# IDENTIFYING PERCEPTIONS OF HEALTH PROMOTION BARRIERS AND BENEFITS IN INDIVIDUALS AT RISK FOR CORONARY HEART DISEASE

by

Nicolett Marie Weston

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Dr. Charlene Winters, CNS-BC

Approved for the College of Nursing

Elizabeth Nichols, DNS, R FAAN

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Nicolett Marie Weston

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# DEFINITIONS

1. *Angina*. Angina was defined as substernal chest discomfort characterized a typical quality and duration, provocation by exertion or emotional stress, and relief with rest or with administration of nitroglycerin (Weiner et al., 1979).
2. *Atypical Angina.* Atypical angina was chest pain with two of the three typical characteristics which are substernal chest discomfort characterized a typical quality and duration, provocation by exertion or emotional stress, and relief with rest or with administration of nitroglycerin (Weiner et al., 1979).
3. *Barriers.* Barriers were defines as the perceived negative costs of health actions that arouse avoidance motives, factors that impede health promoting behavior and include perceptions about the potentially negative aspects of changing behavior (Murdaugh & Verran, 1987; Timmerman, 2007).
4. *Behavior*. A behavior was defined as any response to meaningful stimuli that can be measured directly or indirectly (Murdaugh & Verran, 1987).
5. *Benefits.* Barriers were defined as the perceived positive payoffs that lead to health care activities (Murdaugh & Verran, 1987).
6. *Coronary Heart Disease.* Coronary disease is also called coronary artery disease, ischemic heart disease, atherosclerotic heart disease occurs due to the accumulation of atheromatous plaques with the walls of the arteries that supply the myocardium with oxygen and nutrients. Some of the atheromatous plaques may rupture activating the blood clotting system which limits blood flow to the

myocardium (Davies, Woolf, Rowles, & Pepper, 1988; Kockx et al., 1998; O'Brien et al., 1998).

7. *Dyslipidemia.* Dyslipidemia was elevated total blood cholesterol, and/or elevated low density lipoprotein (LDL), and/or decreased high density lipoprotein (National Cholesterol Education Program, 2002).
8. *Health:* Health was a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity; a state of wellness (Wolf, 2007).
9. *Health behavior.* Health behaviors were those actions motivated by the desire to protect or promote health (Wolf, 2007).
10. *Health promotion.* Health promotion was behavior directed toward increasing the level of well-being and self-actualization of a given individual or group. Health promotion focuses on efforts to approach or move toward a positive state of high-level health and well-being; the act of encouraging the growth and development of health; the process of enabling people to increase control over, and to improve, their health (Fleury, 1991; Wolf, 2007).
11. *Ischemia.* Ischemia was insufficient blood supply and oxygenation of the myocardium, most commonly caused by a blockage of a coronary artery resulting in tissue injury ranging from reversible to permanent damage of cellular components (Gardner & Altman, 2005).
12. *Locus of Control.* Locus of control was a perception of responsibility, choice, and control of events in their lives, actual control can be either internal or external to

the person themselves. This perception, which is not usually within conscious awareness, strongly influences motivation and a sense of self direction (Lefcourt, 1966).

13. *Myocardium.* Myocardium was a layer of the heart wall composed of cardiac muscle cells interspersed with connective tissue and small blood vessels (Bond, 2005).
14. *Primary Prevention.* Primary prevention includes health promotion behaviors aimed at preventing disease and illness in otherwise healthy individuals (Fonarow, 2007).
15. *Risk Factor*. A risk factor is a variable associated with an increased risk of disease or infection (U.S. Department of Health and Human Services, 2007).
16. *Secondary Prevention*. Secondary prevention consists of a multifaceted approach, including cardiovascular medications, risk factor control, and lifestyle modification (National Cholesterol Education Program, 2002).

# ABSTRACT

Coronary Heart Disease (CHD) is the single largest cause of death in the U.S., and is also the leading cause of death in Montana. In addition, the estimated direct and indirect costs of cardiovascular disease in the U.S. for 2007 were $431.8 billion. Anticipated barriers to health promotion behavior have been shown to affect intentions to engage in and execute the behaviors. Exploring individual's perception of the benefits of health promotion behaviors is equally important when addressing barriers to making lifestyle changes. CHD is strongly associated with modifiable risk factors including physical inactivity, poor diet, and tobacco use. Although CHD risk factors have been studied extensively, few studies have assessed individuals' combined perceptions of barriers and benefits as reasons for non-adherence to recommended health promotion behaviors related to CHD risk and most of these studies included only women. The purpose of this research study was to examine perceived barriers and benefits to CHD risk modification in men and women living in a rural western state. Two survey tools were used to collect the data from a convenience sample of persons seen in the cardiac care areas at a local hospital in a rural western state. The findings of this study provided important information about the perceived barriers and benefits to CHD risk modification of persons previously diagnosed or at risk for CHD. Results from this study imply that in order to develop effective interventions, it is important to understand the individual and his or her unique characteristics including gender, socioeconomic status, and education level in relation to his or her perceived barriers and benefits to health promotion. Nurse practitioners and other primary care providers can incorporate this knowledge into future strategies to reduce or eliminate barriers, increase perceived benefits, and promote health promotion behaviors in individuals who are at risk for developing CHD. Advocating for health promotion behavior adoption and CHD risk modification offer a very important and practical tool for providers to help individuals address and lower risk factors as well as prevent CHD and treat individuals with established CHD.

# CHAPTER 1

## INTRODUCTION

Coronary Heart Disease (CHD), the single largest cause of death in the United States (U.S.), is strongly associated with modifiable behaviors including physical inactivity, poor diet, and tobacco use (MacGregor et al., 2006; Rosamond et al., 2007). Accounting for more than one-third (36.3 %) of all deaths in the U.S. in 2004 (American Heart Association, 2007b), CHD is also the leading cause of death in Montana (U.S. Department of Health and Human Services, 2003). Despite significant improvement in primary care management and prevention, CHD claims more lives each year than cancer, chronic lower respiratory diseases, accidents, and diabetes mellitus combined (Rosamond et al., 2007). While the number of deaths is staggering, also important is the number of Americans living with CHD. Among adults age 20 and older, the prevalence of CHD in 2004 was 15,800,000 (8,500,000 men, 7,200,000 women) (American Heart Association, 2007a).

Not only does CHD have an impact on morbidity and mortality, it has vast economic implications. Data included in the American Heart Association (AHA) Heart and Stroke Statistical Update for 2007 indicated that the estimated direct and indirect costs of cardiovascular disease in the U.S. for 2007 was $431.8 billion and the number of patients discharged from short-stay hospitals with CHD as the first-listed diagnosis increased 14% from 1979 to 2004 (Rosamond et al., 2007).

Extensive clinical and statistical studies have identified several factors that increase the risk of CHD and heart attack (American Heart Association, 2007c; Miller, 2002). The majority of CHD risk factors are considered modifiable, which means they can be prevented, treated or controlled (American Heart Association, 2007c). Poor diet, lack of exercise, and smoking are the three leading health behaviors contributing to the prevalence of CHD in the U.S. and are modifiable risk factors that have been proven to increase one's risk of CHD (American Heart Association, 2007c).

Clinical practice guidelines include recommendations that clinicians focus attention on all major risk factors in an attempt to predict and prevent CHD; however there has been an explosive increase in the prevalence of hypertension, obesity, and type II diabetes which are known risk factors for CHD (Lloyd-Jones, Dyer, Wang, Daviglus, & Greenland, 2007; Rosamond et al., 2007). Related complications such as hyperlipidemia and atherosclerotic vascular disease have also increased (Rosamond et al., 2007). Most people with chronic disease such as CHD share multiple common lifestyle characteristics or behaviors. Specifically, smoking, poor diet, and physical inactivity have been identified as leading contributors to overall mortality in the U.S. (American Heart Association, 2007c).

Research has demonstrated that two thirds of unexpected cardiac deaths occurred without prior recognition of CHD (Rosamond et al., 2007). CHD can progress for years without being diagnosed, often not until a major cardiac event has taken place (Deedwania, 1991; Rosamond et al., 2007). Although CHD risk factors have been studied extensively, little research has focused on the perceived barriers to CHD risk

modification or the perceived benefits of health promotion behaviors related to CHD risk. Understanding the perceptions individuals may have related to the barriers and benefits to cardiovascular health promotion behaviors may aid in early identification of those at increased risk for CHD (Thanavaro, 2005).

## Background and Significance

Knowledge of the determinants, distribution, and risk factors of CHD in the U.S. is extensive and growing rapidly, however the prevalence of CHD remains high despite this understanding (Miller, Sales, Kopjar, Fihn, & Bryson, 2005; Tyroler, 2000). There is an abundance of literature on the associations between behaviors such as sedentary lifestyle, tobacco use, and high-fat diet as the major risk factors influencing the risks of developing CHD (American Heart Association, 2007c). However, few studies have focused on individuals' perceptions of barriers and benefits as reasons for non-adherence to recommended health promotion behaviors related to CHD risk.

Barriers are the most powerful predictor of behavior. Anticipated barriers to health promotion behavior have been shown to affect intentions to engage in and execute the behaviors (Frich, Malterud, & Fugelli, 2006; Murdaugh & Verran, 1987; Thanavaro, 2005; Timmerman, 2007; Whetstone & Reid, 1991). Identifying barriers reflects individualized acknowledgement of potential obstacles to changing lifestyle behaviors and aids in appraising readiness to initiate and sustain health promotion behaviors (Murdaugh & Verran, 1987). Researchers have found that perceived barriers prevent patients from practicing health promotion behaviors (Frich, Malterud, & Fugelli, 2006;

Murdaugh & Verran, 1987; Thanavaro, 2005; Timmerman, 2007; Whetstone & Reid, 1991). An understanding of the barriers that individuals have related to health promotion behaviors may potentially help improve care (Bayliss, Steiner, Fernald, Crane, & Main, 2003; Thanavaro, 2005).

At any given moment, only about twenty percent of at-risk populations are ready to take meaningful action to change a health behavior, and forty percent of those with a problem are in a stage of change marked by denial and resistance (Prochaska & Velicer, 1997). Exploring individual's perception of the benefits of health promotion behaviors is equally important when addressing barriers to making lifestyle changes. By exploring individuals' perceptions of the benefits of cardiac health promotion behaviors, the advanced practice nurse will have a better understanding of his or her patients' health behaviors (Fleury, 1991; Murdaugh & Verran, 1987). From this information, interventions can be planned to educate and empower the individual to understand and embrace the behaviors.

Since 2001, researchers with the AHA and American College of Cardiology (ACC) have focused attention on the merits of aggressive risk-reduction therapies for individuals with established CHD (National Cholesterol Education Program, 2002; Smith et al., 2006). Current AHA and ACC guidelines recommend that care providers focus on smoking cessation, blood pressure control, lipid management, increasing physical activity, and weight management (Smith et al., 2006). Research has demonstrated that comprehensive risk factor management improves survival, reduces recurrent events and the need for interventional procedures, and improves quality of life in those with CHD

(Smith et al., 2006). An understanding of the barriers and benefits that individuals perceive related to health promotion behaviors may potentially isolate factors related to differential treatment that could be targeted for improving care and adherence to CHD prevention guidelines (Mosca et al., 2005).

