial obligations (Aldana & Liljenquist, 1998). It is not based on income, but on the number of demands being placed on that income. Measuring financial strain may be an important indicator of how finances influence the level of women's participation in heart-healthy behaviors.

The research literature supports the need for women of all backgrounds to be included in studies that evaluate knowledge of CVRFs. Although the level of awareness of cardiovascular disease in women has increased since the inception of the national heart health educational endeavors, there remains a gap in the awareness of CVRFs among women of lower SES, as well as racial/ethnic and geographic minorities.

Interventions to Reduce CVRFs

CVD can be altered through early identification and intervention to reduce CVRFs in women (Orr, 2001). Mosca and colleagues' study (2006) of ethnically diverse women, aged 18 to 90 years ($N = 6327$), and attending a free public health cardiovascular disease risk factor screening event, found that 90% of the women had major modifiable risk factors for CVD. Among women without diagnosed diabetes or CVD, ($n = 5651$) 77% had three or more CVRFs and were candidates for primary and secondary preventive interventions. These data provide additional support for the need to identify and prevent cardiovascular disease as early as possible and reinforce the American Heart Association's goal to focus educational and research endeavors on activities that promote cardiovascular health in women (Mieres, 2006).

Specific cardiovascular prevention guidelines for women were first published in 1999 (Mosca et al., 1999). In the years following, the focus on CVRF reduction in women has been identified as a research priority, but CVD continues to remain the

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number one killer of US women (American Heart Association, 2005). The 2004 Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women (Mosca et al., 2004) were published to update the recommendations for prevention and to identify CVD as a "prime target for prevention." (p. 6a). Methods evaluating women's understanding and participation in heart-healthy behaviors need to remain a research priority (Halm & Denker, 2003; Kahn, Robertson, Smith & Eddy, 2008) as CVD remains a major cause of mortality in women.

Summary

Healthy outcomes in the mid and older years of life are dependent upon proactive, preventive lifestyles started earlier in life and on a supportive health care environment. Active heart healthy behaviors by women in the years preceding menopause can have a significant impact on how women will fare and the health challenges they will face in their older years (age 65 years or greater) (Zurakowski, 2004). Thus, this study was designed to evaluate women's CVRFs and their participation in preventive heart-healthy activities during the pre menopausal years (ages 35 to 55).

Nemcek (2003) developed a Wellness Model by combining results from a concept analysis, explanatory models of health behavior and life satisfaction as well as integration of established health behavior theories (e.g. Health Promotion Model by Pender, Murdaugh & Parsons, 2002; Health Believe Model, by Rosenstock, 1966). Nemcek proposed that a desired health outcome depended on the knowledge of that outcome, which is moderated by self-nurturance. Nemcek defined nurturance as a means to educate, promote and sustain growth and development and as a life-sustaining skill which is valuable to the process of maintaining change needed in health promotional

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practices (Nemcek, 1987) (Refer to Chapter 2 for a detailed discussion of this model).
This study explored self-nurturance as it related to women's knowledge of CVRFs and
their participation in heart-healthy behaviors. The purpose of this study was to investigate
knowledge of CVRFs, level of self-nurturance and the performance of heart-healthy
behaviors in women ages 35 to 55 years. The study aims were to:

1. Describe 35 to 55 year -old women's knowledge of CVRFs, levels of self-
   nurturance and their participation in heart-healthy behaviors.

2. Describe the relationship between self-nurturance and participation in heart-
   healthy behaviors in this cohort of women.

3. Describe differences in the level of CVRFs knowledge, self nurturance and heart-
   health behaviors by age, education level, race/ethnicity and financial strain.

4. Determine the effect of CVRFs knowledge, self-nurturance, age, education,
   race/ethnicity and financial strain on women's participation in heart-healthy
   behaviors.

In summary, CVD is often preventable. Evidence supports addressing CVRFs
reduction through hearty-healthy behaviors such as increasing physical activity,
promoting heart-healthy eating, no more than moderate alcohol consumption and not
smoking. Reduction of the anticipated burden of post-menopausal CVD may be
successful if women are aware of the need to start heart-healthy behaviors early before
signs and symptoms of CVD are evident (McPherson, Swenson, Kine & Leimer, 2002).
Research focused on factors or variables affecting reduction of CVRF behaviors in
women will assist in the development of strategies targeting more aggressive treatment of
CVRFs in women.

Chapter 2

Introduction

A national campaign to educate women about CAD has increased women's knowledge about CVRFs (Christian et al., 2007; Mosca, Ferris et al., 2004). Unfortunately this information has only reached a small segment of the population. In a survey ($N = 1008$) of women's familiarity with national heart-healthy educational endeavors, only 23 % recalled having seen, read or heard about these campaigns (Mosca, Mochari et al., 2006). Therefore, more research is needed to understand women's knowledge of CVRFs. The purpose of this chapter is to describe the conceptual framework that was used to guide the proposed study and to discuss the conceptual underpinnings that include an exploration of health behaviors, health promotion strategies and behavior change. Lastly, operational definitions for the main study variables will be given.

The purpose of this study was to investigate knowledge of CVRFs, level of self-nurturance and the performance of heart-healthy behaviors in 35 -55 years-old women. The study aims were to:

1. Describe 35 to 55 year - old women's knowledge of CVRFs, levels of self-nurturance and their participation in heart-healthy behaviors.

2. Describe the relationship between self-nurturance and participation in heart-healthy behaviors in this cohort of women.

3. Describe differences in the level of CVRFs knowledge, self nurturance and heart-health behaviors by age, education level, race/ethnicity and financial strain.

4. Determine the effect of CVRFs knowledge, self-nurturance, age, education, race/ethnicity and financial strain on women's participation in heart-healthy behaviors.

Conceptual Underpinnings: Health Behavior, Health Promotion and Behavior Change

Before describing the conceptual framework for this study, it is important to review some major tenets related to health behavior, health promotion and behavior change. Health behaviors include three categories: health promotion, health protection and secondary prevention (Laffrey, 1990; Settersten & Lauver, 2004). Health promotion is defined by the World Health Organization as the process of enabling people to increase control over and to improve their health by building their capacity to make and act upon informed choices for healthy living (World Health Organization, 1986). Historically, nurses have taught patients how to gain greater control over their health decisions and actions that affect their health; this process empowers patients to become more knowledgeable about their own health and that of their families' (Chiverton, Votava, & Tortoretti, 2003).

Health promotion is influenced by strong external elements and acknowledges that an individual is not always in control of his/her own health. Determinants of health span a broad spectrum of ecological, economic, environmental and cultural factors (Whitehead, 2004). An antecedent of health promotion is a collective intertwining of the individual and the communities in which they live and function (Whitehead, 2004). Defined as a complex behavior, health promotion is influenced by personal and extra-personal factors (Zurakowski, 2004). Cultural and socioeconomic factors influence how a woman defines her health, what she will do, or if she is able to promote it (Zurakowski,

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2004). Health promotion involves the individual having a primary role in becoming aware of, and making choices toward, a more successful and healthy life. It is the "way of life" that the individual has chosen to live in order to maintain or improve their health and wellbeing. Health knowledge is one aspect of health promotion. Knowledge of the options available to live in a healthy manner enhances the decision process of women contemplating health promotional activities.

Health protection behaviors are those behaviors that are motivated by the desire to avoid, detect earlier or function within the parameters of an illness (Pender et al., 2002). Pender et al. (2002) identified three theoretical differences between health protection and health promotion. Health promotion is not specific to a certain illness or injury, health protection is. Health protection is avoidance motivated and health promotion is approach motivated. Health promotion's goal is to expand positive health potential and health protection's goal is to avoid or "thwart" the insult to health and maintain wellness.

Health-promoting lifestyle was defined by Walker, Sechrist & Pender (1987) as "a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness" (p. 7). Health promotion is a multi-faceted and complex interaction between an individual's life situations and behavior patterns, not just a decision to avoid certain health risks (Hagoel, Ore, Neter, Silman, & Rennert, 2002). In the mid-1980s the World Health Organization attempted to clarify the definition of health by expanding it to include the individual's ability or challenge to realize aspirations and satisfy needs, as well as to accommodate the potential stresses or internal/ external adaptive needs in dealing with changes in the environment (World Health Organization, 1986).

In a classic article, Shamansky and Clasuen (1980) describe the three levels of health protection: primary, secondary and tertiary prevention. Behaviors and activities that prevent the onset of disease constitute primary prevention. Secondary prevention focuses on early identification or screening measures to identify early disease presentation. Tertiary prevention involves minimizing of the effects of a disease process. Increased knowledge of CVRFs and participation in heart-healthy behaviors would assist women in both preventing the onset of CVD (primary prevention) as well as assist in the screening and identification of CVD in women (secondary prevention).

Behavior change

Researchers have explored the physiologic and psychological variables related to the "push" to action experienced by individuals as they pursue a certain desire or goal (Hagger, Chatzisarantis, & Harris, 2006). Individuals initiate or persist in behaviors to the extent that they believe those behaviors will lead to their desired outcome. These behaviors and actions reflect the beliefs and values of the individual that, in turn, are determined by psychological mediators and social factors (Bandura, 2004; Fisher & Fisher, 2003). Motivation is the mechanism that prompts an individual to keep moving towards a goal, and is the individual's attempt to satisfy an innate psychological need (Deci & Ryan, 2000). Choosing behaviors to meet these needs can be characterized as nurturing self, as the end result is a sense of achievement or accomplishment for supporting growth, health and life.

It is the interaction of the individual's personal characteristics of cognition, biologic and environmental factors that influences action (Bandura, 2001). The emphasis of many motivational theories spans health-beliefs, competencies in health behaviors,

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decision-making processes and control-based behaviors that are critical to implementing health-related behaviors (Nigg, Allegrante, & Ory, 2002). Behaviors are purposeful. Understanding the value attributed to specific behaviors can assist in the development of mechanisms that would support continuation of the desired behaviors. Understanding health behavior, health promotion, behavior change and health promoting lifestyles are important factors that undergird the proposed study. These factors link directly with the Nemcek Wellness Model (Nemcek, 2003) that will be discussed in detail below.

Conceptual Framework

This study was guided by the Nemcek Wellness Model (NWM) (Nemcek, 2003). The basic principles and components of the framework were developed from evidence from self-nurturance research and Nemcek's (1987) concept analysis. Development of the NWN was based on self-nurturance research (Nemcek, 2003), explanatory models of health behavior and life satisfaction (Nemcek, 2007). Nemcek cites integration of some aspects from established health behavior theories such as the Health Promotion Model (Pender, Murdaugh & Parsons, 2002) and the Health Belief Model (Rosenstock, 1966) into the NWM and the use of a systems approach to predicting wellness behaviors.

Self-nurturance research gained momentum in the past fifteen years, mostly in the disciplines of nursing and psychology. Early studies of nurturance were focused on childhood wellness (Cowen, 1994; Prilleltensky, Nelson & Pierson, 2001). It was not until the late 1980s that self-nurturance as a concept of wellness and health promotion was evaluated in adults (Morris, Kerr, Wood & Haughey, 2000).

Nemcek (Nemcek, 1987) refers to self-nurturance as "self-chosen thoughts, feelings, or behaviors that foster a healthy life" (p. 305). It implies that the self is

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responsible for the basic decision to exhibit healthy behaviors (i.e. nutritious dietary intake, regular exercise) and express distaste for self destructive behaviors (i.e. smoking or excessive alcohol ingestion). Health is enhanced through nurturance, an engagement in those activities that holistically nourish the individual (Nemcek, 1990).

Self-nurturance may be perceived as a feminine characteristic as mothers are traditionally seen as the nurturers of the family. Historically, women serve as the gatekeepers for the family, as well as their own, healthcare. Nurturing focuses on those behaviors, attitudes and feelings that facilitate life and growth (Nemcek, 1987). Self refers to the separate and distinct individual and when in conjunction with an activity, implies a process that is primarily the responsibility of that individual. The decision to implement that activity is ultimately the choice of the individual. Self-nurturing is not dependent upon prior behaviors and can be implemented at any time (Nemcek, 1987).

Most studies of self-nurturance have been conducted with women or among predominately female cohorts (Nemcek, 2003). No studies of self-nurturance in exclusively male populations were found. Nemcek (2003), in development of her Wellness Model, speculates that studies of self-nurturance have been influenced by feminist philosophy, women's health issues as research priorities, and the perception that nurturance is a feminine characteristic. Though self-nurturance is a contemporary concept of health promotion, little research on adult self-nurturance is available. No research was found exploring self-nurturance and modification of CVRFs or women's knowledge of CVD.

A variety of conceptual models have been used in quantitative studies of self-nurturance including health promotion and wellness frameworks (Nemcek, 2003). Self-

nurturance refers to "the health promotional choices made by the individual" (Nemcek & James, 2007, p. 241). Assessing self-nurturance as it relates to women's knowledge of CVRFs and levels of physical and mental wellness may assist in the development of interventions that support the pursuit of a heart-healthy way of life.

Wellness is viewed as a multidimensional concept integrating and balancing the physical, emotional, intellectual, spiritual, psychological and social health dimensions (Adams, Bezner, & Steinhardt, 1997). Wellness maximizes the individual's potential in obtaining or pursing health, causing salutogenic behaviors (Sullivan, 1989). Promotion of health is multi-faceted and involves complex interaction between an individual's life situations and behavior patterns, not just a decision to avoid certain health risks (Hagoel et al., 2002). Wellness is the individual's deliberate approach and conscious effort to advance or promote physical and psychological health. The desired outcome of these endeavors is an improvement in perception of physical and mental well being and thus, improved quality of life.

Health and wellness, often used interchangeably in scientific literature, have been described as a balance of the dimensions of social, psychological and physical functioning (Pender et al., 2002). Nemcek's (2003) research and development of the Nemcek Wellness Model, evaluates the outcome of the individual's ability to integrate well being, balance mental and physical health and to physically perform daily activities. Wellness then, is the integration of human function to achieve maximum potential.

Nurturance of self is wellness focused and a vital element for healthy human growth and development at any age (Nemcek, 2003). In childhood, nurturance is a critical aspect of successfully reaching developmental milestones (Palfrey et al., 2005) and in

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adulthood nurturance is integral to the development of self-responsibility (Ali & Toner, 2001; Morris et al., 2000). Nemcek identified five dimensions of human functioning as components of self that individuals nurture: physical, intellectual, emotional, social and spiritual. It is the nurturing of these five dimensions through behaviors, attitudes and feelings that support growth and life (Nemcek, 1987).

The model's wellness outcomes are influenced by antecedents that are moderated by self-nurturance and include the individual's knowledge, ability and autonomy to self-regulate and recognition of self as a separate entity (Nemcek, 2003). Contextual factors are varied and include demographics, culture, social support, health status and personality. Influence of the antecedents or contextual factors may be positive or negative on self-nurturance processes and the ultimate wellness outcomes. This research used the NWM as a guiding framework and was not designed to test the model. For the purposes of this study the following tenets from the NWM were measured and included:

- Contextual influences - age, education level and race/ethnicity

- Antecedents - knowledge of CVRFs

- Self Nurturance

- Wellness - heart-healthy behaviors including physical activity, heart-healthy diet, smoking status and alcohol consumption
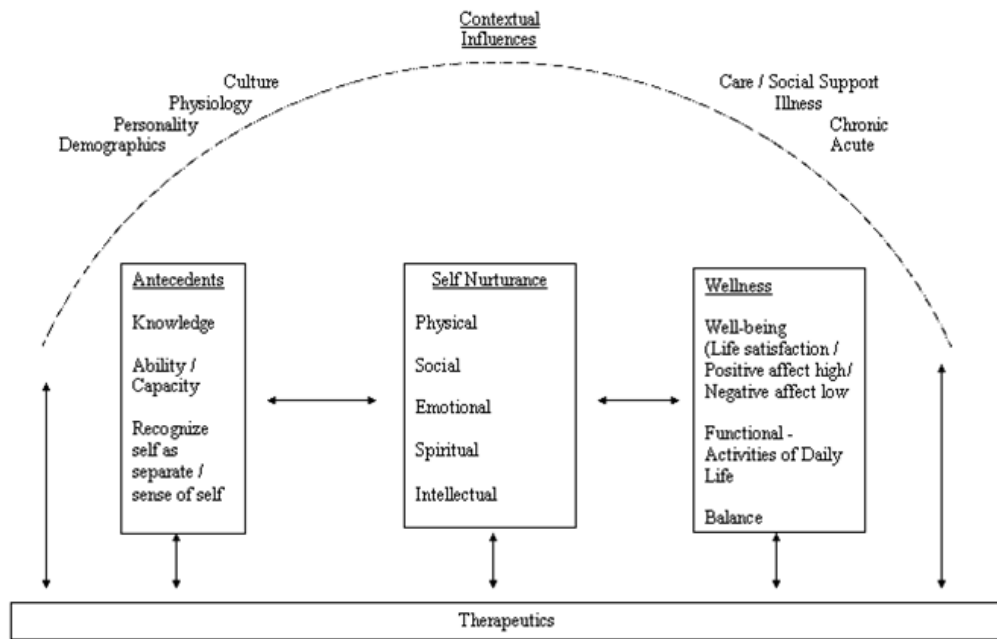
Figure 1. Nemcek Wellness Model.

Note. From "Research trends and wellness model," by M.A. Nemcek, 2003.

American Association of Occupational Health Nursing Journal 51(6), p. 263.