## Purpose

The purpose of this research study was to examine perceived barriers and benefits to CHD risk modification in men and women living in south-western Montana. The specific aims of this study were to (a) identify perceived barriers to adopting the necessary health promotion behaviors related to decreasing CHD risk and to (b) identify perceived benefits to health promotion behaviors. Nurse practitioners and other primary care providers can incorporate this knowledge into future strategies to reduce or eliminate barriers and support health promotion behaviors in individuals who are at risk for developing CHD.

## Theoretical Perspective

The Preventative Behavior Model (PBM) was used to guide this study of perceived barriers and benefits related to CHD risk reduction. The PBM is based on social psychological theories of individual decision making constructed from concepts derived from the Health Belief Model (HBM) and Social Learning Theory (SLT). The PBM is particularly applicable to cardiac related health promotion behaviors and the perceived barriers and benefits an individual may have to adopting these behaviors

because it proposes to explain why individuals do or do not engage in health-promoting lifestyles (Murdaugh & Verran, 1987).

The HBM was developed to examine individual's health behaviors. The HBM has been used as a framework for exploring the reasons some people who are illness-free take actions to avoid illness, while others fail to adopt health promoting behaviors (Pender, 1996). The HBM has been useful in predicting those individuals who would or would not choose health promoting behaviors and in identifying interventions that might increase predisposition of resistant individuals to engage in health promotion behaviors. According to the HBM, variables that directly affect an individual's willingness to take action include the individual's perception of threat to personal health and the conviction that the benefits of taking action to protect health outweigh the barriers that may be encountered. Perceived benefits are an individual's beliefs regarding the effectiveness of recommended health promotion behaviors in preventing a health threat or illness. Perceived barriers are perceptions concerning the potential negative aspects of taking action such as expense, danger, unpleasantness, inconvenience, and time required (Galloway, 2003; Pender, 1996).

In the SLT suggests behavior, cognitive and other personal factors, and environmental influences all operate interactively as determinants of each other (Galloway, 2003). The basis of this theory is that people learn by observing the behaviors of others and the outcomes of those behaviors. In this theory, cognition plays an important role in learning and an individual's awareness and expectations of future reinforcements or punishments can have a major effect on the behaviors that the

individual exhibits. In the SLT both reinforcement and punishment have indirect effects on learning, however are not the sole or main cause of learning. Reinforcement and punishment influence the extent to which an individual exhibits a behavior that has been learned. The expectation of reinforcement influences cognitive processes that promote learning and therefore attention pays a critical role in learning (Galloway, 2003; Ormrod, 1999)

Drawing upon the HBM and SLT, the PBM was developed to explore the influence of perceived barriers, benefits, health value orientations, and certain health care behaviors on physiological outcomes (Murdaugh & Verran, 1987). Perceived barriers and benefits determine how a person values health and participates in health care activities. Taking health-related action is based on the belief that the condition can be avoided by taking the recommended action and that he or she can do so successfully (Galloway, 2003; Murdaugh & Verran, 1987). That is, individuals who perceive the benefits of a preventive behavior as outweighing the barriers usually have a higher health value orientation and undertake the preventive behavior.

The idea of locus of control can be used to better describe the relationship between perceived barriers and benefits and related behaviors. Locus of control is a perception of responsibility, choice, and control of events in an individual's life; actual control can be either internal or external to the person themselves. Health internal locus of control is a belief that health is determined by one's own behavior. This perception, which is not usually within conscious awareness, strongly influences motivation and a sense of self direction (Lefcourt, 1966). Murdaugh and Verran found that subjects with

an internal locus of control were more likely to participate in health care activities than those holding an external locus of control, which is the belief that one's choices are outside the control of the person themselves (Murdaugh & Verran, 1987). Studies of the PBM demonstrated that barriers to undertaking preventive behaviors were more prominent in individuals with an external locus of control whereas perceived benefits lead one to believe that the behaviors are contingent on one's efforts (Thanavaro, 2005; Thanavaro, Moore, Anthony, Narsavage, & Delicath, 2006).

The PBM is particularly applicable to cardiac related health promotion behaviors and the perceived barriers and benefits an individual may have to adopting these behaviors. Utilizing the PBM may allow the nurse practitioner to understand an individual's perceived barriers and benefits to risk reduction behaviors and intervene to breakdown the barriers, promote the benefits, and support health promoting behaviors (Murdaugh & Verran, 1987).

## Assumptions

For the purpose of this study it was assumed that perceived benefits and barriers influence participation in health care activities to the extent that perceived benefits outweigh perceived barriers. It is also assumed that majority of adults living in Montana are aware of the major risk factors for CHD.

# CHAPTER 2

# REVIEW OF LITERATURE

Chapter two contains a review of the literature undertaken using PubMed Central (PMC), MEDLINE, and the Cumulative Index to Nursing and Allied Health Literature (CINAHL) databases. Keywords used during the search included “coronary heart disease, coronary artery disease, clinical guidelines, risk factors, treatment, incidence, prevalence, health promotion, barriers, benefits, and behaviors.” The following major topics identified from the review of the literature that are described in this chapter include: definition of coronary heart disease, health and health promotion, and the barriers and benefits to health promotion behaviors. Specific topics related to CHD include pathophysiology, epidemiology, economic impact, symptoms of CHD, and risk factors and risk factor reduction. Health and health promotion were reviewed to gain a better understanding of their meaning as each can be highly individualized. Barriers and benefits to health promotion were reviewed related to cardiovascular health and behaviors aimed at decreasing CHD risk.

## Coronary Heart Disease

### Pathophysiology

CHD occurs as a result of the accumulation of atheromatous plaques within the walls of the arteries that supply the myocardium with oxygen and nutrients. Atherosclerosis is responsible for almost all cases of CHD. Atherosclerosis presents as a

focal thickening of the arterial intima and an accumulation of lipid deposits known as a fatty streak. The fatty streak lesion expands due to infiltration of immune mediators forming a fibrous plaque laden with lipids (Davies, Woolf, Rowles, & Pepper., 1988; Gardner & Altman, 2005; Kockx et al., 1998; O'Brien et al., 1998). After decades of progression, some of the atheromatous plaques may rupture which activates the blood clotting system. This process limits blood flow to the myocardium resulting in tissue hypoxia (Gardner & Altman, 2005).

Epidemiology

No other life-threatening disease is as prevalent or expensive to society than cardiovascular disease, and persons with cardiovascular disease are more likely to die from their disease (Cooper, Cutler, & Desvigne-Nickens, 2000). CHD accounts for approximately one-third to one-half of the total number of cardiovascular diseases diagnosed each year (Lloyd-Jones et al., 2007) . Advances in prevention and treatment of CHD were accompanied by a 50 percent decline in CHD mortality from the 1950s to the 1980s. However, the number of CHD deaths remained high, and over the past two decades approximately one million Americans have died from CHD each year. Nearly 2,400 Americans die from CHD each day which is an average of one death every 36 seconds (Rosamond et al., 2007). CHD claims more lives in both sexes each year than cancer, chronic lower respiratory diseases, accidents, and diabetes mellitus combined (Rosamond et al., 2007; Yawn, Wollan, Jacobsen, Fryer, & Roger, 2004). CHD remains the leading cause of death in the U.S. and Montana (Cooper et al., 2000; Tyroler, 2000; U.S. Department of Health and Human Services, 2003). Data presented by the AHA

indicated that for the year 2004, 79,400,000 Americans had one or more forms of CHD and in 2007 an estimated 1.2 million Americans will have a new or recurrent coronary attack (American Heart Association, 2007a; DeVon & Zerwic, 2002). According to the AHA Heart Disease and Stroke Update (2007), the average annual rates of first major cardiac event rose from 7 per 1000 men ages 35 to 44 years to 68 per 1000 men ages 85 to 94 years (Rosamond et al., 2007). Women experienced similar increases but 10 years later in life. According to present trends in the U.S., half of healthy 40-year-old men and one in three 40-year-old women will develop CHD (Rosamond et al., 2007).

More importantly, due to the nature of CHD, many people may not even know they have the disease as symptoms do not surface for decades, if at all. For this reason, statistical reports relying on self-reported data (e.g. National Health and Nutrition Examination Survey, National Health Interview Survey, National Hospital Discharge Survey, National Ambulatory Medical Care Survey, National Hospital Ambulatory Medical Care Survey, National Nursing Home Survey, National Vital Statistics, Behavioral Risk Factor Surveillance Survey) probably underestimate the actual prevalence of advanced CHD (Rosamond et al., 2007).

Economic Impact

Not only does CHD have an impact on morbidity and mortality, it has a vast economic impact as well. Researchers from the AHA estimated direct and indirect cost of cardiovascular disease in the U.S. for 2007 was $431.8 billion (Rosamond et al., 2007). In 2006 Montana's economic impact from CHD was $250 million dollars (Centers for Disease Control and Prevention, 2008). Direct costs include: hospitals and nursing

homes; physicians and other professional services; medications, and home health care. Indirect costs include the loss of productivity due to morbidity and mortality (Rosemond et al., 2007). The cost of heart disease and stroke in the U.S. is projected to be more than $448 billion in 2008, including health care expenditures and lost productivity from death and disability (Centers for Disease Control and Prevention, 2008). As the population ages, the economic impact of cardiovascular diseases on our nation's health care system will become even greater. The considerable economic cost associated with CHD underscores the need for preventive education and improved screenings to raise awareness among at-risk patients concerning the importance of lifestyle modifications, and the availability of effective therapies.

## Symptoms

Symptoms of CHD can range from severe chest pain to mild shortness of breath (Weiner et al, 1979). Some heart attacks are sudden and intense, but most heart attacks start slowly, with mild pain or discomfort. Often people affected aren't sure what's wrong and wait too long before getting help. Most heart attacks involve discomfort in the center of the chest that lasts more than a few minutes, or that goes away and comes back. It can feel like uncomfortable pressure, squeezing, fullness or pain. Symptoms can include pain or discomfort in one or both arms, the back, neck, jaw or stomach. Shortness of breath may occur with or without chest discomfort. Other signs may include breaking out in a cold sweat, nausea or lightheadedness (Weiner et al., 1979).

Diagnosing CHD can be difficult. A good clinical history is essential, but additional investigation is generally needed to establish the diagnosis, estimate prognosis, and guide appropriate treatment (Lee & Boucher, 2001). Coronary angiography is considered the "gold standard" for diagnosis, but because it is invasive and costly, it is appropriate as an initial diagnostic study in only a minority of patients (Ridker, 1999). Clinically, coronary ischemia may be detected by observing electrocardiogram (ECG) changes at rest or during exercise stress testing (Deedwania, 1991; Lee & Boucher, 2001; Weiner et al., 1979)

Although there are specific noninvasive options for detecting possible CHD, many individuals with CHD do not have any signs or symptoms. Most individuals with CHD may have the disease for decades before the onset of symptoms. Two thirds of unexpected cardiac deaths occur without prior recognition of CHD (Deedwania, 1991; Rosamond et al., 2007). This is known as silent CHD and it may not be diagnosed until a person shows signs and symptoms of a heart attack, heart failure, or an abnormal heart rhythm. Silent ischemia is thought to account for 75 percent of all ischemic episodes (U.S. Department of Health and Human Services, 2007).