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The components of the model that will be tested in this study are presented below.
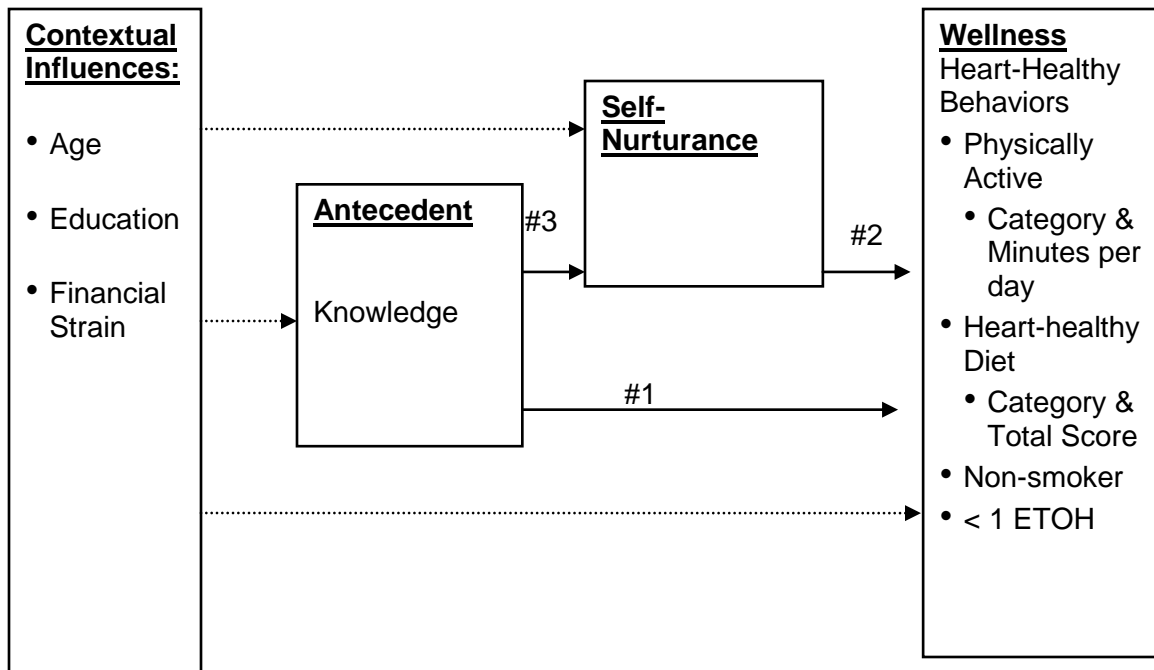
Figure 2. Model for Women's knowledge of CVRF and Heart-healthy behaviors[1].

Hypotheses

Based on the relationships depicted in the NWM the following hypotheses were explored

in this study:

1. Women with higher levels of knowledge of CVRFs will participate in more heart-
   healthy behaviors (moderately intense physical activity; a heart-healthy diet, non-
   smoking status and consumption of no more than one alcoholic beverage per day).

2. Women with higher levels of Self-Nurturance will participate in more heart-
   healthy behaviors (moderately intense physical activity; a heart-healthy diet, non-
   smoking status and consumption of no more than one alcoholic beverage per day).

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[1] Please note: the dotted arrow is used to depict differences analyses; the solid line
is used to depict analyses that will test directional hypotheses

3. Self-Nurturance moderates the relationship between knowledge of CVRFs and women's participation in heart-healthy behaviors (increase level of heart-healthy behaviors: moderately intense physical activity; eating a heart-healthy diet, non-smoking status and consumption of no more than one alcoholic beverage per day).

In addition, the researcher explored the differences in knowledge, self nurturance and heart-healthy behaviors and the contextual influences (age, education level and financial strain).

Nemcek (personal communication, April 14, 2008) proposed that in the Wellness Model, "self- nurturance is the process that persons use to bring about a wellness outcome. It is how they process choices that will enhance health." Nemcek asserts that self-nurturance is holistic and is the process by which an individual "chooses thoughts and feelings that support the decision to engage in healthy behaviors," such as eating heart healthy foods or participating in recommended levels of physical activity. Nemcek refers to self-nurturance as the health promotional decisions of the individual.

According to the NWM, the self-nurturance process must begin with the individual preceding the choice to act or engage in behaviors, with the knowledge and rationale to act, having the ability to identify self as a separate entity, and having the ability or capacity to implement the actions (Nemcek, 1987). Self-nurturing skills are central to health promotion, as positive lifestyle changes rely on an attitude and behaviors of being good to self (Nemcek, 1987). A qualitative study ($N = 11$) among women explored self-nurturing behaviors and components of healthy "ways of living" and found self-nurturance to be a wellness trait (Morris et al., 2000). Results of this study identified five dimensions congruent with Nemcek's proposed concept of self-nurturance. These

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five dimensions were: physical, intellectual, emotional, social and spiritual. Women in the study associated self-nurturing abilities with better health outcomes (Morris et al., 2000).

Nemcek (2007) used the NWM in a wellness study of registered nurses ($N = 136$). Mean scores of self-nurturance (3.5, Range $1 - 5$, SD $= 0.57$) and satisfactions with life (4.87, Range $1 - 7$, SD $= 1.16$) were obtained and were consistent with findings from self-nurturance studies of well women (Seal, 1995). These nurses had high levels of life satisfaction, consistent with previous well population life-satisfaction scores (Mean ranges $= 4.7$ to 5.6) (Pavot, Diener, Colvin, & Sandvik, 1991). A positive correlation was found between life satisfaction scores and self-nurturance scores ($r = .43$, $p < .01$). Nemcek did not find a significant relationship between self-nurturance and the demographics of the population, despite the model's assumption that contextual factors such as demographics influence the self-nurturance process.

Quantitative studies evaluating self-nurturance have used a variety of instruments to assess this concept. Instruments cited in these studies include: The Nurturance Rating Task (Lehman & Rodin, 1989), Self-Nurturance Scale (Seal, 1995) and Self-Nurturance Function Scale (Sherwood, Crowther, Wills, & Ben-Porath, 2000). The Nurturance Rating Task and Self-Nurturance Function Scale are focused on food-related self-nurturance scales. The Self-Nurturance Scale measures feelings, self-chosen thought and behaviors that support self-nurturance (Seal, 1995).

Nemcek uses the Self-Nurturance Survey (Nemcek & James, 2007) as the measure of self-nurturance in her proposed wellness model. Based on a previous study of registered nurses' self nurturance, Nemcek analyzed the data and modified the Self-

Nurturance Scale from the original 54 - items to a 29 - item internally consistent scale. Nemcek and James (2007) obtained this final scale by eliminating items from the 54 - item scale to reduce redundancy and enhance the scale's internal consistency reliability. The Cronbach's alpha of the final 29 - item scale was 0.92 (Nemcek & James, 2007).

Operational Definitions

Pre-menopausal women were those women who had not experienced menopause and were physiologically able to menstruate. In this study pre-menopausal status in women was measured by asking women if they had experienced menstruation in the past six months. Those women indicating that they had not had a menstrual cycle in the past six months were then asked if they were currently using a hormonal contraception which would inhibit menstruation such as injectable medroxyprogesterone acetate or a hormonal intrauterine devise.

Cardiovascular Risk Factor Knowledge was defined as knowing the factors that place women at risk for CAD. In this study, CVRF knowledge was measured using the Heart Disease Facts Questionnaire (HDFQ-2) (Appendix A) (Wagner, Lacey, Chyun & Abbott, 2005).

Self-nurturance was defined as "self-chosen thoughts, feelings, or behaviors that foster a healthy life" (Nemcek, 1987) Self-nurturance was measured using the Self-Nurturance Survey (SNS) (Appendix B) (Nemcek, 2007).

Heart-Healthy Behaviors were defined as participating in moderately intense physical activity; eating a heart healthy diet, not smoking cigarettes and consumption of no more than one alcoholic beverage per day. Heart-health behaviors were measured by using the (1) International Physical Activity Questionnaire (IPAQ) (Appendix C) (Craig

et al., 2003) to measure physical activity, (2) PrimeScreen (Appendix D) (Rifas-Shiman et al., 2001) to assess the intake of fruits, vegetables, whole grains, fish, red meat, low- and whole-fat dairy items, and saturated and un-saturated fats and (3) Smoking status and alcohol ingestion were assessed through questions in the demographic section of the survey. Participants were asked to indicate if they were: current every day smoker; current some day smoker; never smoker; smoker, current status unknown; or unknown if ever smoked.

Alcohol intake was assessed by asking the participants to indicate their daily alcohol intake by answering if they: 1) never drink alcoholic beverages, 2) drink alcoholic beverages but not more than 1 – 3 per week, 3) drink alcoholic beverages daily but not more than one per day or 4) drink 2 or more alcoholic beverages per day. The AHA Guidelines (2006) recommendations are for moderate alcohol consumption; for women this is not more than one alcoholic beverage per day. For this study, alcohol consumption was categorized as having 2 or more alcoholic beverages per day; have 1 or less alcoholic beverage per day; or abstains from alcoholic beverages.

Financial strain was defined as the perceived demands of meeting the financial responsibility of home, self and family (Angel, Frisco, Angel, & Chiriboga, 2003). It is the ability to pay for basics of food, clothing and home. In the Study of Women's Health Across the Nation (SWAN) (Sowers et al., 2000) a question to assess financial strain was used to assess individuals ability to pay for the basic care needs. In this study women were asked to answer the question: how hard is it to pay for the very basics like food, housing, medical care and heating? The choices were: not hard, hard or very hard.

Race/ethnicity was defined as an individual's self-identified racial and/or ethnic group. Subjects were asked to identify their race and ethnicity

Education level was defined as highest level of education completed. Subjects were asked to indicate the level of completed education; less than high school, high school, college degree, graduate degree, post graduate degree.

Age was self-reported by study subjects as their current age at the time of survey completion.

Summary

In summary, participation in heart-healthy choices has the potential to reduce the risk of CVRFs and the development of CVD through primary and secondary prevention (Grundy, et al. 2001; Mosca, et al. 1999). Research identifying moderators of women's awareness and knowledge of CVRFs and their participation in heart-healthy behaviors may help guide the development of population-specific interventions. This research sought to explore self-nurturance as a moderator of women's knowledge of CVRFs and their participation in heart-healthy behaviors.

Chapter 3

Methods

Introduction

The purpose of this chapter is to describe the methods for the proposed study. The study investigated pre-menopausal women's knowledge of CVRFs, levels of self-nurturance and participation in heart-healthy behaviors. The Nemcek Wellness Model (Nemcek, 2003) was used to guide this study. Pre-menopausal women, ages 35 to 55 years, were recruited to participate in the survey.

The study aims were to:

1. Describe 35 to 55 year-old women's knowledge of CVRFs, levels of self-nurturance and their participation in heart-healthy behaviors.

2. Describe the relationship between self-nurturance and participation in heart-healthy behaviors in this cohort of women.

3. Describe differences in the level of CVRFs knowledge, self nurturance and heart-health behaviors by age, education level, race/ethnicity and financial strain.

4. Determine the effect of CVRFs knowledge, self-nurturance, age, education level, race/ethnicity and financial strain on women's participation in heart-healthy behaviors.

Design

A cross-sectional survey design with a multivariate analysis plan was used to address the study aims. This design was chosen because of its descriptive or observational method of assessing a given population at a specified point in time for the characteristics of interest (Burns & Grove, 2005). This study design allowed for a

description of the relationship of the variables of interest, measured the frequency of their

occurrence and demonstrated associations that might have existed between the variables.

Power Analysis

Based on the assumption of equal group calculation of sample size, a power

analysis was done using a web-based calculator (UCLA, 2007). The sample size was

calculated for the inference for means comparing two independent samples considering:

confidence level set at alpha level = .05, effect size = 0.50 (Rosner, 2006). Calculation

for comparing two independent samples was based first on the SNS (SD, 0.57) with a

sample size estimation of 21 for each sample; then calculated based on the Heart Disease

Facts Questionnaire, (HDFQ-2) (SD, 1.3) resulting in an estimation of 107 per sample. A

sample size calculation for linear regression based on six independent variables (IV),

alpha level = 0.05, effect size = 0.15 (Soper, 2008) and a statistical power of 0.8 resulted

in a minimum required sample size of 97. For this study a sample of 107 completed

surveys was needed to obtain the desired power.

Sample

The target population for this research study was 35 - 55 year old pre-menopausal

women. Venue sampling was used to recruit study participants. Venue sampling recruits

study participants from the target population at times and places where they congregate

(Muhib et al., 2001). Therefore, the accessible population included women, meeting the

inclusion criteria, who presented to a chain discount department store in a northern

county of Connecticut during January through February 2009. In addition, snowball

sampling, a method of accessing others that share the characteristics required of the study

participants through key informants (Trochim, 2000), was used to survey women who were known to the accessible population.

Inclusion Criteria

Women were eligible to participate in this study if they met the following criteria: (1) were female (2) were 35 – 55 years of age, (3) were still physiologically capable of menstruation, having had a menses at sometime in the preceding six months, (4) and able to read English. To evaluate menstrual status, subjects were asked if they have had at least one menses in the past six months. If they answer "no" they were asked if they were using a long-term contraceptive method inhibiting menstruation. The subjects needed to answer "yes" to one of these menstruation questions to be included in the study. The researcher had anticipated distributing survey packets to 250 women to achieve a completed sample size of 107, estimating a 43% response rate (Dillman, 2000; Muhib et al., 2001).

Exclusion Criteria

Eleven of the returned surveys were not included in the analysis because the respondents indicated they no longer were menstruating or were using contraception to prohibit menstruation and thus did not meet the inclusion criteria. No women were excluded based on having had a myocardial infarction or cerebral vascular accident.

Setting

Volunteers for the study were recruited from women presenting to a chain discount department store (Wal-Mart) in Windham County, which is in northeastern Connecticut. Review of the demographics of the chain discount store (Information Resources Inc. 2006) showed 83% total U.S. households frequent the store to buy

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personal and home items; 55% of the shoppers listing incomes of less than $39,000, and 46% of the shopper's listing incomes of $50,000. Women 44 years of age or younger comprise 50% of the shoppers. Consideration of the target population's attendance was influential in the choice of this particular venue.

A number of towns within Windham County have been designated as either Medically Underserved Area and Population (MUA/P) or a Health Professional Shortage Area (HPSA) (Mitchell, 2007). These designations reflect the reduced availability of health care professionals and limited access to healthcare in this region. Windham County's census data from 2006 list the population as 116, 872 (U.S. Census Bureau. 2006). Women account for 50.7% of this population with approximately 60% between the ages of 34 and 54 years of age. The county is predominantly white (94.6%) with African-Americans comprising 2.4% of the population, Asians, 1.1% and Native American or Alaska native being only 0.5%. People reporting two or more races are 1.4% of the population.

Pilot Study

To assess the survey instruments for ambiguity and estimate the time necessary to complete the survey, the instrument packet was given to seven women, ages 35-55 years who were living in Windham County. The pilot participants were asked to review and complete the survey questionnaire and comment on their perceptions of the instruments. They were asked to identify any survey items that were unclear or difficult to answer and to indicate the length of time needed to complete the survey. Respondents indicated that the survey was easy to read and understand. They were able to complete the survey in 15 - 20 minutes. No changes or modifications were suggested by these participants.

Procedures

Recruitment

Recruitment and survey distribution took place in January through February 2009. The researcher had a display table at the entrance of the chain discount department store to recruit women to participate in the study. A banner advertising the study served as a backdrop to the table. The researcher collected data on weekend days and weekday evenings until subject enrollment was completed (N = 107 returned surveys). The weekend days and weekday evenings were chosen given the increased volume of customers at the venue during these time periods.

Women entering the chain discount department store were approached by the investigator to participate in the study. If the woman expressed an interest in participation in the survey she was screened for eligibility to participate in the study. Given the personal nature of the inclusion questions, the participant was taken to the side of the table to review the questions on page two of the survey. The questions were if her age was within the target range of 35 to 55 years, she was able to read English and was still capable of having a menstrual cycle. If the women answer "yes" to the inclusion criteria questions a survey packet was given. Each packet was assigned a number prior to distribution as a method of accounting for each survey distributed. The packet included an Institutional Review Board approved letter of introduction to the research project and the survey which included the: demographic collection form, Heart Disease Facts Questionnaire, (HDFQ-2), Self-Nurturance Survey (SNS), International Physical Activity Questionnaire (IPAQ), PrimeScreen instruments, and a numbered raffle ticket. The

demographic collection form included a question asking whether they received the survey at the store directly or were given the survey by a friend or acquaintance.

The participant had the opportunity to complete the survey onsite or to take the survey home and return it in an addressed, stamped envelope. The original data collection plan anticipated the majority of participants completing the survey onsite. Stamped, self-addressed "take home" survey packets were available for those that indicated their preference to complete the survey at home. As data collection began it became clear that participants preferred to complete the survey off site. As anticipated, many participants took additional surveys for other women known to them that might be interested in completing a survey. Of the completed returned surveys, 62% were picked up by the respondent at the venue and 38% were given the survey by a friend. Those completing the survey onsite were given packets that included a non-stamped envelope and instructed to return it and the raffle ticket prior to leaving the venue. A non-locked box for the raffle tickets and a locked box for completed surveys were available at the display table for participants who complete the survey onsite.

The raffle tickets were collected and entered into a drawing for a "Caring for Your Heart - Healthy" basket. A description of the raffle basket content and information concerning the drawing was included in each packet. The basket included: Go Red for Women items (Canvas bag, lunch tote, travel mug, eating healthy grocery list), pharmacy gift certificate, Heart-Healthy Cookbook, iPod Shuffle-Red and pedometer. The value of the basket was approximately $175. The basket was on display during the venue based recruitment. The drawing was held at the completion of study enrollment.

The instruments to be used in this study are summarized in Table 1.

Knowledge of cardiovascular disease risk factors was measured using the Heart Disease Facts Questionnaire, (HDFQ-2). The HDFQ-2 is a 25-item scale that was developed in 2005 (Wagner et al.) to measure heart disease risk knowledge. The questionnaire domains are based on national guidelines and recommendations from the American Heart Association, the American Diabetes Association and the National Diabetes Education Program. The domains in the HDFQ-2 include age, sex, smoking status, glycemic control, cholesterol levels, blood pressure, physical activity, weight and knowledge about CVD. The response options include true, false and "I don't know". The scale score is calculated by adding the number of items answered correctly multiplied by 4, yielding a score between 0 – 100 percent. The higher the participant's score the greater the knowledge of CVD.

The HDFQ-2 is used to measure outcomes of educational and behavioral interventions and has demonstrated its ability to distinguish between groups who would be expected to differ in their knowledge of heart disease risk based on their education level, cardiovascular diagnosis and treatment group ($N = 524$, Wagner et al., 2005). Reliability of the items was assessed and yielded a Kuder-Richardson-20 coefficient of 0.77. Discriminative functional analysis was used to evaluate criterion related validity. Participants were divided into groups where an expected difference in comparison was anticipated. Groups evaluated were those indicating they were (1) confident about their knowledge of CVD, (2) uncertain about their knowledge and (3) knowledgeable about their CVD diagnosis compared to those who were uncertain about whether they had any

CVD diagnoses. Significant differences were seen between the knowledgeable or not knowledgeable of cardiovascular problems group ($X^2 = 7.88$, $p < 0.05$); those taking or not taking lipid lowering medication ($X^2 = 5.96$, p < 0.05); insurance status ($X^2 = 19.42$, $p < 0.05$); and level of education ($X^2 = 10.99$, $p < 0.05$). Corrected item-total correlations ranged from 0.18 – 0.41, with 80% above 0.30.

Self-nurturance was measured using the Self-Nurturance Survey (SNS) (Nemcek & James, 2007). The SNS measures levels of self-nurturance by assessing self-chosen thoughts and feelings as well as health-fostering behaviors. The SNS is based on the Self-Nurturance Scale. Developed in 1995 (Seal), the Self-Nurturance Scale was initially 54 items with a 1 to 5 Likert scale measuring frequency of health promotional behaviors or attitudes. Face and content validity were established by a panel of five diverse and independent judges. Initial internal consistency using Cronbach's alpha was 0.94. A three-week interval test-retest correlation was 0.88 ($p < 0.05$). Concurrent criterion-related validity was assessed by comparing two scores. The first score was the individual's score from the Self-Nurturance Scale; the second score was an assessment of the individual's self-nurturance by a close associate of the individual. Each groups' score was compared yielding a correlation of 0.60 ($p < .002$) between scores. Convergent construct validity was evaluated by comparing Self-Nurturance Scale results with the Rosenberg Self-Esteem Measure ($r = -0.64$, $p < .01$), low self-esteem was indicated by high Rosenberg Self-Esteem Scores. The Self-Nurturance Scale's measurement of the distinct construct was moderately related to self-esteem.

Divergent construct validity was assessed through comparison of Self-Nurturance Scale scores with the Beck Depression Inventory, resulting in a moderate correlation ($r =$

0.44, $p < .01$). This suggests that the two scales do measure distinct constructs (Seal, 1995).

A second study using the Self-Nurturance Scale (Nemcek, 2007) reported similar reliability and validity. In a study of Registered Nurses' self-nurturance and life and career satisfaction, the Cronbach's alpha was 0.95. A three week interval test-retest of the SNS in this study resulted in a correlation of 0.94 ($p < .01$) (Nemcek, 2007).

Nemcek and James (2007) continued to refine the Self-Nurturance Scale reducing it to the 29-item Self-Nurturance Survey (SNS). Using the data from the Registered Nurses' study the authors were able to identify internally consistent scales and removed items until Cronbach's alpha no longer increased with item removal, decreasing the original 54-item Self-Nurturance Scale to the 29-item Self-Nurturance Survey. The Cronbach's alpha for the 29-item scale was 0.92.

The SNS includes statements concerning health promotional behaviors, (I eat right) or attitudes (I forgive myself if I have done something wrong). Each item is rated from (1) "not at all true" to (5) "extremely true." The SNS is scored by calculating the mean score of the 29 items. The possible range of scores is 29 to 145. Higher scores indicate higher levels of self-nurturance.

Physical activity was measured using the International Physical Activity Questionnaire (IPAQ), an instrument developed in 1998- 2000 by an International Consensus group for population surveillance of physical activity that would be comparable across countries (Craig et al., 2003). Pilot studies resulted in four versions of the IPAQ, a long and short version for telephone-interview and self-administration (Craig et al., 2003). The IPAQ was developed and tested to assess physical activity in

individuals aged 15 years through 65 years of age in both developed and developing countries. Categorical or continuous indictors may be obtained with the use of the IPAQ instrument.

The 7-item self administered short form was used for this study and measures four types of activities: sedentary, moderate-intense, vigorously-intense and walking activities. The instrument provides the individual's score in four domains of physical activity (PA): leisure time PA, domestic PA, work-related PA and transportation associated PA. The IPAQ provides separate scores for sedentary, moderate-intense, vigorously-intense and walking activities. Based on a seven-day recall, a total score is calculated by adding the duration and frequency of PA in each domain. The domains can not be estimated separately. Weekly estimate of total physical activity is calculated by weighting the reported minutes per week in each PA domain by METs assigned to each PA category. The last question is the indicator variable of sedentary time and is not included in the total PA score (Craig et al., 2003).

The IPAQ score results in both a continuous and categorical variable measuring PA. Categorical indicators include one of three levels of PA: low, moderate or high. Low levels of PA are categorized as less than 30 minutes of moderate-intense PA on most days; moderate level of PA is categorized as at least 30 minutes of moderate-intense PA on most days; high level of PA is categorized as greater than one hour per day or more of moderate-intense PA above the basal activity. Continuous measure of PA is the volume of activity weighted by the type of activity, yielding a score in MET-minutes. The continuous PA score may be reported as MET-minutes per day or MET-minute per week. (IPAQ Guidelines, 2005). Physical activity was further categorized as greater than or

equal to 150 minutes per week of moderate-intense PA or less than 150 minutes per week of moderate-intense PA.

Average MET-minutes scores are assigned to each level of PA. Walking is assigned 3.3 METs, moderate PA is assigned 4.0 METs and vigorous PA is 8.0 METs. Continuous PA scores are computed based on these values. An example given is: walking MET-minutes/week is equal to 3.3 X walking minutes per day X number of days walked (Craig et al., 2003). The current recommendation is for 150 minute per week of moderate to intense activity to achieve adequate levels of physical activity for health (U.S. Department of Health and Human Services, 1996). For the purposes of this research the IPAQ score was reported as the median MET-minutes per week. The current recommendations for heart healthy activity are for 30 minuets per day or a total of 150 minutes per week. For this research physical activity was analyzed as a continuous variable of minutes per week and then categorized into recommended physical activity level (greater than or equal to 150 minutes per week of moderate-intense PA or less than 150 minutes per week of moderate-intense PA).

Extensive reliability and validity testing in 12 countries, including the United States, was completed and supports the instrument's use in assessing PA (Craig et al., 2003; MaDer, Martin, Schutz & Marti, 2006). Test-retest reliability of the instrument was assessed through administration of the IPAQ not more than eight days apart, with initial validity of reported physical activity evaluated against the data recorded by an accelerometer worn by the participants for the week between completions of the survey (Craig et al., 2003). Craig et al., (2003) reported acceptable levels of reliability with 75% of the test-retest Spearman rank-order correlation coefficients ranging from 0.65 to 0.88

(N = 1974). Median MET minutes across all studies was 2514 minutes, with 82% (pooled p = 0.76) of the participants engaging in sufficient amounts of PA (95% CI 0.73-0.77).

A Swiss population study (MaDer et al., 2006) evaluated the validity of both the categorical and continuous scoring of the IPAQ with three other short PA instruments. The PA questionnaires were used in a middle-aged population (N=178). The three Swiss questionnaires were: Office in Motion Questionnaire (OIMQ); Health-enhancing Physical Activity (HEPA); and Swiss Health Survey 1997 (SHS97). Questionnaire responses were compared to data obtained from an accelerometer and heart rate monitor worn for seven days by the study participants. Spearman correlations of the continuous data showed moderate agreement between two repeated measures of IPAQ. Correlation coefficients for the comparison of the repeated IPAQ varied by activity level measured: vigorous activity (r = 0.43), walking (r = 0.48), moderate activities (r = 0.50), total activities (r = 0.54) and sitting (r = 0.60). Statistical significance was demonstrated by both the OIMQ (r = 0.60) and IPAQ (r = 0.54) for total physical activities summarized as MET-minutes per week (p <0.005).

In the original evaluation of the IPAQ (Craig et al., 2003) the criterion validity analysis involved comparing data from an accelerometer worn by the participants during the one week test-retest interval (n = 781). Spearman's correlations of the weekly totals of PA with the accelerometer data had generally good agreement for the short form (pooled p = 0.30, 95% CI 0.23-0.36), and the long form (pooled p = 0.33, 95% CI 0.26-0.39).

The Swiss four questionnaire evaluation (MaDer et al., 2006) demonstrated similar criterion validity result. Of the original sample (N =178), 35 completed the

validity portion of the study. Acceptable levels of validity were reported on the IPAQ in walking ($r = 0.38$), total activities ($r = 0.39$), and in moderate activity ($r = 0.43$). IPAQ correlation coefficients for walking ($r = 0.38$) and moderate activity ($r = 0.39$) were higher than the OIMQ at a statistically significant level when compared to the accelerometer generated data ($p < .05$).

In a cross sectional study (N = 50) of Swedish men and women conducted to evaluate construct validity of the IPAQ, significant correlations were observed when comparing the subjects' previous seven days physical activity log books, activity monitor and aerobic fitness and body composition (Hagstromer, Oja, & Sjostrom, 2006). Significant correlations were demonstrated with the IPAQ scores of time in vigorous-intensity PA ($n = 46$, $p = 0.71$, P < 0.001) and total time in PA ($n = 46$, $p = 0.55$, P < 0.001) when compared to accelerometer readings. No significant correlation was found with IPAQ score for moderate-intensity PA and accelerometer readings ($p = 0.12$) or with self-report of sitting activities IPAQ score and accelerometer counts < 101 counts ($p = 0.17$). In comparison of aerobic fitness, total amount moderate-intensity PA and total weekly PA weak positive correlations were demonstrated ($p = 0.21$, $P < 0.05$). The IPAQ was a more significant measure of vigorous-intensity PA and total time in PA than it was a measure of aerobic fitness.

The IPAQ is used in many countries (Craig et al., 2003). In the United States it has been used to evaluate PA in a number of populations: the Old Order Amish (Bassett, Schneider, & Huntington, 2004), after gastric bypass in obese adults (Bond et al., 2006), in post menopausal women (da Silva, Costa-Paiva, Pinto-Neto, Braga, & Morais, 2005) and assessment of walking in a middle-income country (Hallal et al., 2005).

Heart-Healthy Diet

Heart-healthy dietary intake was measured using the PrimeScreen, a brief

instrument used to assess average consumption of specific foods and food groups of

adults in primary care settings (Rifas-Shiman et al., 2001). The developers of

PrimeScreen sought to create an instrument that would be based on research evidence of

both the effects of dietary factors on Americans' mortality and morbidity, and the effects

of dietary changes on long term health gains. A secondary goal was to develop an

instrument that was brief and easily implemented in the primary care setting (Rifas-

Shiman et al., 2001).

PrimeScreen assesses the average frequency of consumption of specific food

groups, and is not a measurement of total dietary intake. Five response options are given

for the frequency of consumption: less than once per week, once per week, 2-4 times per

week, nearly daily or daily, or twice or more per day (Rifas-Shiman et al., 2001). The

scale specifically assesses intake of fruits, vegetables, whole grains, fish, red meat, low-

and whole-fat dairy items, and saturated and un-saturated fats.

The first 18 items of the questionnaire include examples of the most commonly

consumed foods in each category; the last seven items assess the intake of vitamins and

supplements. Each category of food is given a positive or negative value based on the

level of consumption. The total score is calculated by adding each value to give a

summary variable. Scores of $35 - 42$ indicate excellent intake of a nutritionally healthy

diet, $16 - 34$ indicates a good dietary intake, and $1 - 15$ indicates a dietary intake lacking

the recommended intake of nutritionally healthy foods and nutrients (Rifas-Shiman et al.,

2001). Heart-healthy diet was further categorized as score greater than or equal to 16 or score less than 16.

Construct validity of PrimeScreen was assessed by comparing it with the semi-quantitative food frequency questionnaire (SFFQ), a full-length 131-item food frequency review. Comparison of the instruments was conducted by administering both to men and women aged 19 – 65 years of age ($N = 160$) (Rifas-Shiman et al., 2001). Test – retest reliability of the instrument was assessed by computing Spearman correlation coefficients of food groups and 13 selected nutrients in two administrations of PrimeScreen (Rifas-Shiman et al., 2001). Spearman correlation coefficients ranged from 0.50 for other vegetables to 0.87 for added salt, the mean r was 0.70; correlations of each of the food groups and selected nutrients ranged from 0.36 for other vegetables to 0.82 for whole eggs with a mean r of 0.61. Validity was assessed by calculating the correlation between the PrimeScreen administered closest in time to administration of the SFFQ. The overall scores as well as subgroup correlations were evaluated by gender (Female, $r = 0.69$; Male, $r = 0.70$), race (White, $r = 0.72$; Black, $r = 0.64$) and education (College graduate, $r = 0.74$, Some College, $r = 0.64$).

PrimeScreen sensitivity, specificity and positive and negative predictive values for selected cut-points of fruit and vegetable consumption and percent of energy from saturated fats were evaluated. At the cut-point of three servings per day, PrimeScreen had: a positive predictive value of 0.67, negative predictive value of 0.73, sensitivity of 0.73 and specificity of 0.67 when compared to SFFQ results (Rifas-Shiman et al., 2001). The data supports the reliability and validity of the shorter instrument (PrimeScreen) in comparison with a longer, established instrument such as the SFFQ. PrimeScreen was

found by 90% of the survey participants to be easy or very easy to understand, and 87% were able to complete the survey in less than ten minutes (Rifas-Shiman et al., 2001).

Financial Strain

Financial strain was assessed by asking participants to respond to the following question from the SWAN study (Sowers et al., 2000): how hard is it to pay for the very basics like food, housing, medical care and heating? The choices were: 0 = not hard, 1 = hard or 2 = very hard, with higher scores reflecting more financial strain.

Smoking and Alcohol

Smoking status and alcohol ingestion was assessed through questions in the demographic section of the survey. For cigarette smoking status participants were asked to answer the following question (based on the National Health Interview Survey (NHIS), National Center for Health Statistics, 2008):

Which answer best describes your current smoking status:

- ○   Current every day smoker
- ○   Current some day smoker
- ○   Former smoker
- ○   Never smoked

Participants were then categorized as being a current every day smoker, current some day smoker, former smoker or never smoker. For the final analysis this variable was further categorized into current smoker (current every day, current some day smokers) and non smoker (former smoker and never smoked).

Alcohol ingestion was assessed by asking the participants to respond to the following question:

Which answer best describes your usual alcohol use:

○   Never drink alcohol

○   Drink alcoholic beverage, but not more than 1 – 3 alcoholic beverages per

        week

○   Drink alcoholic beverage daily, but not more than one alcoholic drink per day

○   Drink alcoholic beverage daily, usually two or more alcoholic beverage per

        day.

Participants were categorized as abstains from alcohol, drinks alcoholic beverages but not more than 1 – 3 per week, drinks alcoholic beverages but not more than 1 per day or drinks 2 or more alcoholic beverages per day. For the final analysis this variable was further categorized into drinks more than 1 drink per day or drinks less or no drinks per day.

        Demographic Information included: self-reported age, educational level, marital status and race/ethnicity.

Data Management and Data Collection

        Prior to the initiation of data collection, a codebook for the study variables was developed. Each survey was assigned a unique identification number prior to distribution. The primary investigator was the only data collector for this study. Each returned survey was reviewed for completeness and missing data identified. As the packets were returned the survey were separated from the raffle ticket. The raffle ticket, with identifying information, was placed in a storage box separate from the surveys. The surveys were stored in a locked file cabinet in the investigator's office. As the surveys were returned,

data was double-entered into SPSS v. 16. Hard disk computer data files were backed up on external data memory cards for added data security.

Data Analysis

Statistical consultation was provided by a University of Massachusetts bio-statistician. Data were evaluated for dispersion and central tendencies, identifying outliers or implausible associations. Printouts of the variables were reviewed and checked for out of range entries. Descriptive statistics were computed to describe the sample characteristics. Missing data were handled according to the directions for each instrument. The HDFQ-2 score was based on the number of correctly answered questions; unanswered questions were not counted towards the total score. In the HDFQ-2 "I don't know," refused or missing data were coded as such, only the correctly answered questions were summed to give the score for this instrument. For the SNS the mean score was calculated from those questions answered in the survey, those not answered were not calculated into the mean but the case was included in the analysis. Data cleaning for the IPAQ followed the protocol within the Guidelines for Data Processing and Analysis of the IPAQ. If there was "refused" or "I don't know" or data were missing then the case was removed from the analysis (IPAQ Guidelines, 2005).

The descriptive statistics to describe the sample characteristics showed the HDFQ-2 (knowledge of CVRFs measure) scores and the physical activity variables were not normally distributed. The physical activity variable normalized with a square root transformation, but the HDFQ-2 scores' distributions were not amendable to transformation. Non-parametric analyses were used to evaluate the HDFQ-2 variable for each research aim. An alpha level of .05 was set for each test.

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Demographic variables of age, financial strain and education levels were dichotomized for certain data modeling and used when noted in the analyses descriptions. Age was dichotomized by applying the study population's median age as a cut point. Given the small number of responders listing financial strain as very hard this variable was collapsed into hard (combining hard and very hard) and not hard. Education was collapsed from the nine categories into no college education and some or more college education.

Total scores were calculated for the HDFQ-2, SNS, IPAQ and PrimeScreen. The distributions of continuous data were evaluated and transformations performed as noted to meet the assumptions of the statistical procedures outlined below. Cronbach's' alphas were calculated for HDFQ-2, SNS, IPAQ and PrimeScreen.

Aim 1: Describe 35 to 55 year-old women's knowledge of cardiovascular disease risk factors, levels of self-nurturance and their participation in heart-healthy behaviors (physical activity, heart-healthy dietary intake, smoking status and daily alcohol intake). Descriptive statistics were computed to address Aim 1 and included: frequencies, measures of central tendency and measures of dispersion within the sample.

Aim 2: Describe the relationship between self-nurturance and participation in heart-healthy behaviors (physical activity, heart-healthy dietary intake, and smoking status) in this cohort of women.

Pearson's Product-Moment Correlation Coefficients was computed for those variables with normal distributions to asses the relationships between knowledge, self nurturance and heart-healthy dietary intake score, non-smoking status and physical activity. Spearman Rank-Order Correlation Coefficients was calculated for the HDFQ-2

as it was not normally distributed nor was it amendable to either square root or log transformation.