## Treatment

Primary preventive strategies such as health promotion behaviors play a significant role, not only in the reduction of risk factors but also in prevention and effective treatment of CHD (Rippe, Angelopoulos, & Zukley, 2007). Health promotion behaviors such as following a heart healthy eating plan, increasing physical activity, maintaining a healthy weight, quitting smoking, and reducing stress have been associated

with decreasing individuals' risk for CHD ( Rippe, Angelopoulos, & Zukley, 2007; U.S. Department of Health and Human Services, 2007). The potential benefits of primary preventive strategies accounted for drastic reductions in CHD risk as illustrated by decreases in mortality rates (McGovern et al, 2001; McGovern et al., 1996) and by large epidemiologic studies such as the Nurses' Health Study, Women's Health Study, and INTERHEART study (Kurth et al., 2006; Stampfer et al., 2000; Yusuf et al., 2004).

AHA and ACC guidelines for comprehensive risk reduction in individuals with CHD recommend aggressive secondary prevention strategies in individuals with CHD. Secondary prevention consists of a multifaceted approach, including cardiovascular protective medications, risk factor control, and lifestyle modification. Recommended cardiovascular medications include aspirin, beta blockers, angiotensin-converting enzyme (ACE) inhibitors, and lipid-lowering medications (Smith et al., 2001). If CHD progresses to the point that symptoms (e.g. angina, shortness of breath, or fatigue) are severe enough to impact activities of daily living, interventional and surgical procedures may be needed to either reopen or bypass obstructed coronary arteries (Gentz, 2000).

## Risk Factors and Risk Factor Reduction

The majority of known risk factors for CHD are modifiable, including smoking, hypertension, diet, dyslipidemia, physical inactivity, obesity, and diabetes mellitus (Yusof et al., 2004). Poor diet, lack of exercise, and smoking are the three leading health behaviors contributing to the prevalence of CHD in the U.S. (American Heart Association, 2007c). Nonmodifiable risk factors cannot be changed and include age, male

gender, and family history (American Heart Association, 2007c). Family history is a significant independent risk factor for CHD. Compared to no parental history of CHD, a maternal history, a paternal history, or both were associated with an increased risk for CHD (Lloyd-Jones et al., 2004; Murabito et al., 2004; Sesso et al., 2001). In addition, the risk for CHD progressively increased with the number and intensity of risk factors (Lloyd-Jones, Dyer, Wang, Daviglus, & Greenland, 2007).

Physical Inactivity

A number of observational studies have shown a strong inverse relationship between physical activity with the risk of CHD and death. Physical inactivity is inversely and causally associated with the incidence of CHD (Albright & Thompson, 2006; Fonarow, 2007; Kessler, 2000; Paeffenbarger, Hyde, Wing, & Hsueh, 1986; Powell, Thompson, Caspersen, & Kendrick, 1987). These findings provide strong evidence that regular physical activity of at least moderate intensity reduces the risk of coronary events, thus leading to the conclusion that physical inactivity is a major CHD risk factor. The number of people at risk from CHD because of physical inactivity is considerably higher than the number at risk from any of the other primary risk factors including poor diet and smoking. Death rates in sedentary individuals are approximately twice as high as for active persons (Miller, Sales, Kopjar, Fihn, & Bryson, 2005; Paeffenbarger, Hyde, Wing, & Hsueh, 1986; Powell, Thompson, Caspersen, & Kendrick, 1987). Exercise can help control blood cholesterol, diabetes and obesity, help lower blood pressure in some people, and ultimately decrease risk for CHD (American Heart Association, 2007c;).

Although inadequate physical activity has been recognized as an independent risk factor for premature development of CHD, research has demonstrated that only one in four Americans adhere to recommendations for exercise (Miller, Sales, Kopjar, Fihn, & Bryson, 2005). In meeting the daily recommended minimum of 30 minutes of moderately intense physical activity (e.g. walking briskly), many activities can easily be incorporated into the routines of daily life, such as journeys to and from work, school or shops in addition to, or as an alternative to, recreation and sporting activities (U.S. Department of Health and Human Services, 2007). Systematic research focusing on why people do or do not begin an exercise program or physical activity has become increasingly more important with the shift in emphasis from treatment to prevention of disease. Following Dishman's (1982) early review of exercise adherence, there is a growing appreciation that exercise and physical activity behaviors are complex with multiple determinants (Dishman, 1982). It has been speculated that exercise behavior is a conscious decision and any barriers to adopting a more physically active lifestyle are largely perceived as intrinsic to the individual (Messent, Cooke, & Long, 2000).

Diet

Epidemiologic evidence suggests that "Western" style diets rich in red meats, fatty foods, added fats, desserts, and sweets are associated with a substantially increased risk for CHD (Fung et al, 2001). Numerous studies have consistently shown that individuals who eat more fruits and vegetables have a reduced risk of CHD. There is substantial evidence that diets high in unsaturated fats as the predominant form of dietary fat, whole grains as the primary form of carbohydrate, fruits and vegetables, and omega-3

fatty acids including fish or fish oil supplements offer significant protection against CHD (Hu & Willett, 2002; Joshipura et al., 1999; Law & Morris, 1998). However, only one in five Americans adheres to the recommended intake for fruit and vegetables (Miller Sales, Kopjar, Fihn, & Bryson, 2005). While dietary fat has also been proven to be a factor in CHD risk, some research has suggested that the type of fat consumed appears to be more important than the amount of total fat. None the less, a diet high in total fat is associated with an increased risk for CHD (Allison et al., 1995).

Smoking

The facts regarding the risk of cigarette smoking and CHD are well known to health professionals and the public (Ockene, 1997). Cigarette smoking is the leading cause of preventable death every year in the U.S. (Rippe, Angelopoulos, & Zukley, 2007). Cigarette smoking is a powerful independent risk factor for sudden cardiac death in patients with CHD, and research has demonstrated that smokers have about twice the risk for sudden cardiac death than nonsmokers (Goldenberg et al., 2003). Cigarette smoking also acts with other risk factors to greatly increase the risk for CHD and exposure to second hand smoke increases the risk of heart disease even for nonsmokers (American Heart Association, 2007c; Goldenberg et al., 2003).

There is a large body of evidence from prospective cohort and case-control studies that smoking cessation reduces the risk of CHD and CHD mortality (American Heart Association, 2007c; U.S. Department of Health and Human Services, 2003; Goldenberg et al., 2003; Prescott et al., 1998; U.S. Department of Health and Human Services, 1990). In individuals without known CHD, the reduction in cardiac event rate

associated with smoking cessation ranged from 7 to 47 percent (Hjermann et al., 1981; Multiple Risk Factor Intervention Trial Research Group, 1982; Rose et al., 1982). The cardiac risks associated with cigarette smoking diminish relatively soon after smoking cessation and continue to fall with increasing length of time since quitting. Similar benefits have been noted in individuals with CHD (U.S. Department of Health and Human Services, 1990).

## Health and Health Promotion

There is consistent and compelling scientific evidence that cardiovascular health promotion behaviors reduce the risk of CHD (primary prevention) and improve survival in individuals with CHD (secondary prevention) (Fonarow, 2007). Primary prevention guidelines include recommendations for smoking cessation, blood pressure control, lipid management, physical activity, diet, and weight management in order to reduce the risk for CHD (Grundy et al., 1997).

Secondary prevention consists of aggressive risk reduction in patients with established CHD using a multifaceted approach, including cardiovascular protective medications, risk factor control, and lifestyle modification. Studies confirm a reduction in morbidity and mortality in individuals with CHD after intervention addressing risk factors (National Cholesterol Education Program, 2002). The components of comprehensive secondary prevention include exercise, smoking cessation, and management of dyslipidemia, hypertension, diabetes, and weight (Smith et al., 2006). If an individual is able to exercise, eat a healthy diet, and refrain from smoking, he or she

can simultaneously prevent hypertension, dyslipidemia, diabetes, and obesity and lower the risk for CHD (American Heart Association, 2007c; Lloyd-Jones, Dyer, Wang, Daviglus, & Greenland., 2007).

Although there are a number of risk factors for CHD, this study will focus on the three main modifiable risk factors; physical inactivity, unhealthy diet, and smoking. If an individual partakes in regular cardiovascular exercise, maintains a balanced low fat diet, and refrains from smoking, he or she has a reduced risk for developing CHD. By addressing these three behaviors, the incidence of hypertension, hyperlipidemia, obesity, and diabetes are also decreased (American Heart Association, 2007c; Smith et al., 2001).

The majority of known risk factors for CHD are modifiable by specific preventive measures (American Heart Association, 2007c). Primary prevention guidelines highlight effective strategies for reducing CHD through health promotion behaviors (Grundy et al., 1997). A large body of literature focuses on the associations between health promotion behaviors and prevention of CHD. From this data, considerable effort has been devoted to exploring the correlations of risk factors and CHD. The Adult Treatment Panel (ATP III) guidelines include the statement that primary prevention represents the greatest opportunity for reducing the incidence of CHD (Mosca, 2002). The National Institutes of Health Chicago Heart Association Detection Project and the National Cholesterol Education Program III have provided clear evidence of the benefits of avoiding major cardiovascular risk factors and following a healthy lifestyle. Aggressive risk factor reduction has been recommended in all individuals with CHD risk factors (Lloyd-Jones, Dyer, Wang, Daviglus, & Greenlabd, 2007; Fedder, Koro, & L'Italien, 2002).

Evidence indicates that the earlier we adopt healthy behaviors the greater the preventive effect and reduction in CHD risk (Rosamond et al., 2007). If individuals are aware of the risks associated with CHD, are able to define what the benefits of health promotion behavior means to them, and are able to address any barriers that may inhibit them from sustaining cardiovascular health promotion behaviors, they may be better able to incorporate the behaviors into their lives and decrease their risk for CHD.

## Barriers and Benefits

There is an abundance of literature on the associations between behaviors such as sedentary lifestyle, tobacco use, and high-fat diet as the major risk factors influencing the risks of developing CHD. However, few studies have assessed individuals' combined perceptions of barriers and benefits as reasons for non-adherence to recommended health promotion behaviors related to CHD risk and most of these studies included only women.

Anticipated barriers to health promotion behavior have been shown to affect intentions to engage in and execute the behaviors, but only a handful of studies have explored predictors of barriers to CHD risk modification as a factor. Perceived barriers prevent patients from practicing health promotion behaviors (Murdaugh & Verran, 1987). Perceived barriers have been shown to be powerful predictors of behavior (Thanavaro, 2005; Timmerman, 2007).

## Related Research

In prior research, barriers to health promotion have been unique to each individual and the health promotion behavior. Barriers identified in previous research included internal barriers such as lack of time, external barriers such as lack of money, interpersonal relationships such as family roles, and environmental barriers such as lack of transportation (Timmerman, 2007). Tod, Read, Lacey, and Abbott (2001) conducted a study investigating barriers to use of services by adults diagnosed with angina. Structural barriers such as lack of transportation, personal barriers such as fear and denial that an illness existed, and social and cultural barriers such as difficulty coping with life hardships were identified as barriers to health promotion behaviors. Past experiences with health services and health professionals who were blaming, negative, or difficult were also identified as barriers (Tod, Read, Lacey, & Abbott, 2001).