Logistic regression was used to assess the relationship between the levels of knowledge of CVRFs and levels of SN with the binary variables of non-smoking status, physical activity and heart-healthy dietary intake

Aim 3: Describe differences in level of CVRFs knowledge, self-nurturance and heart-healthy behaviors by age, education level and financial strain.

Difference in knowledge levels by the sociodemographic variables (age, education, and financial strain) as categorical variables were assessed with the non-parametric Mann Whitney U analysis. Chi-square analysis was used for the dependent variables (recommended physical activity, recommended heart-healthy dietary intake and non-smoking status) as binary outcomes with each categorized independent demographic variable (age, college education and financial strain). This process evaluated the unadjusted associations of each of the demographic variables with each heart-healthy behavior.

Student t-tests were used to evaluate the differences for the continuous scored heart-healthy behavior of physical activity by minutes per week and heart-healthy dietary intake score by age group, educational category and financial strain category. A chi square analysis was used to evaluate non-smoking status by age (median cut point categories), educational category and by financial strain category. Binary logistic regression was used to evaluate the heart-healthy behaviors as binary variables with the set of continuous measure demographic IVs.

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Aim 4: Determine the effect of CVRFs knowledge, self-nurturance, age, educational level and financial strain on women's participation in heart- healthy behaviors.

Data were analyzed through expansion of the binary logistic regression model developed for AIM 3 and expanded by adding knowledge of CVRFs and SN into the model with the four demographic IVs. This analysis evaluated if knowledge of CVRFs and SN levels contributed any explanatory power after accounting for the demographic variables.

Protection of Human Subjects

All procedures related to this study were submitted for approval to the IRB at the University of Massachusetts Medical School. A cover letter describing the study purpose and aims was given to each woman participating in the study. The letter explained the risks and benefits associated with participating in the study. There were minimal anticipated risks associated with participation in the study. Benefits associated with participation were possible increased awareness of implications of CVD in women as well as increased awareness of the national campaigns to educate women on heart health. The women participating in the study had a chance to win the "Caring for your Heart - Healthy" basket. A returned survey was considered consent to participate in the study.

There were no physical or psychological risks anticipated. The completion time for the questionnaires was approximately 15 -20 minutes (according to pilot data) and would not be an undue burden to the women participating in the study.

Limitations

Generalizability is limited secondary to convenience sampling from a venue in a specific geographic area. The demographics of the targeted geographic area did limit the number of participants from varied ethnic or racial categories. A potential response bias could be present because those women completing the survey may have been more likely to participate in a healthy lifestyle and thus not reflect the general 35 to 55 year-old women in the community. Financial strain may have had a stronger implication at this time (Winter 2008 -2009) as historic events of escalating cost of gas, numerous foreclosures on mortgages and the precarious nature of the economy has had a national impact. Lastly, the researcher is a primary healthcare provider in one of the towns in the targeted geographic area and may have been recognized by the women presenting to the venue on subject recruitment days. Though not foreseen as a problem, a bias based on familiarity with the researcher may have influence the woman' decision concerning participation in the study.

The conceptual model used has not been extensively tested and never in this context. As the model was only guiding the researcher, the proposed research was not a test of the model and would have limited function in expanding the theory surrounding the wellness model.

Conclusions

This study used a cross-sectional survey design to describe 35 to 55 year - old women's knowledge of cardiovascular risk factors, levels of self-nurturance and participation in heart-healthy behaviors. The Nemcek Wellness Model served as the conceptual framework guiding the research. It was anticipated that this study would help

identify interventions that would raise women's knowledge of their CVRFs and promote

heart-healthy activities and wellness in pre-menopausal women.

Chapter 4

Results

This chapter presents an analysis of the study data. First, the sample

characteristics are described. Second, study findings are organized according to research

aim. Finally, results related to the study hypotheses are discussed.

Sample

Data collection took place from January through February 2009. Two hundred

and fifty-eight surveys were distributed and 147 were returned resulting in a response rate

of 57%. Eleven of the returned surveys were excluded because the participants did not

meet the inclusion criteria of having had a menstrual cycle in the last six months and they

were not using a contraceptive method that prohibited menstruation.

The majority of participants were white (94.9%) and married (80.1%) with a

mean age of 45.2 years (Table 3). Most of the study participants did not smoke (80.1%),

rarely or never drank alcohol (57.4%) and were not experiencing financial strain (70.6%)

(Table 3). Just slightly more than half had post-high school education (50.9%) and only

2.2% had not completed high school. Data on race were consistent with demographic

information available for Windham County. Participants in this study were white

(94.9%) with less than 2.2% representing racial minorities (Table 3). Only 1.5% of the

participants were without medical insurance.

Results

Aim 1: Data related to Aim 1 (Describe 35 to 55 year-old women's knowledge of

cardiovascular disease risk factors, levels of self-nurturance and their participation in

heart-healthy behaviors) were evaluated by using frequencies, measures of central

tendency and measures of dispersion within the sample. Table 4 displays each of the
scores from the measures of women's knowledge of CVRFs (HDFQ-2), self-nurturance
survey (SNS), heart-healthy dietary intake (PrimeScreen Survey) and participation in
daily physical activity (IPAQ). Reliability coefficients are listed for the multi-item
measures in Table 4. Cronbach's alpha was acceptable for both the HDFQ-2 (0.85) and
SNS (0.92). The Prime Screen Nutritional scale Cronbach's alpha for this study was
minimally acceptable at 0.60.

Heart-healthy behaviors included: non-smoking status, alcoholic beverage intake
of less than one per day, physical activity of 30 or more minutes per day and a
PrimeScreen score greater than 16. Table 5 displays the results of each heart- healthy
behavior. The majority of women participating in the survey were former or non smokers
(80%) and 20% were some day or everyday smokers. Women were generally active with
58 % reporting at least 30 minutes of exercise each day. Forty-two percent of the sample
reported less than 30 minutes of exercise per day. Heart-healthy dietary intake was
measured as a PrimeScreen score of 16 or better. Scores ranged from -9 to 30 ($M = 8.46$,
$Mdn = 9$, Mode = 12) of a possible maximum of 38, but when categorized into
inadequate (≤ 16) or adequate (> 16) dietary intake, the majority of participants (85%)
did not meet the recommended nutritional intake for a heart-healthy diet.

Alcoholic beverage consumption was removed from the analysis because only
one participant indicated that she consumed more than one drink per day (which is
considered a non-heart healthy behavior for this study). Race and ethnicity were also
eliminated from the analysis because there were only three racial or ethnic minorities in
this sample.

The HDFQ-2 scores, with higher scores reflecting more knowledge of CVRFs, ranged from 0 to 25 correct ($M = 19.53$, $Mdn = 21$, Mode = 22). This cohort of women had high knowledge of CVRFs and thus the knowledge variable was significantly skewed and not amendable to either square root or log- transformation. Therefore, non-parametric statistics were utilized to evaluate HDFQ-2 scores as they related to the variables of interest.

Self-nurturance (SN) mean scores ranged from $2.07 - 4.72$ ($M = 3.41$, $Mdn = 3.38$, Mode = 2.70, SD = .60) with a normal distribution. Higher self-nurturance scores indicated more self-nurturing behaviors by the participants.

AIM 2: Data related to Aim 2 (Describe the relationship between self-nurturance and participation in heart-healthy behaviors (physical activity, heart-healthy dietary intake, smoking status and alcohol intake) in this cohort of women) are presented in Tables 6. Pearson Correlations were used to test the relationships between self-nurturance and the continuously scored behaviors of physical activity and heart-healthy dietary intake score. A moderate correlation was found between self-nurturance and heart-healthy dietary intake score ($r = .331$, $p < .05$) but not with minutes per week of physical activity ($r = .029$, $p < .05$). It would make sense to move the results for unadjusted associations of knowledge vs. heart-healthy behaviors here.

AIM 3: Data related to Aim 3 (Describe differences in level of CVRFs knowledge, self-nurturance and heart-healthy behaviors by age, education level and financial strain) are presented in Tables 7 through 20.

Difference in knowledge levels by heart-healthy behaviors, age, education and financial strain categories were assessed with non-parametric analysis. Knowledge level

was not significantly different by age group defined as either ≤ 46 years of age or > 46 years of age (using a median split) ($Z = -.652$, $p = .52$). Both education ($Z = -2.55$, $p = .01$) and financial strain ($Z = -2.08$, $p = .04$) were significantly related to knowledge score (Table 7). The categories of less financial strain and the college education categories were associated with higher knowledge scores. In evaluating associations of knowledge with the heart-healthy behaviors no differences were seen by smoking status ($Z = -1.59$, $p = .112$), physical activity category ($Z = -1.83$, $p = .067$) or heart-healthy dietary intake ($Z = -1.76$, $p = .079$) (Table 7).

Chi-square analysis was used for the dependent variables (recommended physical activity, recommended heart-healthy dietary intake and non-smoking status) as binary outcomes with each categorical independent demographic variable and displayed in Tables 8 through 11.

Physical activity category. Physical activity was not significantly different by age group (Grouped by ≤ 46 years or > 46 years) ($\chi2$ (1, N = 136) $= .012$, $p = .91$) or by educational category (no college education or at least some college education) ($\chi2$ (1, N = 136) $= .609$, $p = .44$). Physical activity was significantly different by financial strain category ($\chi2$ (1, N = 136) $= 4.270$, $p = .04$). Those participants rating less financial strain were more likely to participate in recommended minutes per week of physical activity. Table 8 gives the details for physical activity category with the number and percentage of women by each sociodemographic variable.

Heart-healthy dietary intake category. Heart-healthy dietary intake was not significantly different by age group ($\chi2$ (1, N = 136) $= 1.021$, $p = .31$) or by financial strain category ($\chi2$ (1, N = 136) $= 2.737$, $p = .10$) but was significantly different by

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college educational category ($\chi2$ (1, N = 136) = .4.427, p = .04) (Table 9). Those with no college education were less likely to have heart-healthy dietary intake.

Non-smoking status category. No significant difference was seen for non-smoking status by age group ($\chi2$ (1, N = 136) = .984, p = .32), financial strain category ($\chi2$ (1, N = 136) = .943, p = .33) or by college educational category ($\chi2$ (1, N = 136) = .1.003, p = .32). Table 10 displays these findings.

Age group by median cut. Chi square analysis was used to assess the differences in age group ($\leq$ 46 years or > 46 years) by heart-healthy behaviors, financial strain and education category (Table 11). No significant differences were noted in age groups by heart-healthy behaviors, financial strain or education.

Self-nurturance. Differences in levels of self-nurturance by heart-healthy behaviors and by demographic variable were evaluated using the t-test statistic for the continuous variables and chi square statistic for the categorical variables (Table 12 through 16). Significant differences were noted in self-nurturance by heart-healthy dietary intake, college educational category and financial strain category. When analyzed with the student t-tests, no significant differences were noted in self-nurturance by physical activity or by non-smoking status.

Tables 17 and 20 display the t-test findings for physical activity (by minutes per week) and heart-healthy dietary intake score by age group, educational category and financial strain category. No significant difference was noted in physical activity or hearty-healthy dietary intake by age median cut category, college educational category or financial strain category.

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Logistic regression was used to assess the relationships between the heart-healthy behaviors as binary outcomes and levels of knowledge of CVRFs and levels of SN (Aim 3). Each of the heart-healthy behaviors of physical activity, heart-healthy dietary intake and non smoking status were first modeled with the demographic variables of age, financial strain and college education. A second model for each heart-healthy behavior as a DV was analyzed with knowledge score and self-nurturance mean scores as additional IVs and is addressed in the discussion of Aim 4 below.

In model 1 for non-smoking behavior the DV of non-smoking was yes. Yes was equal to 1 if the participant would be a non-smoker and 0 if otherwise. The results from non-smoking model 1 indicated that women's non-smoking behavior was not predicted by age group ($B = .48$, $p = .29$), financial strain category ($B = .34$, $p = .50$) or education category ($B = -.48$, $p = .34$) (Table 21)

In model 1 for heart-healthy dietary intake the DV of recommended nutritional intake was yes. Yes was equal to 1 if the participant had a nutritional intake score of greater than 16 and 0 if otherwise. The results from recommended nutritional intake indicated that women's nutritional intake was not predicted by age group ($B = .72$, $p = .16$), financial strain category ($B = .68$, $p = .33$) or education category ($B = -1.13$, $p = .07$) Table 22).

For model 1 of physical activity the DV of recommended physical activity was yes. Yes was equal to 1 if the participant had a physical activity level of 30 or minutes of physical activity per day and 0 if otherwise. The results from this model indicated that women's physical activity level was not predicted by age group ($B = .054$, $p = .89$) or education category ($B = -.021$, $p = .96$). However, physical activity was predicted by

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perceived "hard" financial strain category ($B = .82$, $p = .05$) indicating that women with financial strain were less likely to engage in the recommended level of heart-healthy physical activity. Results are displayed in Table 23.

AIM 4: Data related to Aim 4 (Determine the effect of CVRFs knowledge, self-nurturance, age, education and financial strain on women's participation in heart-healthy behaviors) were evaluated as an expansion of the logistic regression model 1 developed for Aim 3 and as displayed in Tables 21 through 23. Logistic regression model 2 assessed the relationships between the heart-healthy behaviors as binary outcomes with the demographic variables of age, financial strain and college education with the additional covariates of levels of knowledge of CVRFs and levels of SN.

In model 2 for non-smoking behavior the DV of non-smoking was yes. Yes was equal to 1 if the participant would be a non-smoker and 0 if otherwise. Results from the non-smoking model 1 indicated that women's non-smoking behavior was not predicted by age group ($B = .90$, $p = .10$), financial strain category ($B = .41$, $p = .58$), education category ($B = -.66$, $p = .32$) or knowledge of CVRFs ($B = .11$, $p = .16$). However in Model 2, self nurturance predicted smoking status ($B = 1.19$, $p = .01$) (Table 21). These findings suggest that those women with higher levels of SN were less likely to be smokers. Caution must be used in interpreting these findings, since 80% of the study population was non-smokers.

In model 2 for heart-healthy dietary intake the DV of recommended nutritional intake was yes. Yes was equal to 1 if the participant had a nutritional intake score of greater than 16 and 0 if otherwise. The results from recommended nutritional intake indicated that women's nutritional intake was not predicted by age group ($B = .90$, $p = $

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.10), financial strain category ($B = .41$, $p = 58$), education category ($B = -.66$, $p = .32$) or knowledge of CVRFs ($B = .11$, $p = .16$) (Table 22). Self-nurturance did predict the intake of a heart-healthy diet ($B = 1.19$, $p = .01$). This has limited predictive value because 88% of the study population fell below the designated recommended nutritional score of 16 on the PrimeScreen nutritional assessment.

For model 2 of physical activity the DV of recommended physical activity was yes. Yes was equal to 1 if the participant had a physical activity level of 30 or minutes of physical activity per day and 0 if otherwise. The results from this model indicated that women's physical activity level was not predicted by age group ($B =.-.03$, $p = .97$), education category ($B = .10$, $p = .83$) or financial strain category ($B = 79$, $p = .07$). The addition of self-nurturance ($B = -.09$, $p = .79$) and knowledge ($B = .07$, $p = .10$) did not predict physical activity level (Table 23).

Hypothesis

Three *a priori* hypotheses were presented for this research study based on the Self Nurturance Framework. Study findings are summarized as they relate to each hypothesis.

Hypothesis 1: Women with higher levels of knowledge of CVRFs will participate in more heart-healthy behaviors (moderately intense physical activity; a heart-healthy diet, non-smoking status and consumption of no more than one alcoholic beverage per day). No relationships were found between knowledge of CVRFs and heart-healthy behaviors, thus hypothesis 1 was not supported.

Hypothesis 2: Women with higher levels of Self-Nurturance will participate in more heart-healthy behaviors (moderately intense physical activity; a heart-healthy diet, non-smoking status and consumption of no more than one alcoholic beverage per day).

Self-nurturance was related to better heart-healthy dietary intake and minimally correlated with age and educational levels. This was further evaluated for the predictive value of SN on the heart-healthy behaviors. Self nurturance predicted smoking behavior and heart-healthy dietary intake. The value of these findings is limited, because 88% of the study population did not meet the minimum heart-healthy dietary score of 16 and 80% of the study population were non-smokers. Self-nurturance may be predictive of heart-healthy dietary intake and non-smoking status but was not significant in predicting the heart-healthy behavior of physical activity. Hypothesis 2 was only partially supported.

Hypothesis 3: Self-Nurturance moderates the relationship between knowledge of CVRFs and women's participation in heart-healthy behaviors (increase level of heart-healthy behaviors: moderately intense physical activity; eating a heart-healthy diet, non-smoking status and consumption of no more than one alcoholic beverage per day). The relative lack of variability in knowledge may account for the lack of associations between knowledge and heart-healthy behaviors. This lack of variability in knowledge also resulted in an inability to examine effect modification of self-nurturance with knowledge therefore hypotheses 3 could not be evaluated in this sample.

<center>Summary</center>

Results of this study demonstrated that premenopausal women in this sample were quite knowledge about CVRFs. Most women participated in heart-healthy behaviors including not smoking, drinking minimal alcohol, and participating in some physical activity. Study participants also exhibited a moderate level of self nurturance. In contrast, only 15% of the women described a diet that met the heart-healthy recommendations.

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The major analyses revealed that knowledge did not predict heart health behaviors. Only self nurturance and financial strain had predictive value in the final model with self nurturance predicting more physical activity, better diet and non smoking status. Additionally, less financial strain predicted more physical activity. The results of this study will be discussed further in the following chapter.

Chapter 5

Discussion

The purpose of this study was to investigate pre-menopausal women's (ages 35-55) knowledge of CVRFs, levels of self-nurturance and participation in heart-healthy behaviors. The Nemcek Wellness Model (Nemcek, 2003) was used to guide this study and although self nurturance was useful for predicting heart-healthy dietary behaviors, the rest of the model was not supported in this study. This chapter will discuss study findings related to knowledge of CVRFs, self-nurturance, financial strain, education and the Nemcek Wellness Model. Study limitations, implications for practice and directions for future research will also be discussed.

Knowledge

Study participants were highly knowledgeable about CVRFs. Most participants were able to identify that family history of CVD, hypertension, elevated cholesterol, smoking, and inadequate physical activity were important risk factors for CVD. More than half of the participants identified that age, low HDL cholesterol; elevated blood sugar and a history diabetes were also important risks. Thus, women in this study demonstrated higher levels of knowledge compared to those reported by Mosca, Mochari et al (2006) where only 48% correctly identified elevated blood pressure, 37% identified low High Density Lipids (HDL), 31% identified elevated blood sugars and 21% identified elevated Low Density Lipids (LDL). Improvement in knowledge may be related to the increased media attention and national educational programs (e.g., Red Dress or National Women's Heart Health Initiative) aimed at increasing women's awareness of CVRFs. Christian et al. (2007) evaluated findings on the change in

knowledge of CVRFs since the inception of the national education campaign to raise women's awareness of CVD. The women in that cohort recognized the need for blood pressure control (97%), reduction in dietary cholesterol intake (93%), maintaining healthy total cholesterol levels (96%) and the need for daily exercise (96%) to promote heart-health.

Knowledge did not correlate with or predict heart-healthy behaviors in this study, but it may have been the relative lack of variability in the knowledge scores that may account for the lack of associations with heart-healthy behaviors. Knowledge did differ by education level and financial strain. Participants who had attended at least some college scored higher on the knowledge scale compared with women who had not attended college. This was consistent with the findings from previous studies of women's knowledge with populations that had higher educational levels. Mosca, Mochari et al. (2006) evaluated the predictive value of education (< college degree or ≥ college degree) with women's awareness of CVRFs. Women with lower education levels were less aware (OR, 0.45; 95% Cum 0.33 to 0.61) of CVRFs. Knowledge differences by education levels were also seen in a study of young adults 18- 39 years and their CVRFs knowledge (Lynch, Liu, Kiefe & Greenland, 2006). Participants with fewer than 12 years of education were less likely to be knowledgeable about CVRFs compared with those who have a post high school education. Potvin, Richard & Edwards (2000) found that among 23, 129 study participants, the odds ratios of reporting an association of CVRFs between people with elementary education and those with university degrees varied between 0.16 (95%, CI 0.12 to 0.22) for lack of exercise to 0.55 (95%, CI 0.39 to 0.77) for smoking.

Knowledge levels were also lower in those women experiencing more financial strain. Potvin, Richard & Edwards (2000) also found that women with lower incomes exercised less (OR, 0.68, CI 0.48-0.96), had higher cholesterol levels (OR, 0.75, CI 0.52-1.06) and were more likely to smoke (OR, 0.86, CI 0.75-0.98). Similarly, Choiniere, Lafontaine & Edwards (2000) reported significant differences between income levels and knowledge of CVD with lower SES associated with lower knowledge levels. No specific statistical results were published.

These results suggest that CVRFs behaviors are not related to women's knowledge. Similarly, Oliver-McNeil & Artinian (2002) found that among a small sample ($N = 33$) of white, suburban, middleclass women, knowledge was not related to risk-reducing behaviors. No differences by knowledge were reported for nutritional intake or physical activity. These risk-reducing behaviors were measured with the Health Promoting Lifestyle Profile II with a reported nutritional mean score of 2.64 (SD 0.72) and physical activity mean score of 1.76 (SD 0.55).

Health behavior studies often propose a linear relationship between psychosocial predictors (such as knowledge) and the expected behavioral outcome, which fails to account for the human dynamic (Noar & Zimmerman, 2005). In discussion of health behaviors, Schüz, Sniehotta, Mallach, Wiedemann, & Schwarzer (2009) introduced a concept they identified as the "intention behavior gap" where the participants are knowledgeable but knowledge is not translated into action. Knowledge levels may assist individuals in goal setting or identifying what needs to be done; but knowledge does not offer an explanation about what moves individuals to change behavior. Thus, increased

knowledge of CVRFs may increase awareness but not behavior (Marx, Nedelmann, Haertle, Dieterich & Eicke, 2008).

Self-nurturance

The self-nurturance mean score from this study ($M = 3.41$) was consistent with the mean score reported by Nemcek (2007) in the nurses' SN and life and career satisfaction study ($M = 3.5$). These scores represent a moderate to moderately high level of self-nurturance (score range 1 - 5). The present study found that self-nurturance was moderately correlated with heart-healthy dietary intake scores. Those participants with higher self-nurturance scores were more likely to describe eating a heart-healthy diet. Unexpectedly, there was no relationship between the heart-healthy behaviors of physical activity or non-smoking status and self-nurturance. There were differences in self-nurturance by education and financial strain. Women who had not attended college and those with more financial strain had lower self-nurturance scores. This may suggest that self-nurturance is a concept that is socioeconomically biased

Self-nurturance is a process. In choosing to engage in a wellness behavior the individual must first have the knowledge and rationale to act, the ability to identify self as a separate entity and the capacity to implement the action (Nemcek, 1987). Findings from this study indicated that women had the knowledge about CVRFs; yet no significant relationships were found between knowledge levels and engaging (implementing action) in heart-healthy behaviors. Further exploration of the SN process may need to focus on the ability to identify self as a separate entity or the ability or capacity of the individual to implement the desired action and whether this concept is laden with socioeconomic or cultural bias.

Financial Strain

   Financial strain was related to knowledge of CVRFs, self-nurturance levels and it was predictive of physical activity. Those participants with less financial strain were more likely to participate in the recommended 30 minutes a day of physical activity. These findings partially support economic constraints as a predictor of lower physical activity. Previous physical activity research identified certain demographics such as education and socioeconomic status as predictors of physical activity (Trost, Owen, Bauman, Sallis, & Brown, 2002).

   Financial influence may also be seen with the heart-healthy dietary intake. When categorized into inadequate ($\leq$ 16) or adequate ($>$ 16) of heart-healthy dietary intake as over 87% of the study population did not meet the recommended levels. Mean scores varied in the areas of fresh fruits and vegetables with ranges of 1.2 – 1.8, with higher means indicting higher levels of intake. Higher means were also observed in less desirable categories of processed foods such as white pasta and bread (Mean = 1.7) and baked goods (Mean = 1.2). This finding may reflect the time of year (winter months) and the associated higher cost of "out of season" fresh fruits and vegetables in the Northeast U.S. Another consideration is the relative lower cost associated with pasta and processed meats when compared to lean meat proteins, fish/seafood, fresh fruits and vegetables. Food prices and availability have been identified as barriers to nutrient-dense diets (Jetter & Cassidy, 2005). Though the majority of women did not indicate high financial strain, their perceived lower levels of financial strain may be a result of self imposed budgetary limitations.

Smoking Status

The majority of women participating in the survey were former or non smokers (80%) and 20% were some day or everyday smokers. These statistics are slightly higher than the Connecticut state smoking rates (18.5%) as monitored nationally by the CDC (2008b) for the same age group as this study population. Fewer women aged 46 years or younger reported smoking (16.9%) than those women over 46 years of age (23.7%). This was not statistically significant in this study, but clinically would indicate the need to assess smoking practices among all age groups.

Alcohol Use

For this study the threshold for unhealthy alcohol ingestion was more than one per day. Only 1 study participant drank more than one alcoholic beverage per day. Therefore, the effect of knowledge and SN on alcohol consumption could not be evaluated in this study. The Behavioral Risk Factor Surveillance System Data for 2007 in Connecticut suggest that 6% of the female population reported drinking one or more drinks per day (CDC, 2007). Though anonymity was assured in this study, less than 1% reported more than one drink per day, therefore the potential for a social desirability bias in responding to this question must be considered.

Nemcek Wellness Model

Select variables from the Nemcek Wellness Model (NWM) were evaluated in this research. The variable of SN provided some explanatory power. However, the model was less useful for explaining the influence of knowledge of CVRFs on any of the measured heart healthy behaviors. No literature was found that used the NWM to evaluate heart-healthy behaviors. Therefore, no comparisons can be made with other studies. Further

evaluation of self-nurturance as a health promotion-related concept may be useful. However, this model appears to be less useful for explaining the complex factors that predict heart healthy behaviors in women.

Sample Issues

The study sample included mostly White women who were experiencing minimal financial strain. During recruitment, the researcher observed that minority women were frequently present at the venue selected. However, minority women were more likely to decline participation in the study (i.e. they chose not to do the survey or take a survey home to complete, when approached by the researcher). The absence in this sample, of minority women and those who were economically disadvantaged, is problematic because these women are more likely to be unaware of their CVRFs (Mosca, Mochari et al, 2006; Taylor et al, 2002). Therefore, future studies need to consider ways to recruit minority and low income women into CVRF studies.

Recruiting and retaining minority study participants is a priority research area (Gilliss, et al, 2001; Keyzer, et al, 2005; Yancey, Ortega & Kumanyika, 2006) Keyzer et al (2005) described their attempt to recruit a diverse population of women for the Preferences of Women Evaluating Risks and Benefits of Tamoxifen for Breast Cancer Risk Reduction (POWER) Study ($N = 932$). They used an ethnically diverse screening/interview team to recruit study participants. Three cost effective methods were successful in recruiting women for the POWER study. The most successful method was the direct mailing ($n = 341$), second was presentations and on-site recruitment in local community centers and churches with 212 women responding though only 58 were eligible. The third most cost effective and successful was recruiting through an

established community-based health education and promotion program. This method screened 168 women with 46 meeting eligibility requirements. The least successful and most costly methods were the radio and print advertisements. Despite this multifaceted approach to recruitment the study's goal of achieving 33% African-American and Latina representation was not met.

Gilliss et al. (2001) reported on their attempt to recruit minority women into a community-based longitudinal research study. Five different methods (broadcast media, printed materials, face-to-face, direct referral and internet website) were used to recruit ethnic minority women. Broadcast media approaches yielded the largest group of potential study participants but this group also had the highest number of ineligible women and highest attrition rates. Printed materials netted the next highest number of potential candidates but more than 50% were ineligible. Direct referral and face-to-face recruitment had the highest yield of eligible study participants. Participants stated they were drawn to participate when a study was endorsed by institutions that were known to them (their churches, their children's schools or organizations with which they were familiar). In conclusion Gillis et al, suggested that a multifaceted approach to recruiting ethnic minority women for research studies.

Minority recruitment and retention strategies for research participants were reviewed by Yancy, Ortega & Kumanyika (2006). The review spanned the preceding six years and resulted in the identification of themes of methods used to successfully achieve racial and ethnic representation. They described mass-mailing, face-to-face contact, community involvement by the project staff and cultural adaptation by the research staff as effective means to recruitment. Personal contact with face-to-face screening was more

successful with-in the lower SES and African American cohorts. However this method takes longer to recruit the desired number of participants. Future efforts to recruit ethnically diverse women or of the lower SES would be successful if mixed methods were used.

Limitations

There are several important study limitations that need to be considered. First, the study sample included mostly White women. This occurred despite attempts to actively recruit women from diverse racial or ethnic backgrounds. Second, venue sampling was used in an attempt to access low income women. However, the study sample included mostly well-educated women with minimal financial strain. Third, the reliability of the PrimeScreen nutritional assessment scale was lower than anticipated in this study population. Finally, the model (NWM) chosen to guide this study was not used previously to explain heart-healthy behaviors and this may partially explain its limited explanatory power in the present study.

Additional information that was not assessed, but may have assisted in informing the researcher about other contributing factors to the women's lack of heart-healthy behaviors was: women's height and weight to calculate their body mass index (BMI); where they obtained their healthcare (local or outside of the immediate area); and the economic demands beyond that measured by the financial strain measure. These factors may have given additional insight to study findings.

Implications for Practice

Findings from this study suggest that interventions that promote self-nurturance may improve some heart-healthy behaviors among pre-menopausal women. The

counseling paradigm for risk reduction has been based on fear as a motivator to prevent disease or change behavior patterns. A new paradigm that includes self-nurturance may be useful to consider. Primary care providers could focus on the positive aspects of behavior change to improve healthy eating and physical activity as well as support smoking cessation and moderate drinking. In addition, providers could use results of this study to tailor self-nurturing interventions for women with greater financial strain and lower education levels in order to reduce CVRFs.

<div align="center">Implications for Research</div>

Future research should include exploration of self-nurturance as an important health promotion concept. In addition, more work on venue sampling needs to be done. Venue sampling was chosen in order to access women from lower socioeconomic groups (based on the numbers typically attending this particular venue). However, our results suggested that venue sampling may be of limited value for accessing vulnerable populations, such as low income women and minorities. Finally, studies that explore the "intention behavior gap" may be useful for bridging the chasm between knowledge and behavior change.

<div align="center">Conclusions</div>

This study was the first to examine self-nurturance as a concept for promoting heart-healthy behaviors. Results suggest that women are becoming more knowledgeable about CVRFs, but that increase is not being translated into behaviors that would sustain heart health. Knowledge was not correlated with any of the heart-healthy behaviors. Further research on how best to translate knowledge of CVRFs into behavior change is needed. The Nemcek Wellness Model guided this study. However, the key concepts from

this model (knowledge and self-nurturance) provided minimal explanatory power in this study. Only self-nurturance was related to or predicted some heart-healthy behaviors. Finally, the difference in self-nurturance by financial strain and education needs to be explored in future studies to determine if the concept is biased towards more affluent socioeconomic groups.

Table 1. **Survey Measures**

Variable	Number of items	Level of Measurement/ Score range	Reported Reliability
Self Nurturance Survey (SNS)	29	Continuous Range = 29-145	Alpha = 0.92 Test re-test = .94
Physical Activity Questionnaire (IPAQ)	7	Continuous Range = 1-3400	Test re-test = .65-.88
Heart Health Diet: PrimeScreen	18	Continuous Range =1-42	Test-retest = .50-.87
CVD Knowledge: Heart Disease Facts Questionnaire (HDFQ-2)	25	Continuous Range = 0-100 %	KR-20 = 0.77
Smoking	1	Categorical	
Alcohol	1	Categorical	
Financial Strain	1	Categorical	
Age	1	Continuous Range = 35 - 55	
Educational Level	1	Categorical	
Marital Status	1	Categorical	
Race/Ethnicity	1	Categorical	

Table 2 **Time Frame for Study Activities**

Activity	1/09 – 2/09	2/09– 03/09	03/09-05/09
Enroll subjects	XXX		
*Questionnaires collected	XXX		
Data Entry & Cleaning		XXX	
Data Analysis		XXX	
Final Report			XXX

Table 3	**Categorical Variables**
Variable	**Number of Participants (%)**
Marital Status	
Married	109 (80)
Divorced	11 (8)
Single	9 (7)
Living with a partner	7 (5)
Education Level	
High School Diploma/GED	43 (31.6)
Bachelor's degree	34 (25)
Graduate Degrees	27 (19.9)
Technical or Associates' degree	21 (15.5)
Other	8 (5.9)
Did not complete High School	3 (2.2)
Race	
White	129 (94.9)
Native American	2 (1.5)
Asian	1 (.7)
Other	4 (2.9)
Ethnicity	
Not consider self Hispanic	126 (93)
Consider self Hispanic	6 (4)
Missing	4 (3)
Financial Strain	
Not hard	96 (71)
Hard - Very Hard	40 (29)
Smoking Status	
Never or Formerly smoked	109 (80)
Current some/every day smoker	27 (20)
Alcoholic Beverage Use	
Never drink alcohol or drink but not more than 1 per day	135 (99.3)
Drink alcohol, usually two or more per day	1 (.7)
Prime Screen Nutritional Intake	
Adequate or Excellent Nutritional Intake	114 (84)
Inadequate Nutritional Intake	22 (16)

Table 4
Sample Age and Scores on Knowledge, Self Nurturance, Nutrition and Physical Activity Measures[+]

Variable	Mean (SD)	Median	Range of Scores	Cronbach's alpha
Age (years)	45 (5.326)	46	35 - 55	
Cardiovascular Risk Knowledge Score*	19.53(4.551)	21	0 - 25	.85
Self-nurturance Score**	3.41 (.598)	3.38	2.07 – 4.72	.92
Prime Screen Nutrition Score	8.46 (7.184)	9.00	-9 - 30	.60
Physical Activity Weekly minutes	481 (431)	368	0 - 1260	

* Higher scores indicate higher knowledge
** Higher score indicate higher self-nurturance
[+]Variables as continuous values

Table 5
Heart Healthy Behaviors [+]

Behavior	Yes (%)	No (%)
Non Smoking Status	109 (80.1)	27 (19.9)
Alcohol Intake		
Equal to or less than one per day	135 (99.3)	1 (.7)
Physical Activity		
At least 30 minutes per day	86 (63.2)	50 (36.8)
Prime Screen Nutritional Intake		
Meets recommended daily intake	21 (15.4)	115 (84.6)

[+]Heart-healthy behaviors as categorical variables

Table 6

Pearson Correlation Matrix among SN and Heart Healthy Behaviors

	SNS Mean	Physical Activity Minutes per week	Nutrition Intake Score
SNS Mean[+]	1.00	.036	.331*

*p < 0.05 (2-tailed)
[+] Continuous variable

Table 7

Mann Whitney U: Knowledge Difference for Heart Healthy Behaviors and by Age [+]

	(Mean Rank)	U (df)	Z	p
Non-Smoking Status	No (55.7) Yes (71.2)	1181.0(1)	-1.591	.112
Recommended Physical Activity	No (61) Yes (72)	1745.5(1)	-1.833	.067
Recommended Nutrition Intake	No (66) Yes (82)	917.0(1)	-1.756	.079
Financial Strain	No (73) Yes (58)	1485.5(1)	-2.083	.037*
College Education	No (58) Yes (75)	1642.5(1)	-2.552	.011*
Age	≤ 46 yr (70) > 46 yr (66)	2123.5(1)	.652	.520

*p < 0.05 (2-tailed)
[+]As categorical variables

Table 8

Difference in Physical Activity Category by Heart Healthy Behavior, Financial Strain and College Education Category[+]