Some studies focused on barriers to health promotion behaviors in women. Thanavaro (2005) found that the most commonly cited barriers to CHD risk modification related to exercise in women included family commitments, lack of time, motivation or laziness, and lack of self-discipline to exercise regularly. Women with a minority background, smoking history, or hyperlipidemia were more likely to have more perceived barriers to CHD health promotion behaviors. Interestingly, women with access to a nurse practitioner had fewer barriers to CHD risk medication (Thanavaro, 2005).

In another study Thanavaro, Moore, Anthony, Narsavage, and Delicath (2006) explored health promotion behavior and perceived benefits and barriers to CHD risk factor modification. Results demonstrated that women with fewer perceived barriers to

CHD risk modification, higher CHD knowledge levels, and no smoking history or family history of CHD were more likely to practice health promotion behaviors (Thanavaro, Moore, Anthony, Narsavage, & Delicath, 2006). Perceived benefits were high and barriers to health promotion behavior were similar to the 2005 study conducted by Thanavaro, but also included smoking and limited knowledge regarding CHD.

Mosca et al (2006) studied women's awareness of CHD risk factors and barriers to CHD risk modification. The most commonly reported barrier to CHD health promotion behaviors was confusion regarding media reports, followed by the belief that health is determined by a higher power, and caretaking responsibilities. The most common perceived benefits women acknowledged related to CHD prevention were to improve health, to feel better, to live longer, and avoid taking medications (Mosca et al., 2006). Clarke (1999) found that barriers to health promotion behavior were lack of money, lack of transportation, and child care responsibilities. In addition, Clarke found that low self-esteem could also be a barrier to health promoting behavior.

People with chronic conditions have also been studied to identify perceived barriers to health promotion behavior. Bayliss, Steiner, Fernald, Crane, and Main (2003) explored barriers to health promotion in individuals with two or more chronic medical conditions. Barriers identified from their study were related to specific disease processes or compound effects of chronic conditions such as diabetes and chronic obstructive pulmonary disease. Barriers included shortness of breath, physical limitations, medication side effects, financial constraints, and emotional impact of diseases (Bayliss, Steiner, Fernald, Crane, & Main, 2003).

Zeibland, Thorogood, Yudkin, Jones, and Coulter (1998) assessed whether anticipated barriers to diet and exercise in adults were internal or external. Internal barriers included lacking will power, enjoying "bad" behavior, and stress, whereas external barriers included lack of facilities, lack of money, and family obligations or preferences (Ziebland, Thorogood, Yudkin, Jones, & Coulter, 1998).

An understanding of the barriers that individuals have related to health promotion behaviors may potentially isolate factors related to differential treatment that could be targeted for improving care (Bayliss, Steiner, Fernald, Crane, & Main, 2003; Jerant, von Friederichs-Fitzwater, & Moore, 2005). Identifying barriers reflects individualized acknowledgement of potential obstacles to changing lifestyle behaviors and aids in appraising readiness to initiate and sustain health promotion behaviors (Fleury, 1991; Thanavaro, 2005). In addition, if an individual identifies barriers to cardiovascular health promotion behaviors, he or she could be identified at risk for developing CHD (Thanavaro, 2005). A summary of previous research can be found in Table 1.

Table 1. Summary of Previous Research.

| Author | Population | Identified Barriers | Identified benefits |
|---|---|---|---|
| Thanavaro, 2005 | Women 35-60 years old without prior history CHD | Family commitments, lack of time, lack of discipline, laziness | Not assessed |
| Thanavaro, Moore, Anthony, Narsavage, and Delicath, 2006 | Women 35-60 without prior history of CHD | Family commitments, lack of time, lack of discipline, laziness, smoking | Improve health, feel better |
| Mosca et al, 2006 | Women >25 years old | Media Confusion, health determined by a higher power, caretaking responsibilities | Improve health, feel better, live longer, avoid taking medications, and for families. |

Table 1. Summary of Previous Research (continued).

| Author | Population | Identified Barriers | Identified benefits |
|---|---|---|---|
| Clarke, 1999 | Women >18 | lack of money, lack of transportation, and child care responsibilities, low self-esteem | Not assessed |
| Bayliss, Steiner, Fernald, Crane, and Main, 2003 | Adults >18 with 2 or more chronic illnesses | Specific disease processes | Not assessed |
| Zeibland, Thorogood, Yudkin, Jones, & Coulter, 1998 | Adults 35-64 years old | Internal barriers: lack of enjoyment, lack of will power<br>External: inadequate facilities, lack of money | Not assessed |

## Summary

Finding better ways to help patients with or without CHD sustain long-term health promotion behaviors are essential to reduce risk factors and improve health outcomes. In order to reduce CHD risk in patients, health planning, education, and interventions should be appropriately targeted with an awareness of the social context in which the patient's lives and his or her preceived barriers and benefits related to adopting health promotion behaviors. Effective primary prevention not only requires an assessment of risk to categorize patients for selection of appropriate interventions, but an assessment of the barriers that patients may need to overcome in order to adopt a health promotion behaviors (Smith et al., 2001).

# CHAPTER 3

# METHODOLOGY

## Study Design

A descriptive, cross-sectional design was used to identify individual's perceptions to barriers and benefits to health promotion in persons with an increased risk for CHD. Two survey tools were used to collect the data to answer the research question. Data collection took place over a 1-month period of time, from February 7th, 2008 to March 7th, 2008.

## Sample Selection

A convenience sample of persons seen in the cardiac clinic, admitted to the cardiovascular catheterization lab for elective and non-urgent procedures, or referred for stress testing or echocardiogram at a local hospital in a rural western state constituted the study sample. Inclusion criteria were adults 21 years and older; ability to read and understand English; oriented to person, time, place, and situation; and willingness to participate by either completing the questionnaires independently or with assistance. If the participant was unable to fill out the questionnaire while at the cardiac clinic or cardiac catheterization laboratory, he or she was given a self-addressed and stamped envelope to return the questionnaire.

## Procedures for Data Collection

Cardiac research nurses, clinic nurses, and staff nurses in the cardiac clinic and cardiovascular laboratory were oriented to the data collection protocol. The research nurses informed eligible participants of the opportunity to participate in the study, assessed their level of orientation, and obtained written informed consent from those who remained interested. Participation was completely voluntary. The research nurses administered the questionnaires, and offered to read the survey, and record the results for those persons who were unable to complete the survey due to visual impairment, reading difficulties, or other physical limitations.

Identifying information such as name, address, medical record number, social security number, etc, were not be collected in order to protect anonymity. Participants were assigned an identification number to facilitate data management. The research nurses collected the consents and questionnaires and kept the consents and questionnaires in their office in a locked file cabinet for the duration of data collection. Completed surveys and consents were collected by the principal investigator at the end of the data collection period.

## Instruments

The Barriers Assessment Scale (BAS) was used to measure perception of barriers to health promotion (Murdaugh & Verran, 1987). The BAS is a self-report questionnaire consisting of 12 statements describing barriers to undertaking preventive health behaviors. Participants indicate the extent of their agreement or disagreement with each

statement using a 4-point Likert-type scale. Reponses ranged from 1 (strongly disagree) to 4 (strongly agree) for each item. The total possible scores range from 12 to 48. The higher the participant's score on the BAS, the greater the participant's perceived barriers. The reported reliability coefficient of the BAS was 0.72-0.76, and the 2-week-test-retest in a healthy population was 0.64-0.82, indicating the BAS is a reliable tool for assessing barriers to undertaking preventative health behaviors (Murdaugh & Verran, 1987). See appendix A.

The Benefits Assessment Scale (BES) was used to measure perceived benefits to health promotion behaviors (Murdaugh & Verran, 1987). The BES is a self-report questionnaire consisting of 12 statements describing benefits to undertaking preventive health behaviors. Participants indicated the extent of their agreement or disagreement with each statement using a 4-point Likert-type scale. Reponses range from 1 (strongly disagree) to 4 (strongly agree) for each item on the BES. The total possible scores ranged from 12 to 48. The higher the score the participant has on the BES, the greater the participant's perceived benefits. The reported reliability coefficient of the BES was 0.72-0.79, and the 2-week-test-retest in a health population was 0.52-0.71, indicating the BES as a reliable tool for assessing perceived benefits to undertaking preventative health behaviors (Murdaugh & Verran, 1987). See Appendix B.

Additional items were added to the survey to collect demographic information including: age, gender, formal educational level, town of residence, health insurance status, annual income, living arrangements, previous cardiac related illness, and other

chronic illness. Time to complete both questionnaires generally did not take more than 30 minutes.

## Human Subjects Consideration

This study was approved by the Joint Institutional Review Board (JIRB) of the community hospital where the data collection took place and the Institutional Review Board (IRB) at Montana State University. Permission to conduct the study was also obtained from the directors of the cardiac clinic and the cardiovascular catheterization laboratory at the community hospital.

## Statistical Analysis

Responses to the survey were entered into the database by the primary investigator. Data were analyzed using the Statistical Package for the Social Sciences (SPSS v 16.0). Descriptive statistics and frequencies were used to identify possible data entry errors. A mean Likert rating was computed for all respondents on each of the categories for both the BAS and BES instruments. Data are presented as means with standard deviation, frequencies, cross tabulations, and percentages to characterize the sample and examine frequencies in identified barriers and benefits. Due to the small sample size, measures of association were not used to examine differences among subgroups of participants based on race, ethnicity, income, education, marital status, or insurance status.

# CHAPTER 4

# RESULTS

The purpose of this study was to examine perceived barriers and benefits to CHD risk modification in men and women living in south-western Montana. The specific aims of this study were to (a) identify perceived barriers to adopting the necessary health promotion behaviors related to decreasing CHD risk and to (b) identify perceived benefits to health promotion behaviors.

## Sample Demographics

Of the 24 patients who were approached by the research nurses, 22 (91.6%) agreed to participate and completed the survey. Two (8.3%) people approached by the research nurses in the cardiovascular catheterization lab declined to participate in the study. Of the total sample (n=22), thirteen participants (59.1%) were from the cardiovascular catheterization lab, six (27.3%) were from the cardiac clinic, and three (13.6%) participants were from the echocardiogram or stress testing areas. The research nurses did not need to help any of the participants complete the surveys. Four surveys were sent home with patients to complete and mail back; however only two were returned and included in the study data.

All twenty-two (100%) of the participants answered the questions pertaining to demographics. The sample included 11 men (50%) and 11 women (50%) with ages ranging from 37 to 88 with a mean age of 63 years (SD = 14.6). Twenty (90.9%) of the

participants were Caucasian, two participants were American Indian or Alaskan Native (9.1%), and one participant was of Hispanic or Latino descent (4.5%). The majority (86.4%) of the participants were married while three (13.6%) reported their marital status as widowed. Nineteen (86.4%) participants reported living with a spouse, significant other, or partner; two (9.1%) reported living alone; and one (4.5%) lived with a family member. There were nine (40.7%) participants who reported living in a town or city with less than 2,500 people. Six (27.2%) participants reported living in towns or cities with a population between 2,501 to 10,000 people. Only one (4.5%) participant reported living in a town or city with a population between 10,001 to 50,000 people. Six (27.2%) participants reported living in towns or cities with a population greater than 50,001 people.

Of the 22 participants, two (9.1%) participants reported having an eighth grade education or less, one (4.5%) participant reported attending some high school, and seven (31.8%) reported graduating from high school. Six (27.2%) participants had some college education and six (27.2) were college graduates (27.2%, n=6). Twelve (54.5%) participants indicated that they were retired, eight (36.4%) reported being employed full time, and two (9.1%) reported their employment status as part time. Table 2 lists the demographic characteristics of the sample population.

Table 2. Demographic Characteristics.

| **Participant Response (N=22)** | | **Number of Cases** | **% of Total Sample** |
|---|---|---|---|
| Age | 37-49 | 3 | 13.5 |
| | 50-59 | 6 | 27.2 |
| | 60-69 | 4 | 18.0 |
| | 70-79 | 6 | 27.2 |
| | 80-89 | 3 | 13.5 |
| Gender | Male | 11 | 50.0 |
| | Female | 11 | 50.0 |
| Race | Caucasian | 20 | 90.9 |
| | American Indian/Alaskan Native | 2 | 9.1 |
| Ethnicity | Hispanic or Latino | 1 | 4.5 |
| | Non Hispanic or Latino | 21 | 95.5 |
| Marital Status | Married | 19 | 86.4 |
| | Widowed | 3 | 13.6 |
| Living Arrangement | Live alone | 2 | 9.1 |
| | Live with spouse/significant | 19 | 86.4 |
| | other/partner | 1 | 4.5 |
| | Live with family member | | |
| City/Town | < 2,500 | 9 | 40.7 |
| Population | 2,501-10,000 | 6 | 27.2 |
| | 10,001-50,000 | 1 | 4.5 |
| | >50,001 | 6 | 27.2 |
| Education | 8th grade or less | 2 | 9.1 |
| | Attended some high school | 1 | 4.5 |
| | Graduated from high school | 7 | 31.8 |
| | Some college | 6 | 27.2 |
| | College graduate | 6 | 27.2 |
| Income | <10,000 | 2 | 9.1 |
| | 10,001-20,000 | 3 | 13.6 |
| | 20,001-30,000 | 4 | 18.2 |
| | 30,001-50,000 | 8 | 36.4 |
| | 50,001-100,000 | 5 | 22.7 |
| Employment | Employed full time | 8 | 36.4 |
| | Employed part time | 2 | 9.1 |
| | Retired | 12 | 54.5 |

All 22 (100%) of the participants answered the questions regarding health related information including health insurance, smoking status, exercise frequency, diet, previous diagnosis of CHD, and presence of other heart related illnesses. All 22 (100%)

participants had at least one form of health insurance. Only four (18.2%) participants were smokers, eight participants (36.4 %) did not exercise, and 20 (90.9%) of the participants felt that their current diet was healthy. Fourteen (63.6%) participants were previously diagnosed with CHD prior to this study (five women and nine men) and four (18.2%) of the participants had heart related illnesses other than CHD including heart murmur, hypertension, dysrhythmia, and heart failure. Table 3 lists health information characteristics of the sample population.

Table 3. Health Information Characteristics.

| **Participant Response (N=22)** | | **Number of Cases** | **% of Total Sample** |
|---|---|---|---|
| Health Insurance | Medicaid only | 1 | 4.5 |
| | Medicare only | 1 | 4.5 |
| | Private/commercial only | 10 | 45.5 |
| | Medicare and private/commercial | 10 | 45.5 |
| Smoking | Smokers | 4 | 18.2 |
| | Non-smokers | 18 | 81.8 |
| Exercise Frequency | Daily | 6 | 27.3 |
| | 2-3 times per week | 4 | 18.2 |
| | 4-5 times per week | 4 | 18.2 |
| | Not regularly | 8 | 36.4 |
| Diet | Consider diet healthy | 20 | 90.9 |
| | Do not consider diet healthy | 2 | 9.1 |
| Previously Diagnosed with CHD | Yes | 14 | 63.6 |
| | No | 8 | 36.4 |
| History of other heart related other heart illness | Heart murmur | 1 | 4.5 |
| | Hypertension | 1 | 4.5 |
| | Dysrhythmia | 1 | 4.5 |
| | Heart failure | 1 | 4.5 |

Risk Factor Characteristics of
Participants Previously Diagnosed with CHD

Of the 14 (63.6%) participants previously diagnosed with CHD, two (14.3%) indicated they were smokers and two (14.3%) indicated they did not consider their diet healthy. Six (42.3%) indicated they exercised daily; two (14.3%) exercised two to three times per week; one (7.1%) exercised four to five times per week; and five (35.7%) indicated that they did not exercise regularly. Table 4 lists risk factor characteristics specific to whether or not participant had a previous diagnosis of CHD or not.

Table 4. Risk Factor Characteristics of Participants Previously Diagnosed with CHD.

| **Participant Response (N=22)** | | **Number of Cases** | **% of Total Sample** |
|---|---|---|---|
| Smoking Status | Smokers | 2 | 9.1 |
| | Nonsmokers | 12 | 54.5 |
| Diet | Consider diet healthy | 12 | 54.5 |
| | Do not consider diet healthy | 2 | 9.1 |
| Exercise Frequency | Daily | 6 | 27.2 |
| | 2-3 times per week | 2 | 9.1 |
| | 4-5 times per week | 1 | 4.5 |
| | Not regularly | 5 | 22.7 |

Gender Differences

Amongst the 22 participants, there were differences noted between the responses given by men and the responses given by women. All 11 (100%) women indicated they were Caucasian while nine (80.8%) males were Caucasian, two (18.2%) were American Indians or Alaskan Natives, and one (9.1%) male indicated he was of Hispanic of Latino ethnicity. All 11 (100%) males were married and living with their spouse, significant other, or partner. Eight (72.7%) women indicated they were married and three 27.3%)

were widowed. Two (18.2%) women lived alone; one (9.1%) lived with a family member; and eight (72.7%) lived with their spouse, significant other, or partner. Levels of education were fairly equal among men and women except that two (18.2%) women indicated they had eight grade level or less educations while none (0%) of the men indicated an education less than some high school. More men participants did however have slightly higher levels of income with the majority (72.7%) indicating their income before taxes above $30,000 per annum. More women (45.5%) were employed fulltime compared to men (27.3%). In addition, more men (63.6%) indicated they were retired compared to women (45.5%).

Four men (36.4%) indicated they exercised daily compared to two (18.2%) women. Three men (27.3%) exercised between two to three times per week; one (9.1%) exercised four to five times per week, and three (27.3%) indicated they did not exercise regularly. One (9.1%) woman exercised two to three times per week, three (27.3%) exercised four to five times per week, and five (45.5%) indicated they did not exercise regularly. Three (27.3%) of the male participants and one (9.1%) female participant indicated they were smokers. All 11 (100%) females considered their diet healthy, while nine (81.8%) men considered their diet healthy and two (18.2%) indicated they did not consider their diet healthy. Five (45.5%) women and nine (81.8%) men indicated they had been previously diagnosed with CHD prior to this study. Table 5 lists characteristics specific to gender.

Table 5. Gender Differences.

| **Participant Response (N=22)** | | **Number of Cases** | **% of Total Sample** |
|---|---|---|---|
| Race | Males | | |
| | Caucasian | 9 | 40.7 |
| | American Indian/Alaskan Native | 2 | 9.1 |
| | Females | | |
| | Caucasian | 11 | 50.0 |
| | American Indian/Alaskan Native | 0 | 0.0 |
| Ethnicity | Males | | |
| | Hispanic or Latino | 1 | 4.5 |
| | Non Hispanic or Latino | 10 | 45.5 |
| | Females | | |
| | Hispanic or Latino | 0 | 0.0 |
| | Non Hispanic or Latino | 11 | 50.0 |
| Marital Status | Males | | |
| | Married | 11 | 50.0 |
| | Widowed | 0 | 0.0 |
| | Females | | |
| | Married | 8 | 36.4 |
| | Widowed | 3 | 13.5 |
| Living Arrangement | Males | | |
| | Live alone | 0 | 0.0 |
| | Live with spouse/significant other/partner | 11 | 50.0 |
| | Live with family member | 0 | 0.0 |
| | Females | | |
| | Live alone | 2 | 9.1 |
| | Live with spouse/significant other/partner | 8 | 36.4 |
| | Live with family member | 1 | 4.5 |
| Education | Males | | |
| | 8th grade or less | 0 | 0.0 |
| | Attended some high school | 1 | 4.5 |
| | Graduated from high school | 4 | 18.0 |
| | Some college | 3 | 13.5 |
| | College graduate | 3 | 13.5 |
| | Females | | |
| | 8th grade or less | 2 | 9.1 |
| | Attended some high school | 0 | 0.0 |
| | Graduated from high school | 3 | 13.5 |
| | Some college | 3 | 13.5 |
| | College graduate | 3 | 13.5 |

Table 5. Gender Differences (continued).

| Participant Response (N=22) | | Number of Cases | % of Total Sample |
|---|---|---|---|
| | Males | | |
| Income | <10,000 | 0 | 0.0 |
| | 10,001-20,000 | 1 | 4.5 |
| | 20,001-30,000 | 2 | 9.1 |
| | 30,001-50,000 | 5 | 22.7 |
| | 50,001-100,000 | 3 | 13.5 |
| | Females | | |
| | <10,000 | 2 | 9.1 |
| | 10,001-20,000 | 2 | 9.1 |
| | 20,001-30,000 | 2 | 9.1 |
| | 30,001-50,000 | 3 | 13.5 |
| | 50,001-100,000 | 2 | 9.1 |
| Employment | Males | | |
| | Employed full time | 3 | 13.5 |
| | Employed part time | 1 | 4.5 |
| | Retired | 7 | 31.8 |
| | Females | | |
| | Employed full time | 5 | 22.7 |
| | Employed part time | 1 | 4.5 |
| | Retired | 5 | 22.7 |
| Exercise Frequency | Males | | |
| | Daily | 4 | 18.0 |
| | 2-3 times per week | 3 | 13.5 |
| | 4-5 times per week | 1 | 4.5 |
| | Not regularly | 3 | 13.5 |
| | Females | | |
| | Daily | 2 | 9.1 |
| | 2-3 times per week | 1 | 4.5 |
| | 4-5 times per week | 3 | 13.5 |
| | Not regularly | 5 | 22.7 |
| Smoking Status | Males | | |
| | Smokers | 3 | 13.5 |
| | Nonsmokers | 8 | 36.4 |
| | Females | | |
| | Smokers | 1 | 4.5 |
| | Nonsmokers | 10 | 45.5 |
| Diet | Males | | |
| | Consider diet healthy | 9 | 40.7 |
| | Do not consider diet healthy | 2 | 9.1 |
| | Females | | |
| | Consider diet healthy | 11 | 50.0 |
| | Do not consider diet healthy | 0 | 0.0 |
| Diagnosed with CHD | Gender | | |
| | Females | 5 | 22.7 |
| | Males | 9 | 40.7 |

Participants Previously Diagnosed
with CHD and CHD Education

Of the 14 (63.6%) participants previously diagnosed with CHD, nine (64.3%) had received some type of CHD education prior to filling out the questionnaires. All nine (100%) of the participants who reported having CHD had received education on at least one occasion and seven (77.8%) had received more than one type of education including booklets, videos, or discussion. Most (55.6%) participants indicated that Clinical Nurse Specialists (CNS) provided CHD education; four (44.4%) received education from Cardiologists; and one (11.1%) participant indicated receiving CHD education from a Physician's Assistant (PA). Table 6 lists CHD education characteristics of the sample population.