		≤ 30 min/d # (%)	> 30 min/d # (%)	x	df	p
Non Smoking	No	13 (48)	14 (52)	1.87 [a]	1	.171
	Yes	37 (34)	72 (66)			
Recommended Nutrition Intake	No	44 (38)	71 (62)	.717	1	.397
	Yes	6 (29)	15 (71)			
Financial Strain	No	30 (31)	66 (69)	4.27 [a]	1	.039*
	Yes	20 (50)	20 (50)			
College Education	No	22 (40)	32 (60)	.609 [a]	1	.435
	Yes	28 (34)	54 (66)			

*$p < 0.05$ (2-tailed)

a. cells have expected frequencies less than 5

[+]All variables as categorical

Table 9 **Difference in Heart-healthy diet category by Heart Healthy Behavior, Financial Strain and College Education Category**[+]

		Unhealthy Intake # (%)		Healthy Intake # (%)	x	df	p
Non Smoking	No	27 (100)	No	0 (0)	6.15 [a]	1	.013*
	Yes	88 (81)	Yes	16.8 (19)			
Recommended Physical Active	No	44 (88)	No	6 (12)	.717	1	.397
	Yes	71 (83)	Yes	15 (17)			
Financial Strain	No	78 (81)	No	18 (19)	2.74 [a]	1	.098
	Yes	37 (92)	Yes	3 (8)			
College Education	No	50 (93)	No	4 (7)	4.43 [a]	1	.035*
	Yes	65 (80)	Yes	17 (20)			
Age > 46 yr	No	63 (82)	No	14 (18)	1.02	1	.312
	Yes	52 (88)	Yes	7 (12)			

*$p < 0.05$ (2-tailed)

a. cells have expected frequencies less than 5

[+]all variables as categorical for analysis

Table 10

Difference in Non-Smoking Status Category by Age Category, Financial Strain Category and College Education Category**

		Non-Smoker # (%)		Smoker # (%)	x	df	p
Age Category	≤ 46 yr	64 (83)	≤ 46 yr	13 (17)	.984 [a]	1	.32
	> 46 yr	45 (76)	> 46 yr	14 (24)			
Financial Strain	None	17 (68)	None	79 (32)	2.74 [a]	1	.10
	Hard	10 (32)	Hard	30 (77)			
College Education	None	13 (48)	None	41 (62)	1.00 [a]	1	.32
	Some +	14 (52)	Some +	68 (38)			

*p < 0.05 (2-tailed)

a. cells have expected frequencies less than 5

[+]all as categorical variables

Table 11

Difference in Age Group by Heart Healthy Behavior, Financial Strain and College Education Category[+]

	Age Category	No - # (%)	Yes - # (%)	x	df	p
Non Smoking	≤ 46	13 (16.9)	64 (83.1)			
	> 46	14 (23.7)	45 (76.3)	.984 [a]	1	.321
Recommended Physical Activity Category	≤ 46	28 (28.3)	49 (48.7)	.012	1	.912
	> 46	22 (21.7)	37 (37.3)			
Recommended Nutrition Intake Category	≤ 46	63 (81.8)	14 (18.2)	1.02	1	.312
	> 46	52 (88.1)	7 (11.9)			
Financial Strain	≤ 46	52 (67.5)	25 (32.5)	.798 [a]	1	.372
	> 46	44 (74.6)	15 (25.4)			
College Education	≤ 46	37 (48.1)	40 (51.9)	5.16 [a]	1	.023
	> 46	17 (28.8)	42 (71.2)			

*p < 0.05 (2-tailed)

a. cells have expected frequencies less than 5

[+]Heart-healthy behaviors as categorical variables

Table 12

Means, SD and SEM for each subgroup of Independent-Sample *t*-test Self-nurturance[+] by Heart Healthy Behavior

	Number	*M*	SD	SEM
Physical Activity				
Recommended Yes	86	3.43	.608	.066
No	49	3.30	.585	.084
Alcohol Use				
Recommended Yes	44	3.52	.586	.088
No	77	3.33	.604	.069
Heart-healthy Dietary Intake				
Recommended Yes	21	3.77	.727	.159
No	114	3.35	.550	.051
Non-Smoking Status				
Yes	109	3.40	.606	.059
No	26	3.45	.525	.103

Table 13

Independent-Sample *t*-test of Self-nurturance[+] by Heart Healthy Behavior[++]

	t	df	*p*	MD	SED	CI – 95% Lower	Upper
						t-test for Equality of Means	
Physical Activity	-.419	133	.676	-.045	.107	-.257	.167
Alcohol Use	-1.61	119	.110	-.182	.113	-.406	.042
Heart-healthy Dietary Intake	-3.08	133	.002**	-.425	.138	-.697	-.152
Non-Smoking Status	.385	133	.700	.050	.131	-.209	.310

* significance detected at .05 level.
** significance detected at .01 level.
MD = Mean Difference
SED = Standard Error Difference
CI-95% = 95% Confidence Interval of the Difference
[+]Self-nurturance score as continuous variable
[++]Heart-healthy behaviors as categorical variables

Table 14

Means, SD and SEM for each subgroup of Independent-Sample *t*-test Self-nurturance[+] by Financial Strain and Education[++]

	Number	*M*	SD	SEM
Age				
≤ 46 years	77	3.31	.580	.066
> 46 years	58	3.54	.603	.079
College Education				
No college	54	3.17	.561	.076
Some college	81	3.57	.570	.063
Financial Strain				
Not Hard	95	3.52	.568	.058
Hard	40	3.15	.595	.094

Table 15

Independent-Sample _t_-test Self-nurturance[+] by Financial Strain-Education-Age[++]

	t	df	_p_	MD	SED	CI – 95% Lower	Upper
						_t_-test for Equality of Means	
Financial Strain	3.41	133	.001**	.3703	.10851	.15575	.5849
Education	-4.06	133	.000**	-.404	.099	-.601	-.207
Age	-2.19	133	.03*	-.225	.103	-.428	-.022

** significance detected at .01 level.
* significance detected at .05 level.
MD = Mean Difference
SED = Standard Error Difference
CI-95% = 95% Confidence Interval of the Difference
[+]Self-nurturance score as continuous variable

[++]Categorical variables

Table 16

Difference in Self-nurturance by Age-Education-Financial Stain-Recommended Nutritional Categories

	Number in Category	x	df	p
Age		2.382[a]	1	.016
≤ 46 years	77 (57%)			
> 46 years	59 (43%)			
Education		5.765 [a]	1	.123
No College	54 (40%)			
Some or more college	82 (60%)			
Financial Strain		23.059 [a]	1	.000**
Hard	40 (30%)			
Not Hard	96 (70%)			
Recommended Nutritional Intake		64.97 [a]	1	.000**
Inadequate Intake	115 (85%)			
Adequate Intake	21 (15%)			

**p < 0.01 (2-tailed)
a. cells have expected frequencies less than 5.

Table 17

Means, SD and SEM for each subgroup of Independent-Sample *t*-test of Physical Activity Weekly Minutes[+] by Age-Education-Financial Strain Categories[++]

	Number	*M*	SD	SEM
Age				
≤ 46 years	74	18.55	10.99	1.27
> 46 years	58	19.38	11.50	1.51
College Education				
No college	51	16.87	11.73	1.64
Some college	81	20.19	10.70	1.19
Financial Strain				
Not Hard	94	20.09	10.64	1.10
Hard	38	15.98	12.08	1.99

Table 18

Independent-Sample *t*-test of Physical Activity Weekly Minutes[+] by Age-Education-Financial Strain Categories[++]

	t-test for Equality of Means					CI – 95%	
	t	df	*p*	MD	SED	Lower	Upper
Age Median Cut	-.403	130	.687	-.794	1.97	-4.69	3.10
Education	-1.67	130	-.10	-3.32	1.98	-7.25	.61
Financial Strain	1.93	130	.06	4.10	2.13	-.101	8.32

No significance detected at .05 level.
MD = Mean Difference
SED = Standard Error Difference
CI-95% = 95% Confidence Interval of the Difference
[+]Physical activity as continuous
[++]Age-Education-Financial Strain as categorical

Table 19

Means, SD and SEM for each subgroup of Independent-Sample *t*-test of Heart-Healthy Dietary Intake Score[+] by Age-Education-Financial Strain[++]

	Number	*M*	SD	SEM
Age				
≤ 46 years	77	8.66	6.96	.793
> 46 years	59	8.19	7.52	.979
College Education				
No college	54	7.04	6.29	.855
Some college	82	9.39	7.61	.841
Financial Strain				
Not Hard	96	9.04	7.43	.758
Hard	40	7.05	6.44	1.02

Table 20

Independent-Sample *t*-test of Heart-Healthy Dietary Intake Score[+] by Age-Education-Financial Strain[++]

| | t-test for Equality of Means | | | | | CI – 95% | |
	t	df	*p*	MD	SED	Lower	Upper
Age Median Cut	.382	134	.703	.476	1.25	-1.99	2.94
Education	-1.88	134	.061	-2.35	1.25	-4.82	.114
Financial Strain	1.48	134	.141	1.99	1.35	-.671	4.65

No significance detected at .05 level.

MD = Mean Difference

SED = Standard Error Difference

CI-95% = 95% Confidence Interval of the Difference

[+]Heart-healthy dietary intake as continuous variable

[++]Age-Education-Financial Strain as categorical variables

Table 21
Logistic regression analyses:
Predicting the effect of Age Group, Financial Strain, and Education on Non-Smoking Status[+]

Variable	B	SE	Likelihood Ratio	Odd Ratio	p
Age Median Category	.48	.453	129.42	1.61 (.662 -3.90)	.29
Financial Strain Category	.40	.502	129.41	1.40 (.525 -3.76)	.50
College Education Category	-.475	.492	129.41	.622 (.237 -1.63)	.34

With Knowledge of CVRFs and SN added to the Non-Smoking Status[+] Model

Variable	B	SE	Likelihood Ratio	Odd Ratio	p
Age Median Category	.90	.550	128.63	2.46 (.837 -7.24)	.10
Financial Strain Category	.41	.726	128.61	1.50 (.36 -6.23)	.58
College Education Category	-.66	.657	128.61	.517 (.14 -1.87)	.32
Knowledge of CVRFs Score	.11	.081	128.61	1.12 (.96 -1.31)	.16
Self-Nurturance Score	1.19	.475	128.61	3.27 (1.30 -8.30)	.01**

* Significant at p = .01
[+]Knowledge of CVRFs score and SNS score as continuous variables
[++]as categorical variables

Table 22
Logistic regression analyses:
Predicting the effect of Age Group, Financial Strain, and Education on Heart Healthy Diet Recommendations

Variable	*B*	SE	Likelihood Ratio	Odd Ratio	*p*
Age Median Category	.72	.519	108.98	2.061 (.74 -5.69)	.16
Financial Strain Category	.68	.698	108.69	.324 (.50 – 7.78)	.33
College Education Category	1.13	.631	108.69	.324 (.094- 1.12)	.07

With Knowledge of CVRFs[++] and SN[++] added to the Heart Healthy Diet Recommendations Model[+]

Variable	*B*	SE	Likelihood Ratio	Odd Ratio	*p*
Age Median Category	.90	.550	100.59	2.46 (.83 – 7.24)	.10
Financial Strain Category	.41	.726	99.75	1.50 (.36-6.23)	.58
College Education Category	-.66	.657	99.73	.517 (1.43-1.87)	.32
Knowledge of CVRFs Score	.11	1.95	99.73	1.12 (.96-1.31)	.16
Self-Nurturance Score	1.19	6.24	99.73	3.27 (1.29-8.26)	.01*

* significant at p = .01
[++] As continuous variables
[+]Age-Education-Financial Strain as categorical variables

Table 23
Logistic regression analyses:
Predicting the effect of Age Group, Financial Strain, and Education on Physical Activity Category[++]

Variable	B	SE	Likelihood Ratio	Odd Ratio	p
Age Median Category	.05	.375	172.36	1.05 (.51 – 2.20)	.89
Financial Strain Category	.82	.423	172.33	2.27 (.99 – 5.20)	.05*
College Education Category	-.20	.411	172.33	.44 – 2.20)	.98
With Knowledge of CVRFs and SN added to the Model					
Variable	B	SE	Likelihood Ratio	Odd Ratio	p
Age Median Category	-.03	.384	169.60	.986 (.47 – 2.09)	.97
Financial Strain Category	.79	.435	169.60	2.21 (.94 – 5.19)	.07
College Education Category	.10	.434	169.60	1.10 (47 – 2.58)	.83
Knowledge of CVRFs Score	.07	.045	169.60	1.07 (.99 – 1.18)	.10
Self-Nurturance Score	-.09	.336	169.60	.914 (.47 – 1.77)	.79

* Significant at p = .05
[+] Knowledge of CVRFs score and SNS score as continuous variables,
[++] All others categorical variables.

<center>**References**</center>

Adams, T., Bezner, J., & Steinhardt, M. (1997). The conceptualization and measurement of perceived wellness: integrating balance across and within dimensions. *American Journal of Health Promotion, 11*(3), 208-218.

Aguilar, D., Skali, H., Moyé, L., Lewis, E., Gaziano, J., Rutherford, J., et al. (2004). Alcohol consumption and prognosis in patients with left ventricular systolic dysfunction after a myocardial infarction. *Journal of the American College of Cardiology, 43*(11), 2015-2021.

Albert, C. M., Chae, C. U., Grodstein, F., Rose, L. M., Rexrode, K. M., Ruskin, J. N., et al. (2003). Prospective study of sudden cardiac death among women in the United States. *Circulation, 107*(16), 2096-2101.

Aldana, S. G., & Liljenquist, W. (1998). Validity and reliability of a financial strain survey. *Financial Counseling and Planning., 9*(2), 11-19.

Ali, A., & Toner, B., (2001). Symptoms of Depression Among Caribbean Women and Caribbean-Canadian Women. *Psychology of Women Quarterly, 25*(3), 175-180.

Ambrose, J. A., & Barua, R. S. (2004). The pathophysiology of cigarette smoking and cardiovascular disease: An update. *J Am Coll Cardiol, 43*(10), 1731-1737.

American Heart Association Guidelines. Retrieved November 2, 2008 from http://www.americanheart.org.presentee.jhtml?identifier=1045

American Heart Association. (2005). *Heart Disease and Stroke Statistics - 2005 Update.* Retrieved from http://www.americanheart.org/downloadable/heart/1105390918119HDSStats2005 Update.pdf.

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Angel, R., Frisco, M., Angel, J., & Chiriboga, D. (2003). Financial Strain and Health among Elderly Mexican-Origin Individuals. *Journal of Health and Social Behavior, 44*(4), 536-551.

Appel, S., Harrell, J., & Deng, S. (2002). Racial and socioeconomic differences in risk factors for cardiovascular disease among southern rural women. *Nursing Research, 51*(3), 140-147.

Bandura, A. (2001). Social Cognitive Theory: An Agentic Perspective. *Annual Review of Psychology, 52*, 1-26.

Bandura, A. (2004). Health Promotion by Social Cognitive Means. *Health Education Behavior, 31*(2), 143-164.

Barua, R. S., Ambrose, J. A., Eales-Reynolds, L.-J., DeVoe, M. C., Zervas, J. G., & Saha, D. C. (2001). Dysfunctional endothelial nitric oxide biosynthesis in healthy smokers with impaired endothelium-dependent vasodilatation. *Circulation, 104*(16), 1905-1910.

Bassett, D., Schneider, P., & Huntington, G. (2004). Physical activity in an Old Order Amish community. *Medicine & Science in Sports & Exercise, 36*(1), 79-85.

Benowitz, N. L. (2003). Cigarette smoking and cardiovascular disease: Pathophysiology and implications for treatment. *Progress in Cardiovascular Diseases, 46*(1), 91-111.

Bermudez, E. A., Rifai, N., Buring, J. E., Manson, J. E., & Ridker, P. M. (2002). Relation between markers of systemic vascular inflammation and smoking in women. *The American Journal of Cardiology, 89*(9), 1117-1119.

Bond, D., Evans, R., DeMaria, E., Wolfe, L., Meador, J., Kellum, J., et al. (2006).

    Physical activity and quality of life improvements before obesity surgery.

    American Journal of Health Behavior, 30(4), 422-434.

Burke, A. P., Farb, A., Malcom, G. T., Liang, Y.-h., Smialek, J., & Virmani, R. (1997).

    Coronary risk factors and plaque morphology in men with coronary disease who

    died suddenly. *N Engl J Med, 336*(18), 1276-1282.

Burke, A. P., Farb, A., Malcom, G. T., Liang, Y.-h., Smialek, J., & Virmani, R. (1998).

    Effect of risk factors on the mechanism of acute thrombosis and sudden coronary

    death in women. *Circulation, 97*(21), 2110-2116.

Burns, N., & Grove, S. (2005). *The Practice of Nursing Research: Conduct Critique and*

    Utilization (5th. ed.). St. Louis: Elsevier.

Canto, J. G., Goldberg, R. J., Hand, M. M., Bonow, R. O., Sopko, G., Pepine, C. J., et al.

    (2007). Symptom Presentation of Women With Acute Coronary Syndromes:

    Myth vs Reality. *Arch Intern Med. , 167*(22), 2405-2413.

Center for Disease Control and Prevention. (2001). Sudden cardiac deaths are increasing

    in young people, especially among young women. Retrieved March 21, 2007,

    from http://www.cdc.gov/od/oc/media/pressrel/r010301.htm

Centers for Disease Control and Prevention. (2007). Behavioral Risk Factor Surveillance

    System Survey Data. (Publication.: http://apps.nccd.cdc.gov/brfss/)

Centers for Disease Control and Prevention. (2008a). Prevalence of Self-Reported

    Physically Active Adults – United States, 2007. Retrieved March 26, 2009 from

    www.cdc.gov/mmwr/preview/mmwrhtml/mm5748a1.htm - Vol 57, No 48;1297

Centers for Disease Control and Prevention. (2008b). Smoking Prevalence Among

    Women of Reproductive Age --- United States, 2006. Retrieved March 26, 2009

    from www.cdc.gov/mmwr/preview/mmwrhtml/mm5731a2.htm - Vol 57, No

    31;849

Chiverton, P. A., Votava, K. M., & Tortoretti, D. M. (2003). The Future Role of Nursing

    in Health Promotion. *American Journal of Health Promotion, 18*(2), 192-194.