Table 6. CHD Education.

| **Participant Response (N=22)** | | **Number of Cases** | **% of Total Sample** |
|---|---|---|---|
| Previous CHD Education | Yes | 9 | 40.9 |
| | No | 5 | 22.7 |
| | Not applicable (no history of CHD) | 8 | 36.3 |
| Those with History of CHD | Frequency of Education | | |
| | Once | 5 | 22.7 |
| | Twice | 1 | 4.5 |
| | Three times | 2 | 9.1 |
| | Five times | 1 | 4.5 |
| | Professional Providing Education | | |
| | Physician's Assistant | 1 | 4.5 |
| | Clinical Nurse Specialist | 5 | 22.7 |
| | Cardiologist | 4 | 18.2 |
| | Place of Education | | |
| | Hospital only | 7 | 31.8 |
| | Hospital and Clinic | 2 | 9.1 |
| | Type of Education | | |
| | Booklet only | 1 | 4.5 |
| | Discussion only | 1 | 4.5 |
| | Video only | 0 | 0 |
| | Demonstration | 0 | 0 |
| | More than 1 type education | 7 | 31.8 |

BAS Results

Participants indicated the extent of their agreement or disagreement with each statement on the BAS using a 4-point Likert-type scale. Potential reponses ranged from 1 (strongly disagree) to 4 (strongly agree) for each item. The total possible scores on the BAS range from 12 to 48. The higher the participant's BAS score the greater the participant's perceived barriers (Murdaugh & Verran, 1987).

All 22 (100%) participants responded to the statements on the BAS. The participants' total BAS scores ranged from 12 to 35 with a mean total score of 24.5 (SD = 5.0). The mean item score was 2.38 (SD = 0.62, range 1-4), indicating that the participants overall had a moderate level of perceived barriers to CHD risk modification. The ranges of total BAS scores are shown in Table 7.

Table 7. Participant BAS Scores.

| BAS Score | Number (n) | Percent % |
|---|---|---|
| 0-10 | 0 | 0 |
| 11-20 | 3 | 13.6 |
| 21-30 | 17 | 77.3 |
| 31-40 | 2 | 9.1 |
| 41-48 | 0 | 0 |

Specific findings from the BAS showed that ten (45.5%) participants agreed that family commitments were a barrier to making healthy choices. Ten (45.5%) indicated that enjoyment of eating was a barrier to changing their diet. Nine (40.9%) agreed and 13 (59.1%) participants disagreed they did not take the time to exercise even though exercising is a good idea. Nineteen (86.4%) disagreed that a low fat diet takes too much time to prepare. The majority (90.9%) of participants disagreed that people don't need to

bother to change their habits because people die in the long run anyway. Sixteen (72.7%) disagreed that low fat diets are too unappetizing to follow for long periods and only two (9.1%) participants agreed that they were not convinced of the benefits of regular exercise. All (100%) participants disagreed that unsafe neighborhoods were a barrier to exercise. One (4.5%) participant indicated that stress was a barrier to smoking cessation. None of the participants agreed with the statement that weight gain was a barrier to stop smoking. Table 8 summarizes the participants' responses to the BAS statements.

Table 8. Participant Responses to BAS Statements.

| **Number Agreeing to Strongly Agreeing** | **Number Disagreeing to Strongly Disagreeing** | **BAS Statements** |
|---|---|---|
| 10 (45.5%) | 12 (54.5%) | Family can often get in the way when I want to make healthy changes |
| 10 (45.5%) | 12 (54.5%) | I enjoy eating too much to change my diet |
| 9 (40.9%) | 13 (59.1) | Even though it is a good idea, I don't take time to exercise |
| 3 (13.6%) | 19 (86.4%) | A low fat diet takes too much time to prepare |
| 7 (31.8%) | 15 (68.2%) | If I feel healthy there is no need to change my diet |
| 2 (9.1%) | 20 (90.9%) | In the long run I will die anyway so I need not bother to change my habits |
| 6 (27.3%) | 16 (72.7%) | Low fat diets are too unappetizing to follow for long periods |
| 2 (9.1%) | 20 (90.9%) | I am not convinced of the benefits of regular exercise |
| 0 (0%) | 22 (100%) | I do not exercise because it is not safe in my neighborhood |
| 7 (31.8%) | 15 (68.2%) | I am too busy with my family to exercise regularly |
| 0 (0%) | 22 (100%) | If I stopped smoking I will gain weight, so I may as well smoke |
| 1 (4.5%) | 21 (95.5%) | It will be too stressful for me to stop smoking |

BES Results

Participants indicated the extent of their agreement or disagreement with each statement on the BES using a 4-point Likert-type scale. Potential responses range from 1

(strongly disagree) to 4 (strongly agree) for each item on the BES. The total possible scores on the BES range from 12 to 48. The higher the participant's BES score, the greater the participant's perceived benefits (Murdaugh & Verran, 1987).

All 22 (100%) participants responded to the statements on the BES. The participants' total BES scores ranged from 31 to 48 with a mean total score of 38.2 (SD = 4.6). The mean item score was 2.88 (SD = 0.522, range 1-4), indicating that the participants overall had a moderately high level of perceived benefits to CHD risk modification. The ranges of total BES scores are shown in Table 9.

Table 9. Participant BES Scores.

| BES Score | Number (n) | Percent % |
|---|---|---|
| 0-10 | 0 | 0 |
| 11-20 | 0 | 0 |
| 21-30 | 0 | 0 |
| 31-40 | 16 | 72.7 |
| 41-48 | 6 | 27.3 |

Specific findings from the BES included all (100%) participants agreed that regular exercise decreases the risk of heart attack. Participants also disagreed with the statement that eating a low fat diet doesn't reduce the risk of heart disease. The majority (90.9%) agreed with the statement that regular exercise helps reduce tension and stress. All (100%) participants agreed with the statement that regular exercise helps maintain a normal weight. Nineteen (86.4%) agreed that lowering dietary salt decreases the risk for high blood pressure. All (100%) participants agreed that annual check ups help decrease the risk for heart disease and that regular exercise may help prevent high blood pressure. Only one (4.5%) participant agreed that research has shown that it is okay to eat a high

fat diet. Twenty (90.9%) participants agreed that losing weight may help control high blood pressure. One (4.5%) participant disagreed that regular exercise can increase energy. All (100%) participants agreed that stopping smoking lowers the chance of heart disease, however 7 (31.8%) agreed that after smoking for many years it is too late to stop. Table 10 summarizes the BES findings.

Table 10. Participant Responses to BES Statements.

| Number Agreeing to Strongly Agreeing | Number Disagreeing to Strongly Disagreeing | BES statements |
|---|---|---|
| 22 (100%) | 0 (0%) | Regular exercise may decrease my chances of a heart attack |
| 0 (0%) | 22 (100%) | Even if I eat a low fat diet I will not reduce my chance of heart disease |
| 20 (90.9%) | 2 (9.1%) | Regular exercise helps reduce tension and stress |
| 0 (0%) | 22 (100%) | Regular exercise can help me maintain a normal weight |
| 19 (86.4%) | 3 (13.6%) | Lowering salt in my diet may lessen my risk for high blood pressure |
| 22 (100%) | 0 (0%) | Annual check ups will help me learn my risk for heart disease |
| 22 (100%) | 0 (0%) | Regular exercise may help prevent high blood pressure |
| 1 (4.5%) | 21 (95.5%) | Research now shows that it is probably okay to eat a high fat diet |
| 20 (90.9%) | 2 (9.1%) | Losing weight may help control high blood pressure |
| 21 (95.5%) | 1 (4.5%) | Regular exercise can make me feel I have more energy |
| 22 (100%) | 0 (0%) | If I stopped smoking I will lower my chance of heart disease |
| 7 (31.8%) | 15 (68.2%) | If I have smoked for many years it is too late to stop now |

BAS Gender Differences

Men and women's total BAS scores were very similar (Table 11). A review of the individual responses show that women were more likely to agree that family commitments were a barrier to CHD risk modification than men. Woman were also more likely to agree that time was a barrier to exercise. Only one man (4.5%) agreed that stress

was a barrier to stopping smoking. Table 12 shows the responses to individual items on the BAS based on gender.

Table 11. Gender BAS Scores.

| BAS Score | Number (n) | |
|---|---|---|
| | Males | Females |
| 0-10 | 0 | 0 |
| 11-20 | 2 | 1 |
| 21-30 | 8 | 9 |
| 31-40 | 1 | 1 |
| 41-48 | 0 | 0 |

Table 12. BAS Results Based on Gender.

| Number Agreeing to Strongly Agreeing | | Number Disagreeing to Strongly Disagreeing | | BAS Statements |
|---|---|---|---|---|
| M | F | M | F | |
| 3 | 7 | 8 | 4 | Family can often get in the way when I want to make healthy changes |
| 5 | 5 | 6 | 6 | I enjoy eating too much to change my diet |
| 3 | 6 | 8 | 5 | Even though it is a good idea, I don't take time to exercise |
| 2 | 1 | 9 | 10 | A low fat diet takes too much time to prepare |
| 4 | 3 | 7 | 8 | If I feel healthy there is no need to change my diet |
| 1 | 1 | 10 | 10 | In the long run I will die anyway so I need not bother to change my habits |
| 4 | 2 | 7 | 9 | Low fat diets are too unappetizing to follow for long periods |
| 0 | 2 | 11 | 9 | I am not convinced of the benefits of regular exercise |
| 0 | 0 | 11 | 11 | I do not exercise because it is not safe in my neighborhood |
| 2 | 5 | 9 | 6 | I am too busy with my family to exercise regularly |
| 0 | 0 | 11 | 11 | If I stopped smoking I will gain weight, so I may as well smoke |
| 1 | 0 | 10 | 11 | It will be too stressful for me to stop smoking |

BES Gender Differences

Men and Women's total BES scores were similar. Table 13 shows total BES scores based on gender. All (100%) men and women agreed that regular exercise and eating a low fat diet decrease the risk for heart disease. All (100%) men and women agreed that regular exercise and annual check ups reduce the risk for high blood pressure and heart disease. Table 14 summarizes responses to the BES based on gender.

Table 13. Gender BES Scores.

| **BES Score** | **Number (n)** | |
|---|---|---|
| | **Males** | **Females** |
| 0-10 | 0 | 0 |
| 11-20 | 0 | 0 |
| 21-30 | 0 | 0 |
| 31-40 | 8 | 8 |
| 41-48 | 3 | 3 |

Table 14. BES Results Based on Gender.

| **Number Agreeing to Strongly Agreeing** | | **Number Disagreeing to Strongly Disagreeing** | | **BES statements** |
|---|---|---|---|---|
| M | F | M | F | |
| 11 | 11 | 0 | 0 | Regular exercise may decrease my chances of a heart attack |
| 0 | 0 | 11 | 11 | Even if I eat a low fat diet I will not reduce my chance of heart disease |
| 9 | 11 | 2 | 0 | Regular exercise helps reduce tension and stress |
| 11 | 11 | 0 | 0 | Regular exercise can help me maintain a normal weight |
| 10 | 9 | 1 | 2 | Lowering salt in my diet may lessen my risk for heart disease |
| 11 | 11 | 0 | 0 | Annual check ups will help me learn my risk for heart disease |
| 11 | 11 | 0 | 0 | Regular exercise may help prevent high blood pressure |
| 1 | 0 | 10 | 11 | Research now shows that it is probably okay to eat a high fat diet |
| 9 | 11 | 2 | 0 | Losing weight may help control high blood pressure |
| 10 | 11 | 1 | 0 | Regular exercise can make me feel I have more energy |
| 11 | 11 | 0 | 0 | If I stopped smoking I will lower my chance of heart disease |
| 5 | 2 | 6 | 9 | If I have smoked for many years it is too late to stop now |

BAS Total Score Means

BAS total score means were tabulated in order to further analyze the data. Women scored slightly higher on the BAS (25.9, SD = 4.3) than men (23.2, SD = 5.6). Participants between 50 to 59 years of age had a higher BAS total score mean (26.25) than other age groups and participants between 80 and 89 had the lowest BAS total score mean (24.7). Interestingly, participants with an eighth grade or less education level had the highest BAS total score mean (30.5, SD = 6.4) while college graduates had the lowest (19.5, SD = 19.5). When the participant's income level was used as a variable, those with an income of less than $10,000 per annum had the highest BAS total score mean (30.5, SD = 6.4) while participant's with incomes between $10,000 and $20,00 per annum had the lowest (21.0, SD = 7.9). Participants that reported their living situation as living alone had the highest BAS total mean score (26.0, SD = 0.0), while participants living with a spouse, significant other, or partner had the lowest BAS scores. The BAS total score mean was higher for participants employed full time (25.8, SD = 4.1). Participants who smoke had a higher BAS total score mean (28.0, SD = 2.9) than those who did not smoke (23.8, SD = 5.2). Using exercise frequency as a variable, participants who reported not exercising regularly had the highest BAS total score mean (26.4, SD = 5.9). Participants without a previous diagnosis of CHD had a higher BAS total score mean (26.3, SD = 4.4) than those that indicated they had a previous diagnosis of CHD (23.6, SD = 5.3). Of the participants with a previous diagnosis of CHD, those who had received previous CHD education had previous education had a BAS total score mean of 24.8 (SD= 5.0) and those who had not had a BAS total score mean of 21.4 (SD = 5.6).

BES Total Score Means

BES total score means were also tabulated in order to further analyze the data. BES Men and women's BES total score means were 38.2 and 38.3, respectively. The BES total score mean based on age was highest for participants 37 to 49 years of age (42.0) and lowest for participants between 70 and 79 years of age (36.0). College graduates had the highest BES total score mean (43.5) and participants with some high school education had the lowest BES total score mean (35.0). Participants with an income between $10,000 to $20,000 per annum had a higher BES total score mean than the other participants. Participants who reported living with a spouse, significant other, or partner had the highest BES total score mean (38.6) while those living alone had a BES total score mean of 35.5. The BES total score mean was highest for participants employed part time (41.5, SD = 2.1) and lowest for those employed full time (36.8, SD = 3.9). Nonsmokers had a higher BES total score mean (39.2, SD = 4.4) than smokers (33.8, SD = 2.6). Participants who reported exercising daily had the highest BES total score mean (41.3, SD = 1.5. Participant BES total score means were similar between those with a previous diagnosis of CHD (38.6, SD = 4.7) and those without (37.62, SD = 4.6). However, those that reported not having received previous CHD education had a higher BES total score mean (40.2, SD = 5.5) compared to those that had received CHD education (37.7. SD = 4.3). Table 15 lists the mean scores for BAS and BES.

Table 15. Mean Total BAS and BES Scores.

| **Demographic Variables** | **Participant Characteristics** | **BAS Total Score Mean** | **BES Total Score Mean** |
|---|---|---|---|
| Gender | Males | 23.2 (SD 5.6) | 38.2 (SD 6.0) |
| | Females | 25.9 (SD 4.3) | 38.3 (SD 2.8) |
| Age | 37-49 | 25.3 | 42.0 |
| | 50-59 | 26.25 | 36.25 |
| | 60-69 | 23.0 | 39.5 |
| | 70-79 | 25.7 | 36.0 |
| | 80-89 | 24.7 | 36.7 |
| Education | $8^{th}$ grade or less | 30.5 (SD 6.4) | 37.0 (SD 2.8) |
| | Attended some high school | 24.0 (SD 0.0) | 35.0 (SD 0.0) |
| | Graduated high school | 26.7 (SD 3.6) | 36.3 (SD 4.1) |
| | Some College | 25.2 (SD 0.8) | 36.2 (SD 2.6) |
| | College graduate | 19.5 (SD5.6) | 43.5 (SD 3.7) |
| Income | <10,000 | 30.5 (SD 6.4) | 37.0 (SD 2.8) |
| | 10,001-20,000 | 21.0 (SD 7.9) | 40.0 (SD 6.9) |
| | 20,001-30,000 | 25.8 (SD 2.4) | 36.5 (SD 1.7) |
| | 30,001-50,000 | 24.6 (SD 5.0) | 38.9 (SD 6.0) |
| | 50,001-100,000 | 23.2 (SD 3.6) | 38.0 (SD 3.4) |
| Living Situation | Live alone | 26.0 (SD 0.0) | 35.5 (SD 0.7) |
| | Live with spouse/significant other/partner | 24.4 (SD 5.4) | 38.6 (SD 4.8) |
| | Live with family member | 24.0 (SD 0.0) | 36.0 (SD 0.0) |
| Employment | Employed full time | 25.8 (SD 4.1) | 36.8 (SD 3.9) |
| | Employed part time | 23.5 (SD 0.7) | 41.5 (SD 2.1) |
| | Retired | 23.9 (SD 6.0) | 38.7( SD 5.1) |
| Smoking Status | Smokers | 28.0 (SD 2.9) | 33.8 (SD 2.6) |
| | Nonsmokers | 23.8 (SD 5.2) | 39.2 (SD 4.4) |
| Exercise | Daily | 24.3 (SD 1.9) | 37.2 (SD 3.3) |
| Frequency | 2-3 times per week | 23.2 (SD 7.8) | 38.5 (SD 3.3) |
| | 4-5 times per week | 22.5 (SD 3.9) | 41.3 (SD 1.5) |
| | Not regularly | 26.4 (SD 5.9) | 37.4 (SD 4.8) |
| CHD | Diagnosed with CHD | 23.6 (SD 5.3) | 38.6 (SD 4.7) |
| | No diagnosis of CHD | 26.3 (SD 4.4) | 37.6 (SD 4.6) |
| | CHD Education | | |
| | Previous CHD education | 24.8 (SD 5.0) | 37.7 (SD 4.3) |
| | No previous CHD education | 21.4 (SD 5.6) | 40.2 (SD 5.5) |

# CHAPTER 5

# DISCUSSION

The theoretical perspective used in this study was the PBM which is based on social psychological theories of individual decision making constructed from concepts derived from the HBM and SLT. The PBM is particularly applicable to cardiac related health promotion behaviors and the perceived barriers and benefits an individual may have to adopting these behaviors because it proposes to explain why individuals do or do not engage in health-promoting lifestyles (Murdaugh & Verran, 1987). This study focused on the perceived barriers and benefits individuals at risk for CHD may have to health promotion behaviors. Specific health promotion behaviors included exercising, eating healthy, and not smoking. Perceived barriers and benefits were the focus of this study because perceived barriers and benefits determine how a person values health and participates in health care activities. Individuals who perceive the benefits of a preventive behavior as outweighing the barriers usually have a higher health value orientation and undertake the preventive behavior (Galloway, 2003; Murdaugh & Verran, 1987).

## Perceived Barriers and Benefits

### Barriers

The findings of this study provided important information about the perceived barriers and benefits to CHD risk modification of persons previously diagnosed or at risk for CHD. There was a high level of awareness of CHD risk factors among the

participants in this study. Family commitments and enjoyment of current diet were perceived barriers to making healthy changes. However, the majority (90.9%, n=20) of the participants considered their current diet healthy. Lack of time and lack of motivation were identified as barriers to exercise. Most participants did not identify weight gain or stress as barriers to quitting smoking, however one participant indicated that stress was a barrier to smoking cessation. These findings support those from previous studies conducted by Clark (1999), Mosca et al (2006), Thonavaro (2005), Thanavaro, Moore, Anthony, Narsavage, & Delicath (2006) and Zeibland, Thorogood, Yudkin, Jones, & Coulter (1998).

Benefits

Participants demonstrated that as a group they had a high level of perceived benefits of health promotion behavior and CHD risk modification. All agreed that regular exercise decreases the risk for heart attack, helps maintain a normal weight, and prevents high blood pressure. Similarly, all agreed that annual check ups were important regarding CHD risk and that smoking cessation will lower the risk of CHD. These findings are similar to previous research. However Thanavaro, Moore, Anthony, Narsavage, and Delicath (2006), and Mosca et al (2006) also found that individuals identified improving health, feeling better, and living longer as perceived benefits of health promotion behaviors. The questionnaires utilized in this study did not solicit information about these perceptions.

One marked difference between this study and previous studies is that the women in the sample population demonstrated moderately high perceptions of the benefits of

CHD risk modification and health promotion based on the moderately high sores they had on the BES. Thanavaro, Moore, Anthony, Narsavage, and Delicath (2006), Mosca et al (2006), Emslie (2005), and Hart (2005) all found that women lacked CHD knowledge and did not partake in health promotion behaviors (Emslie, 2005; Hart, 2005; Mosca et al., 2006; Thanavaro, Moore, Anthony, Narsavage, & Delicath, 2006).

Gender Differences

Women in this study as a group had a slightly higher BAS total score mean than men and identified more barriers than men. Women were more likely to indentify lack of time and family commitments as barriers to health promotion. Overall, men did not collectively identify one barrier more than the rest. These findings are consistent with previous research by Mosca et al (2006), Thanavaro (2005), Thanavaro, Moore, Anthony, Narsavage, and Delicath (2006), and Clarke (1999) who found that women in particular identified lack of time, family commitment, and family roles as barriers to health promotion behaviors. A more recent study by Folta and colleagues (2008) identified similar perceived barriers to CHD risk reduction including lack of time and lack of motivation in women.