Choiniere, R., Lafontaine, P., & Edwards, A. C. (2000). Distribution of cardiovascular

    disease risk factors by socioeconomic status among Canadian adults. *Canadian*

    Medical Association Journal, 162(9 Suppl), S13-24.

Christian, A. H., Rosamond, W., White, A. R., & Mosca, L. (2007). Nine-year trends and

    racial and ethnic disparities in women's awareness of heart disease and stroke: An

    American Heart Association national study. *Journal of Women's Health, 16*(1),

    68-81.

Cowen, E. (1994). The enhancement of psychological wellness: Challenges and

    opportunities *American Journal of Community Psychology, 22*(2), 149-179.

Craig, C. L., Marshall, A. L., Sjostrom, M., Bauman, A. E., Booth, M. L., Ainsworth, B.

    E., et al. (2003). International Physical Activity Questionnaire: 12-Country

    Reliability and Validity. *Medicine & Science in Sports & Exercise, 35*(8), 1381-

    1395.

Craig, W. Y., Palomaki, G. E., & Haddow, J. E. (1989). Cigarette smoking and serum

    lipid and lipoprotein concentrations: an analysis of published data. *BMJ, 298*,

    784-788.

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da Silva, R. B., Costa-Paiva, L., Pinto-Neto, A. M., Braga, A. d. A., & Morais, S. S. (2005). Association between habitual physical activity and parameters of physical fitness in postmenopausal women. *Climacteric, 8*(4), 360-370.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227-268.

de Lorgeril, M., Salen, P., Martin, J.-L., Boucher, F., Paillard, F., & de Leiris, J. (2002). Wine drinking and risks of cardiovascular complications after recent acute myocardial infarction. *Circulation, 106*, 1465-1469.

Dillman, D. A. (2000). *Mail and internet surveys: The tailored design method.* (2nd Ed.). New York: John Wiley & Sons.

Eckel, R., Kris-Etherton, P., Lichtenstein, A., Wylie-Rosett, J., Groom, A., Stitzel, K., et al. (2009). Americans' Awareness, Knowledge, and Behaviors Regarding Fats: 2006-2007. *Journal of the American Dietetic Association, 109*(288-296).

Enns, C. Z. (2004). *Feminist Theories and Feminist Psychotherapies: Origins, Themes, and Diversity.* (2nd Ed.). New York: Haworth Press.

Estruch, R., Martinez-Gonzalez, M. A., Corella, D., Salas-Salvado, J., Ruiz-Gutierrez, V., Covas, M. I., et al. (2006). Effects of a Mediterranean-Style Diet on Cardiovascular Risk Factors: A Randomized Trial. *Ann Intern Med, 145*(1), 1-11.

Expert Panel on Detection Evaluation and Treatment of High Blood Cholesterol in Adults. (2001). Executive Summary of The Third Report of The National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, And Treatment of High Blood Cholesterol In Adults (Adult Treatment Panel III). *JAMA, 285*(19), 2486-2497.

Freiberg, M. S., & Samet, J. H. (2005). Alcohol and Coronary Heart Disease: The

    Answer Awaits a Randomized Controlled Trial. *Circulation, 112*(10), 1379-1381.

Fisher, W. A., & Fisher, J. D. (2003). The Information-Motivation-Behavioral Skills

    Model: A general social psychological approach to understanding and promoting

    health behavior. In J. Suls & K. A. Wallston (Eds.), *Social Psychological*

    Foundations of Health and Illness. Malden, MA: Blackwell Publishing Ltd.

Gilliss, C. L., Lee, K. A., Gutierrez, Y., Taylor, D., Beyene, Y., Neuhaus, J., et al. (2001).

    Recruitment and retention of healthy minority women into community-based

    longitudinal research. *Journal of Women's Health & Gender-Based Medicine,*

    10(1), 77-85.

Greenland, P., Smith, S. C., Jr., & Grundy, S. M. (2001). Improving coronary heart

    disease risk assessment in asymptomatic people: Role of traditional risk factors

    and noninvasive cardiovascular tests. *Circulation, 104*(15), 1863-1867.

Grady, D., Chaput, L. & Kristof, M. (2003). *Results of Systematic Review of Research on*

    Diagnosis and Treatment of Coronary Heart Disease in Women: Evidence

    Report/Technology Assessment No. 80. Rockville, Md: Agency for Healthcare

    Research and Quality.

Grundy, S. M., D'Agostino Sr, R. B., Mosca, L., Burke, G. L., Wilson, P. W., Rader, D.

    J., et al. (2001). Cardiovascular risk assessment based on US cohort studies:

    Findings from a National Heart, Lung, and Blood institute workshop. *Circulation,*

    104(4), 491-496.

Gulati, M., Pandey, D. K., Arnsdorf, M. F., Lauderdale, D. S., Thisted, R. A., Wicklund, R. H., et al. (2003). Exercise Capacity and the Risk of Death in Women: The St James Women Take Heart Project. *Circulation, 108*(13), 1554-1559.

Hagger, M. S., Chatzisarantis, N. L., & Harris, J. (2006). From psychological need satisfaction to intentional behavior: testing a motivational sequence in two behavioral contexts. *Personality & Social Psychology Bulletin, 32*(2), 131-148.

Hagoel, L., Ore, L., Neter, E., Silman, Z., & Rennert, G. (2002). Clustering women's health behaviors. *Health Education & Behavior, 29*(2), 170-182.

Hagstromer, M., Oja, P., & Sjostrom, M. (2006). The International Physical Activity Questionnaire (IPAQ): A study of concurrent and construct validity. *Public Health Nutrition, 9*(6), 755-762.

Hallal, P. C., Azevedo, M. R., Reichert, F. F., Siqueira, F. V., Araujo, C. L. P., & Victora, C. G. (2005). Who, when, and how much? Epidemiology of walking in a middle-income country. *American Journal of Preventive Medicine, 28*(2), 156-161.

Halm, M. A., & Denker, J. (2003). Primary prevention programs to reduce heart disease risk in women. *Clinical Nurse Specialist, 17*(2), 101-109.

Haskell, W. L., Lee, I. M., Pate, R. R., Powell, K. E., Blair, S. N., Franklin, B. A., et al. (2007). Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Medicine & Science in Sports & Exercise, 39*(8), 1423-1434.

Huang, P. A., Buring, J. E., Ridker, P. M., & Glynn, R. J. (2007). Awareness, accuracy, and predictive validity of self-reported cholesterol in women. *Journal of General Internal Medicine, 22*, 606-613.

Hu, F. B., & Manson, J. E. (2000). Trends in the incidence of coronary heart disease and changes in diet and lifestyle in women. *New England Journal of Medicine, 343*, 520-537.

Information Resources Inc. (2006). The new Walmart: The powerhouse in transition. [Electronic Version]. *Times & Trends*. Retrieved September 7, 2008 from http://www.gmabrands.com/publications/gmairi/2006/may/may.pdf.

IPAQ Guidelines. (2005). Guidelines for data processing and analysis of the International Physical Activity Questionnaire. [Electronic Version]. Retrieved April 5, 2008 from http://www.ipaq.ki.se/scoring.pdf.

Jetter, K. M., & Cassidy, D. L. (2005). The availability and cost of healthier food items. AIC Issues Brief. Retrieved April 4, 2009 from: http://aic.ucdavis.edu

Kahn, R., Robertson, R. M., Smith, R., & Eddy, D. (2008). The impact of prevention on reducing the burden of cardiovascular disease. *Diabetes Care, 31*(8), 1686-1696.

Keyzer, J. F., Melnikow, J., Kuppermann, M., Birch, S., Kuenneth, C., Nuovo, J., et al. (2005). Recruitment strategies for minority participation: challenges and cost lessons from the POWER interview. *Ethnicity & Disease, 15*, 395-406.

Kim, J. K., Alley, D., Seeman, T., Karlamangla, A., & Crimmins, E. (2006). Recent changes in cardiovascular risk factors among women and men. *Journal of Women's Health, 15*(6), 734-746.

112

King, D., Mainous III, A., & Geesey, M. (2008). Adopting Moderate Alcohol

    Consumption in Middle Age: Subsequent Cardiovascular Events. *The American*

    Journal of Medicine, 121(3), 201-206.

King, K. B., & Mosca, L. (2000). Prevention of heart disease in women:

    Recommendations for management of risk factors. *Progress in Cardiovascular*

    Nursing, 15(2), 36-42.

King, K. B., Quinn, J. R., Delehanty, J. M., Rizzo, S., Eldredge, D. H., Caufield, L., et al.

    (2002). Perception of risk for coronary heart disease in women undergoing

    coronary angiography. *Heart & Lung, 31*(4), 246-252.

Kip, K. E., Marroquin, O. C., Kelley, D. E., Johnson, B. D., Kelsey, S. F., Shaw, L. J., et

    al. (2004). Clinical importance of obesity versus the metabolic syndrome in

    cardiovascular risk in women: A report from the Women's Ischemia Syndrome

    Evaluation (WISE) Study. *Circulation, 109*(6), 706-713.

Krauss, R. M., Eckel, R.H., Howard, B., Appel, L.J., Daniels, S.R., Deckelbaum, R.J., et

    al. (2000). Revision 2000: A statement for Healthcare Professionals from the

    nutrition committee of the American Heart Association. *Circulation, 102*, 2296 -

    2311.

Krummel, D., Koffman, D., Bronner, Y., Davis, J., Greenlund, K., Tessaro, I., et al.

    (2001). Cardiovascular health interventions in women: What works? *Journal of*

    Women's Health & Gender-Based Medicine, 10(2), 117-136.

Kudenchuk P, Maynard C, Martin J, Wirkus M, Weaver WD. (1996). Comparison of

    presentation, treatment, and outcome of acute myocardial infarction in men versus

women (the Myocardial Infarction Triage and Intervention Registry). *Am J Cardiology,* 78:9-14

Laffrey, S. C. (1990). An exploration of adult health behaviors. *Western Journal of Nursing Research, 12*(4), 434-436.

Lansky, A. J., Hochman, J. S., Ward, P. A., Mintz, G. S., Fabunmi, R., Berger, P. B., et al. (2005). Percutaneous coronary intervention and adjunctive pharmacotherapy in women: A Statement for healthcare professionals from the American Heart Association. *Circulation, 111*(7), 940-953

Lehman, A. K., & Rodin, J. (1989). Styles of self-nurturance and disordered eating. *Journal of Consulting & Clinical Psychology, 57*(1), 117-122.

Lloyd-Jones, D. M., Wilson, P. W. F., Larson, M. G., Beiser, A., Leip, E. P., D'Agostino, R. B., et al. (2004). Framingham risk score and prediction of lifetime risk for coronary heart disease. *American Journal of Cardiology, 94*(1), 20-24.

Lynch, E. B., Liu, K., Kiefe, C. I., & Greenland, P. (2006). Cardiovascular disease risk factor knowledge in young adults and 10-year change in risk factors. . *American Journal of Epidemiology, 164*(12), 1171-1179.

MaDer, U. R. S., Martin, B. W., Schutz, Y., & Marti, B. (2006). Validity of four short Physical Activity Questionnaires in Middle-Aged Persons. *Medicine & Science in Sports & Exercise, 38*(7), 1255-1266.

Manson, J. E. (2006, October). *Primary Preventions of Cardiovascular Disease in Postmenopausal Women.* Paper presented at The North American Menopause Society 17th Annual Meeting, Menopause: Evidence & Practice, Nashville, TN.

Manson, J. E., Hu, F. B., Rich-Edwards, J. W., Colditz, G. A., Stampfer, M. J., Willett, W. C., et al. (1999). A prospective study of walking as compared with vigorous exercise in the prevention of coronary heart disease in women. *New England Journal of Medicine, 341*(9), 650-658.

Marx, J., Nedelmann, M., Haertle, B., Dieterich, M., & Eicke, B. M. (2008). An educational multimedia campaign improves stroke knowledge and risk perception in different stroke risk groups. *Journal of Neurology, 255*(3), 378-384.

Mastroianni, A.C., Faden, R. & ,Federman, D. (1994) *Women and Health Research: Ethical and Legal Issues of Including Women in Clinical Studies.* Washington, DC: National Academy Press; 1994.

McPherson, C. P., Swenson, K. K., Pine, D. A., & Leimer, L. (2002). A nurse-based pilot program to reduce cardiovascular risk factors in a primary care setting. *American Journal of Managed Care, 8*(6), 543-555.

McSweeney, J. C., Cody, M., O'Sullivan, P., Elberson, K., Moser, D. K., & Garvin, B. J. (2003). Women's early warning symptoms of acute myocardial infarction. *Circulation, 108*(21), 2619-2623.

Mieres, J. H. (2006). Review of the American Heart Association's guidelines for cardiovascular disease prevention in women. *Heart 92*(Supplement III), iii10 - iii13.

Mitchell, M. (2007). *Health care for Connecticut's underserved population.* Retrieved August 12, 2008 from http://www.ct.gov/dph/lib/dph/hisr/pdf/healthcareforctsunderservedpop_2007jan.pdf.

Morris, H. M., Kerr, J. C., Wood, M. J., & Haughey, M. (2000). Health promotion and senior women with limited incomes. *Journal of Community Health Nursing, 17*(2), 115-126.

Mosca, L., Appel, L. J., Benjamin, E. J., Berra, K., Chandra-Strobos, N., Fabunmi, R. P., et al. (2004). Evidence-based guidelines for cardiovascular disease prevention in women. *Circulation, 109*(5), 672-693.

Mosca, L., Edelman, D., Mochari, H., Christian, A. H., Paultre, F., & Pollin, I. (2006). Waist circumference predicts cardiometabolic and Global Framingham Risk among women screened during National Woman's Heart Day. *Journal of Women's Health, 15*(1), 24-34.

Mosca, L., Ferris, A., Fabunmi, R., Robertson, R. M., & American Heart, A. (2004). Tracking women's awareness of heart disease: An American Heart Association national study. *Circulation, 109*(5), 573-579.

Mosca, L., Grundy, S. M., Judelson, D., King, K., Limacher, M., Oparil, S., et al. (1999). Guide to Preventive Cardiology for Women. AHA/ACC Scientific Statement Consensus panel statement. *Circulation, 99*(18), 2480-2484.

Mosca, L., Jones, W., King, K., Ouyang, P., Redberg, R., & Hill, M. (2000). Awareness, perception, and knowledge of heart disease risk and prevention among women in the United States. *Archives of Family Medicine 9*(6), 506 - 515.

Mosca, L., Manson, J. E., Sutherland, S. E., Langer, R. D., Manolio, T., & Barrett-Connor, E. (1997). Cardiovascular disease in women : A statement for healthcare professionals from the American Heart Association. *Circulation, 96*(7), 2468-2482.

Mosca, L., Mochari, H., Christian, A., Berra, K., Taubert, K., Mills, T., et al. (2006). National study of women's awareness, preventive action, and barriers to cardiovascular health. *Circulation, 113*, 525 - 534.

Mozaffarian, D., Katan, M. B., Ascherio, A., Stampfer, M. J., & Willett, W. C. (2006). Trans fatty acids and cardiovascular disease. *New England Journal of Medicine, 354*(15), 1601-1613.

Muhib, F. B., Lin, L. S., Stueve, A., Miller, R. L., Ford, W. L., Johnson, W. D., et al. (2001). A venue-based method for sampling hard-to-reach populations. *Public Health Reports, 116 Suppl 1*, 216-222.

National Center for Health Statistics (2008). *National Health Interview Survey*, National Center for Health Statistics, Center for Disease Control and Prevention, Hyattsville, Maryland. http://www.cdc.gov/nchs/about/major/nhis/hisdesgn.htm

Nemcek, M. A. (1987). Self nurturing - a concept analysis. *AAOHN Journal, 35*(8), 349-352.

Nemcek, M. A. (1990). Health beliefs and preventive behaviors: A review of research literature. *AAOHN Journal, 38*(3), 127-138.

Nemcek, M. A. (2003). Self Nurturance: Research trends and wellness model. *AAOHN Journal, 51*(6), 260-266.

Nemcek, M. A. (2007). Registered nurses' Self-Nurturance and life and career satisfaction. *AAOHN Journal, 55*(8), 305-310.

Nemcek, M. A., & James, G. D. (2007). Relationships among the nurse work environment, self-nurturance and life satisfaction. *Journal of Advanced Nursing, 59*(3), 240-247.

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Nichols, H. B., Trentham-Dietz, A., Hampton, J. M., Titus-Ernstoff, L., Egan, K. M., Willett, W. C., et al. (2006). From menarche to menopause: Trends among US women born from 1912 to 1969. *Am. J. Epidemiol., 164*(10), 1003-1011.

Nigg, C. R., Allegrante, J. P., & Ory, M. (2002). Theory-comparison and multiple-behavior research: common themes advancing health behavior research. *Health Educ. Res., 17*(5), 670-679.

Noar, S. M., & Zimmerman, R. S. (2005). Health Behavior Theory and cumulative knowledge regarding health behaviors: are we moving in the right direction? *Health Education Research, 20*, 275-290.

Oliver-McNeil, S., & Artinian, N. T. (2002). Women's perceptions of personal cardiovascular risk and their risk-reducing behaviors. *American Journal of Critical Care, 11*(3), 221-227.

Orr, A. A. (2001). Women behind men in treatment, awareness of heart disease. *Circulation, 104*(23), E9057-9058.

Palfrey, J. S., Hauser-Cram, P., Bronson, M. B., Warfield, M. E., Sirin, S., & Chan, E. (2005). The Brookline Early Education Project: A 25-year follow-up study of a family-centered early health and development intervention. *Pediatrics, 116*(1), 144-152.

Pavot, W., Diener, E., Colvin, C. R., & Sandvik, E. (1991). Further validation of the Satisfaction with Life Scale: Evidence for the cross-method Convergence of Well-Being Measures. *Journal of Personality Assessment, 57*(1), 149 - 161.

Pender, N. J., Murdaugh, C. L., & Parsons, M. A. (2002). *Health promotion in nursing practice* (4th ed.). Upper Saddle River, New Jersey: Haworth Press, Inc.

Pendergast, H. M., Bunney, E. B., Roberson, T., & Davis, T. (2004). Knowledge of heart disease among women in an urban emergency setting. *Journal National Medical Association, 96*(8), 1027 - 1031.

Pettee, K.K., Storti, K.L., Conroy, M.B., & Ainsworth, B.A. (2008). A Lifestyle Approach for Primary Cardiovascular Disease Prevention in Perimenopausal to Early Postmenopausal Women. *American Journal of Lifestyle Medicine,* 2: 421-431.

Pinn, V. W. (2003). Sex and Gender Factors in Medical Studies: Implications for Health and Clinical Practice, *JAMA. , 289*(4), 397-400.

Poduri, A., & Grisso, J. A. (1998). Cardiovascular risk factors in economically disadvantaged women: a study of prevalence and awareness. *Journal of the National Medical Association, 90*(9), 531-536.

Polk, D. M., & Naqvi, T. Z. (2005). Cardiovascular disease in women: Sex differences in presentation, risk factors and evaluation. *Current Cardiology Reports, 7*, 166-172.

Potvin, L., Richard, L., & Edwards, A. C. (2000). Knowledge of cardiovascular disease risk factors among the Canadian population: relationships with indicators of socioeconomic status. . *CMAJ, 162* (9), S5-S11.

Prilleltensky, I., Nelson, G., & Peirson, L. (2001). The role of power and control in children's lives: an ecological analysis of pathways toward wellness, resilience and problems. *Journal of Community & Applied Social Psychology, 11*(2), 143-158.

Program for Appropriate Technology in Health. (2005). Older women. [Electronic Version]. *Reproductive Health Outlook*. Retrieved March 31, 2007 from http://www.rho.org/html/older_women.htm.

Ramsey, P. W., & Glenn, L. L. (2002). Obesity and health status in rural, urban, and suburban southern women. *Southern Medical Journal, 95*(7), 666-671.

Rifas-Shiman, S. L., Willett, W. C., Lobb, R., Kotch, J., Dart, C., & Gillman, M. W. (2001). PrimeScreen, a brief dietary screening tool: reproducibility and comparability with both a longer food frequency questionnaire and biomarkers. *Public Health Nutrition, 4*(2), 249-254.

Rimm, E. B., Williams, P., Fosher, K., Criqui, M., & Stampfer, M. J. (1999). Moderate alcohol intake and lower risk of coronary heart disease: meta-analysis of effects on lipids and haemostatic factors. *BMJ, 319*(7224), 1523-1528.

Rosamond, W., Flegal, K., Friday, G., Furie, K., Go, A., Greenlund, K., et al. (2007). Heart Disease and Stroke Statistics--2007 Update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation, 115*(5), e69-171.

Rosamond, W., Flegal, K., Furie, K., Go, A., Greenlund, K., Haase, N., et al. (2008). Heart Disease and Stroke Statistics--2008 Update: A report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation, 117*(4), e25-146.

Rosenfeld, A. G. (2006). State of the Heart: Building science to improve women's cardiovascular health. *Am J Crit Care, 15*(6), 556-566.

Rosenstock, I. M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly, 44*, 94-124.

Rosner, B. (2006). *Fundamentals of Biostatistics. 6th Ed.*: Thomson Brooks/Cole.

Sachs, F. M., Svetkey, L. P., Vollmer, W. M., Appel, L. J., Bray, G. A., Harsha, D., et al. (2001). Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) Diet. *New England Journal of Medicine, 344*(1), 3-10.

Schüz, B., Sniehotta, F. F., Mallach, N., Wiedemann, A. U., & Schwarzer, R. (2009). Predicting transitions from preintentional, intentional and actional stages of change. *Health Education Research, 24*, 64-75.

Seal, T. L. (1995). Correlates and predictors of high self-nurturance. *Dissertations Abstracts International, 57*(2-B), 1454.

Settersten, L. & Lauver, D. (2004). Critical thinking, perceived health status, and participation in health behaviors. *Nursing Research, 53*(1), 11-18.

Shamansky, S. L., & Clausen, C. L. (1980). Levels of prevention: Examination of the concept. *Nursing Outlook, 28*, 104-108.

Shaw, L. J., Merz, C. N., Pepine, C. J., Reis, S. E., Bittner, V., Kelsey, S. F., et al. (2006). Insights From the NHLBI-Sponsored Women's Ischemia Syndrome Evaluation (WISE) Study: Part I: Gender differences in traditional and novel risk factors, symptom evaluation, and gender-optimized diagnostic strategies. *Journal of the American College of Cardiology, 47*(3, Supplement 1), S4-S20.

Shaw, L. J., Lewis, J. F., Hlatky, M. A., Hsueh, W. A., Kelsey, S. F., Klein, R., et al. (2004). Women's ischemic syndrome evaluation: Current status and future

research directions: Report of the National Heart, Lung and Blood Institute Workshop: October 2-4, 2002: Section 5: Gender-related risk factors for ischemic heart disease. *Circulation, 109*(6), e56-58.

Sherwood, N. E., Crowther, J. H., Wills, L., & Ben-Porath, Y. S. (2000). The perceived function of eating for bulimic, subclinical bulimic and non-eating disordered women. *Behavior Therapy, 31*(4), 777-793.

Soper, D. (2008). "The Free Statistics Calculators Website", Online Software, http://www.danielsoper.com/statcalc/ .

Sowers, M., Crawford, S. L., Stemfeld, B., Morganstein, D., Gold, E. B., Greendale, G. A., et al. (2000). SWAN: A multicenter, multiethnic, community-based cohort study of women and the menopausal transition. . In R. Lobb, R. Marcus & J. Kelly (Eds.), *Menopause: biology and pathobiology.* (pp. 175-188). New York/San Diego: Academic Press.

Sternfeld, B., Wang, H., Quesenberry, C. P., Jr., Abrams, B., Everson-Rose, S. A., Greendale, G. A., et al. (2004). Physical activity and changes in weight and waist circumference in midlife women: findings from the Study of Women's Health Across the Nation. *American Journal of Epidemiology, 160*(9), 912-922.

Sullivan, G. C. (1989). Evaluating Antonovsky's Salutogenic Model for its adaptability to nursing. *Journal of Advanced Nursing, 14*(4), 336-342.

Tabloski, P. A. (2004). Global aging: implications for women and women's health. *JOGNN - Journal of Obstetric, Gynecologic, & Neonatal Nursing, 33*(5), 627-638.

Taylor, H. A., Hughes, G. D., & Garrison, R. J. (2002). Cardiovascular disease among women residing in rural America: epidemiology, explanations, and challenges. *American Journal of Public Health, 92*(4), 548-551.

Thanavaro, J. L., Moore, S. M., Anthony, M., Narsavage, G., & Delicath, T. (2006). Predictors of health promotion behavior in women without prior history of coronary heart disease. *Applied Nursing Research, 19*(3), 149-155.

Thun, M. J., Peto, R., Lopez, A. D., Monaco, J. H., Henley, S. J., Heath, C. W., et al. (1997). Alcohol consumption and mortality among middle-aged and elderly U.S. adults. *N Engl J Med, 337*(24), 1705-1714.

Trochim, W. M. (2000). *The Research Methods Knowledge Base, 2nd Edition.* . Retrieved September 28, 2008, from http://www.socialresearchmethods.net/kb.

Trost, S.G., Owen, N., Bauman, A.E., Sallis, J.F., & Brown, W., (2002). Correlates of adults participation in physical activity: Review and update. *Medicine and Science in Sports and Exercise*, 34:1996-2001.

UCLA. (2007). General Advanced-Placement (AP) Statistics Curriculum E-Book Retrieved May 27, 2008, from http://www.stat.ubc.ca/~rollin/stats/ssize/n2.html

U.S. Census Bureau. (2006). *Census 2006*. Retrieved December 1, 2007. from http://factfinder.census.gov.

U.S. Department of Health and Human Services. (1996). *Physical activity and health: A report of the surgeon general.* Retrieved September 7, 2007 from http://www.cdc.gov/nccdphp/sgr/sgr.htm.

Vaccarino, V. R., Saif, S., Wenger, N. K., Frederick, P. D., Abramson, J. L., Barron, H.V., et al. (2005). Sex and Racial Differences in the Management of Acute Myocardial Infarction, 1994 through 2002. *N Engl J Med 353*(7), 671-682.

Wagner, J., Lacey, K., Chyun, D., & Abbott, G. (2005). Development of a questionnaire to measure heart disease risk knowledge in people with diabetes: the Heart Disease Fact Questionnaire. *Patient Education & Counseling, 58*(1), 82-87.

Walker, S. N., Sechrist, K. R., & Pender, N. J. (1987). The Health-Promoting Lifestyle Profile: development and psychometric characteristics. *Nursing Research, 36*(2), 76-81.

Whitehead, D. (2004). Health promotion and health education: advancing the concepts. *Journal of Advanced Nursing, 47*(3), 311-320.

Wilson, P. W., D'Agostino, R. B., Levy, D., Belanger, A. M., Silbershatz, H., & Kannel, W. B. (1998). Prediction of coronary heart disease using risk factor categories. *Circulation, 97*(18), 1837-1847.

WomenHeart: The National Coalition for Women with Heart Disease. (2008). Women and heart disease: Fact sheet (Publication. Retrieved October 24, 2008: http://www.womenheart.org/information/women_and_heart_disease_fact_sheet.asp

World Health Organization. (1986). Ottawa Charter for Health Promotion [Electronic Version]. Retrieved September 8, 2007 from http://www.who.int/hpr/NPH/docs/ottawa_charter_hp.pdf.

Yancey, A. K., Ortega, A. N., & Kumanyika, S. K. (2006). Effective recruitment and retention of minority research participants. . *Annals Review, 27*, 1-28.

Zurakowski, T. L. (2004). Health promotion for mid- and later-life women. *Journal of Obstetric, Gynecologic, & Neonatal Nursing, 33*(5), 639-647.

Appendix A

Heart Disease Facts Questionnaire

These next questions ask about heart disease. Please circle true or false; if you are unsure about the correct answer, you may circle "I don't know". Please circle only one response to each question. Please try to answer all of the questions.Thank you!

1.   A person always knows when they have heart disease:
      a. True   **b. False**   c. I don't know

2.   If you have a family history of heart disease you are at risk for developing heart disease:
      a. True   b. False   c. I don't know

3.   The older a person is, the greater their risk of having heart disease:
      a. True   b. False   c. I don't know

4.   Smoking is a risk factor for heart disease:
      a. True   b. False   c. I don't know

5.   A person who stops smoking will lower their risk of developing heart disease:
      a. True   b. False   c. I don't know

6.   High blood pressure is a risk factor for heart disease:
      a. True   b. False   c. I don't know

7.   Keeping blood pressure under control will reduce a person's risk for developing heart disease:
      a. True   b. False   c. I don't know

8.   High cholesterol is a risk factor for developing heart disease:
      a. True   b. False   c. I don't know

9.   Eating fatty foods does <u>not</u> affect blood cholesterol levels:
      a. True   **b. False**   c. I don't know

10.   If your "good" cholesterol (HDL) is high you are at risk for heart disease:
      a. True   **b. False**   c. I don't know

11.   If your "bad" cholesterol (LDL) is high you are at risk factor for heart disease:
      a. True   b. False   c. I don't know

12.   Being overweight increases a person's risk for heart disease:

| **a. True** | b. False | c. I don't know |

13. Regular physical activity will lower a person's chance of getting heart disease:
| **a. True** | b. False | c. I don't know |

14. Only exercising at a gym or in an exercise class will help lower a person's chance of developing heart disease:
| a. True | **b. False** | c. I don't know |

15. Walking and gardening are considered exercise that will help lower a person's chance of developing heart disease:
| **a. True** | b. False | c. I don't know |

16. Diabetes is a risk factor for developing heart disease:
| **a. True** | b. False | c. I don't know |

17. High blood sugar puts a strain on the heart:
| **a. True** | b. False | c. I don't know |

18. If your blood sugar is high over several months it can cause your cholesterol level to go up and increase your risk of heart disease:
| **a. True** | b. False | c. I don't know |

19. A person who has diabetes can reduce their risk of developing heart disease if they keep their blood sugar levels under control:
| **a. True** | b. False | c. I don't know |

20. People with diabetes rarely have high cholesterol:
| a. True | **b. False** | c. I don't know |

21. If a person has diabetes, keeping their cholesterol under control will help to lower their chance of developing heart disease:
| **a. True** | b. False | c. I don't know |

22. People with diabetes tend to have low HDL (good) cholesterol:
| **a. True** | b. False | c. I don't know |

23. A person who has diabetes can reduce their risk of developing heart disease if they keep their blood pressure under control:
| **a. True** | b. False | c. I don't know |

24. A person who has diabetes can reduce their risk of developing heart disease if they keep their weight under control:
| **a. True** | b. False | c. I don't know |

25.   Men with diabetes have a higher risk of heart disease than women with diabetes:
        a. True   **b. False**   c. I don't know

Self-Nurturance Survey

Please indicate, for each of the following behaviors, how characteristic they are of you using the scale of "Not at all true = 1" to "Extremely true = 5". Please circle the answer that BEST corresponds to how you usually behave where 1 = not at all true and 5 = extremely true. Please complete all of the items and circle only ONE answer per item.
Thank you!

	Not at all true				Extremely True
I try to allow time each day "just for me"	1	2	3	4	5
I am a good friend to myself	1	2	3	4	5
I have fun	1	2	3	4	5
I have something that I do to relax when I'm uptight	1	2	3	4	5
I exercise in a way that I enjoy	1	2	3	4	5
I spend time enjoying nature	1	2	3	4	5
I forgive myself when I think I've done something wrong	1	2	3	4	5
I talk to myself in positive and encouraging ways	1	2	3	4	5
I get or give myself a massage	1	2	3	4	5
I spend time doing a hobby I enjoy	1	2	3	4	5
I call or visit a good friend when I'm feeling down	1	2	3	4	5
I take time out when working on a difficult task	1	2	3	4	5
I tell myself that I am a good person	1	2	3	4	5
I provide myself with a comfortable place to live	1	2	3	4	5
I eat right	1	2	3	4	5
I encourage myself when learning something new	1	2	3	4	5

I reward myself when I have completed a project or goal.	1	2	3	4	5
I buy myself fresh flowers or enjoy them at a park	1	2	3	4	5
I have a friend that I confide in when I feel troubled	1	2	3	4	5
I spend time with a supportive or loving friend	1	2	3	4	5
I do sensuous things for myself	1	2	3	4	5
I take long hot showers or baths	1	2	3	4	5
I buy "toys" for myself	1	2	3	4	5
I spend time "playing"	1	2	3	4	5
I take vacations	1	2	3	4	5
I allow myself to just "let loose"	1	2	3	4	5
I spend time alone when I feel like it	1	2	3	4	5
I avoid people that are abusive	1	2	3	4	5
I spend time learning new things	1	2	3	4	5

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Appendix C

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think *only* about those physical activities that you did for at least 10 minutes at a time.

1.   During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, aerobics, or fast bicycling?

_____ **days per week**

☐ No vigorous physical activities ➡ *Skip to question 3*

2.   How much time did you usually spend doing **vigorous** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time.

3.   During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

_____ **days per week**

☐

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No moderate physical activities ➡ *Skip to question 5*

4. How much time did you usually spend doing **moderate** physical activities on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure.

5. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time?

_____ **days per week**

☐ No walking ➡ *Skip to question 7*

6. How much time did you usually spend **walking** on one of those days?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

The last question is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television.

7. During the **last 7 days**, how much time did you spend **sitting** on a **week day**?

_____ **hours per day**

_____ **minutes per day**

☐ Don't know/Not sure

PrimeScreen Questionnaire

INSTRUCTIONS: For each question, mark the circle indicating how often **on average** you have eaten the item(s) **during the past year**. Remember to include things you cook with. These questions are not intended to assess your total diet, and you may not find all the foods you eat listed.

1. Dark Green Leafy Vegetables (spinach, romaine lettuce, kale, turnip greens, bok choy)
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

2. Broccoli, Cauliflower, Cabbage, Brussel Sprouts
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

3. Carrots
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

4. Other Vegetables (e.g., peas, corn, green beans, tomatoes, squash)
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

5. Citrus Fruits (e.g., orange juice or grapefruit juice, oranges, grapefruit)
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily

6. Other Fruits (e.g., fresh apples or pears, bananas, berries, grapes, melons)
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

7. Whole Milk Dairy Foods (whole milk, hard cheese, butter, ice cream)
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

8. Low-fat Milk Products (e.g., low-fat/skim milk, yogurt, cottage cheese)
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

9. Whole eggs
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

10. Margarine (stick-type not tub)
- ○ Less than once per week
- ○ Once per week
- ○ 2-4 times per week
- ○ Nearly daily or daily
- ○ Twice or more per day

○ Twice or more per day

As before, the following questions refer to your **usual** food intake **during the past year.**

11. Whole Grain Foods (e.g., whole grain breads, brown rice)
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

12. Pasta, Rice, Noodles
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

13. Baked Products (donuts, cookies, muffins, crackers, cakes, sweet rolls, pastries)
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

14. Beef, Pork or Lamb as Main Dish
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

15. Processed Meats (sausages, salami, bologna, hot dogs, bacon)
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

16. Fish/Seafood (not fried, but broiled, baked, poached, canned)
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

17. Deep Fried Foods (deep fried chicken, fish or seafood; French fries, onion rings)
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

18. How often do you add salt to food at the table?
○ Less than once per week
○ Once per week
○ 2-4 times per week
○ Nearly daily or daily
○ Twice or more per day

19. Do you currently take a multiple vitamin?
    ○ NO   ○ YES   If `YES', how many per **week**? _____

20. Do you currently take any of the following individual supplements (not counting multiple vitamins)?

Vitamin A	○ NO	○ YES	If `YES', how many per **day**? _____
Calcium	○ NO	○ YES	If `YES', how many per **day**? _____
Iron	○ NO	○ YES	If `YES', how many per **day**? _____

Vitamin C	⭘ NO	⭘ YES	If `YES', how many per **day**? _____
Vitamin E	⭘ NO	⭘ YES	If `YES', how many per **day**? _____
Beta carotene	⭘ NO	⭘ YES	If `YES', how many per **day**? _____
Other Nutrition Supplements	⭘ NO	⭘ YES	If `YES', how many per **day**? _____