Men and women's responses to statements on the BES were very similar and both groups scored quite high on the BES suggesting that the participants in this study were knowledgeable about the benefits of CHD risk reduction and health promotion. Both men and women indicated that regular exercise decreases the risk for heart attack, helps maintain a normal weight, and prevents high blood pressure. Men and women also agreed

that annual check ups were important regarding CHD risk and that smoking cessation will lower the risk of CHD.

### Education, Socioeconomic Status, and Living Situation

Comparing the mean total scores on the BAS, participants with less education, and lower yearly incomes had higher scores indicating more perceived barriers to CHD health promotion. These findings are consistent with previous research by Mosca et al (2006), Thanavaro (2005), Thanavaro, Moore, Anthony, Narsavage, and Delicath (2006) and Timmerman (2007) who also found that limited income and lower levels of education are associated with increased perception of barriers to health promotion (Mosca et al., 2006; Thanavaro, 2005; Thanavaro, Moore, Anthony, Narsavage, & Delicath, 2006; Timmerman, 2007; Volkers, Westert, & Schellevis, 2007). Participants living alone also had higher perceptions of barriers to CHD modification in this study which is similar to results by Gulliksson, Burell, Toss, H, and Svärdsudd (2007) who found that people who lived alone tended to report having more barriers, less support systems, and lower quality of life (Gulliksson, Burell, L., Toss, & Svärdsudd, 2007).

### Health Promotion Behaviors

Smoking, exercise, and diet are behavioral aspects of health that are of increasing interest, because they influence CHD risk. The nature and role of health promotion is an emerging area of translational research.

Exercise. The finding that participants who reported that they did not exercise regularly had higher BAS and lower BES scores than participants who exercised was not a surprise since exercising was one of the modifiable health promotion behaviors under performed by many Americans (American Heart Association, 2007c). It could be assumed that those who did not exercise regularly may have more perceived barriers to health promotion behaviors. Previous research has demonstrated that barriers to physical activity include weather, physical environment, time, health and psychological limitations; internal motivators such as immediate or long term psychological, health or spiritual benefits, commitment, and guilt; and the role of significant others such as health and exercise professionals in initiating advice and continuing support, social interaction and commitment or contracts made to others (Elley, Dean, & Kerse, 2007). However, the BAS used in this study does not assess for the specific barriers that an individual may have to exercise in that much detail. Even though participants that did not exercise regularly scored higher on the BAS and lower on the BES than those that exercised which demonstrates they did have a generally high perception of the benefits of health promotion in relation to CHD. These findings are consistent with other studies concluding that knowledge alone does not necessarily alter behavior or predict outcomes (Green, Bazata, Fox, & Grandy, S, 2007).

Diet. The majority of participants indicated that their diet was healthy, however the questionnaire did not fully assess the participant's diet choices or patterns, therefore it is unknown if their diets were truly "healthy." This may be a reflection of the many conflicting principles of healthy eating that have been proposed over the past few

decades, generating diverse opinions on what constitutes healthy food choices (Fung et al, 2001). Some dietary recommendations promote the exclusion of particular foods, while others indicate that the same foods should occupy the central focus of the diet. The general population, including the medical and nursing professions, may have some confusion as to which dietary recommendations to follow, and which dietary components may be most important (Fung et al, 2001).

Hu (2007) demonstrated that individuals have barriers to achieving a heart-healthy diet included lack of knowledge regarding what a healthy diet consists of, lack of time, and concern about wasting food. This study did not solicit the participants' understanding of a heart healthy diet. Therefore the participants may have had a knowledge deficit or other barriers to eating a healthy diet than was assessed in this study.

Smoking. Smokers from the sample population had higher BAS scores and lower BES scores than nonsmokers suggesting that people who smoke have more perceived barriers and lower perceived benefits of health promotion behaviors. Previous research has demonstrated that smokers generally have a lower awareness of the services available to help them quit smoking or have misconceptions about their availability and effectiveness despite that the enormous health benefits of smoking cessation are well established (Hammond, McDonald, Fong, & Borland, 2004; Roddy, Antoniak, Britton, Molyneux, & Lewis, 2006; Sutherland, 2003). The majority of the participants agreed that if a person had smoked for many years, quitting would not reduce CHD risk. In contrast, a recent study conducted by Kabir et al., 2007) found that the overall smoking

prevalence declined by 14% between 1985 and 2000, resulting in about 685 fewer deaths (minimum estimate 330, maximum estimate 1,285) attributable to smoking cessation (Kabir et al., 2007).

CHD develops over several decades, and it is known that preventative efforts started early in life are likely to have the greatest benefit, however lifestyle modifications started later in life may still reduce risk (Albright & Thompson, 2006; Fleury, 1991; Ford, Ford, Will, Galuska, & Ballew, 2001;Miller, Sales, Kopjar, Fihn, & Bryson, 2005). Not only does smoking cessation reduce an individual's risk for CHD, cancer, and death, it is the only intervention shown to alter the relentless progression of pulmonary diseases such as chronic obstructive pulmonary disease and emphysema (Rennard, 2006).

Previous Diagnosis of CHD and Education It has been shown that effective education is an essential component of healthcare, particularly for those with CHD (Redfern, Ellis, Briffa, & Freeman, 2006). An interesting finding from this study was that five participants diagnosed with CHD prior to filling out the questionnaires indicated they had not received CHD education. In addition participants with a previous diagnosis of CHD that had not received CHD education scored lower on the BAS and higher on the BES than participants that had received CHD education. This is an important finding since individuals with established CHD have a high risk of subsequent cardiovascular events, including myocardial infarction, stroke, and death from cardiovascular disease (National Cholesterol Education Program, 2002).

Even more surprisingly, was the finding that participants with CHD that had CHD education scored lower on the BES than those that had not had CHD education. This lack

of understanding may be partially explained by evidence that individuals with heart disease have difficulty retaining and appreciating the relevance of information provided to them (Ratcliffe, 2007). It has also been reported that patients with heart disease are sometimes unwilling to openly acknowledge their diagnosis and its implications (Ratcliffe, 2007). However there is a strong inverse association between educational attainment and CHD mortality (Deniss et al., 1993). CHD education and empowerment are key pathways in reducing complications of cardiovascular disease in those with established CHD. Secondary prevention in this population is important health promotion behaviors such as exercise and dietary modification in combination with drug therapy should be used to achieve the goals of CHD risk reduction. While critical, as this study demonstrated CHD education alone is not sufficient for improving compliance (Grundy et al., 2004; National Cholesterol Education Program, 2002; Smith et al., 2006).

Those that did receive education most often received more than one type of education such as discussion, booklets, videos, or demonstration. Provision of multiple education materials is important because relying primarily on discussion has been shown to be ineffective as individuals tend to forget approximately one-half the information provided (Redfern, Ellis, Briffa, & Freeman, 2006). It is unknown if participants in this study without CHD had received some type of CHD education because neither questionnaire included information related to CHD education in those without a previous diagnosis of CHD.

## Study Limitations

This study was limited in that it was conducted in one community hospital, in one western state in the U.S., with a small sample, and over a very limited period of time. The sample population was primarily Caucasian, well educated, and had health insurance. In addition, participants were screened for the presence of CHD risk factors by the research nurses prior to participation in the study. Those persons who agreed to participate may be more receptive to teaching, and it is possible those persons who chose not to participate in the study may have answered quite differently than this group. It is important to note that individuals who participated may be different from the general population, therefore the results may not be generalized to all populations. Larger studies with more diverse samples are needed to further explore the findings from this study.

A very important limitation of this study is the absence of questions on the BAS and BES related to CHD education in those without a previous diagnosis of CHD. It would have been helpful to assess the number of participants without CHD that had received some sort of CHD education in order to better apply the findings from the study to this population.

## Implications

### Research

Previous research has focused on CHD risk factors and the associated health promotion behaviors necessary to reduce CHD risk, however only a handful of studies have explored individuals' perceived barriers and benefits of these behaviors. In addition,

there is a lack of research in which gender differences are explored related to perceived barriers and benefits to health promotion behaviors and CHD risk. The findings from this study indicated a need for further research related to individuals' perceived barriers and benefits to CHD risk modification including exercising, eating healthy, and smoking cessation. This study demonstrated that men and women have different perceptions of barriers to health promotion. Additional research is needed to explore the differences in perceptions men and women may have so that protocols, guidelines, and health practices can be designed to appropriately address the needs of both men and women related to CHD risk reduction.

## Practice

The findings of this study provide important practice considerations for primary health care provider such as family nurse practitioners and physicians. Since CHD is caused by multiple modifiable risk factors, practitioners in primary care clinics should be leaders in identifying individuals at risk and implementing health promotion behaviors, based on the identification of the individual's perceived barriers and benefits to these behaviors. In the past, primary care providers have often failed to provide effective behavior-change counseling and education regarding CHD risk modification to their patients (MacGregor et al., 2006), a finding supported by this study.

Individualized Care. A collaborative approach between the provider and patient has been shown to be a promising technique for assisting individuals at risk for CHD to make healthy lifestyle choices (MacGregor et al., 2006). Previous research has

demonstrated that both men and women value his or her provider's recommendations as the primary determinant in the decision to make healthy lifestyle changes (Lieberman, Meana, & Stewart, 1998). Providers need to be aware that their recommendations regarding health promotion behavior have been shown to be strong motivators for patient health behavior change and use this to their advantage. In addition, practitioners must be aware and address the perceived barriers an individual may have to the recommended health behavior change in order to facilitate successful adoption of the recommended behavior.

Identifying barriers reflects individualized acknowledgement of potential obstacles to changing lifestyle behaviors and aids in appraising readiness to initiate and sustain health promotion behaviors (Fleury, 1991; Thanavaro, 2005). The individual's level of perceived benefit related to the health behavior change is equally important and thus the practitioner must continually educate the individual on the benefits of health promotion behaviors, such as exercise, healthy eating, and smoking cessation in relation to CHD risk reduction then follow-up to see if changes in behavior were made.

Practitioners need to target both men and women, but data from this study and previous research suggested women in particular need assistance with identification of barriers and support in reducing these barriers due to increasing evidence that women are at increased risk to CHD, and experience marked differences in diagnosis, treatment, and referral for CHD (Frich, Malterud, & Fugelli, 2006). To effectively care for women at risk for CHD, practitioners need to incorporate information about the resources in the

community important to women, such as availability of fitness programs with childcare facilities.

Education, Socioeconomic Status, and Living Situation. Individuals in the lowest occupational positions are more likely to suffer from chronic diseases such as CHD and lower educational levels induce an additional risk of poor health and disease (Deniss et al., 1993; Volkers, Westert, & Schellevis, 2007). Individuals with lower socioeconomic status, education, or individuals living alone are at an increased risk for CHD (Volkers, Westert, & Schellevis, 2007), which was shown in this study. These findings support the need to improve the conceptual framework of health disparities. Individuals from lower socioeconomic classes, with less education, or living alone may have higher perceptions of barriers to health promotion and lower perceptions of health promotion benefits and could be at increased risk for CHD. Practitioners must take these findings into account when addressing CHD risk and planning care in order to address the unique needs of this population.

Exercise. Inadequate physical activity has been recognized as an independent risk factor for premature development of CHD. During the past 5 decades, numerous studies have demonstrated a reduced rate of initial CHD events in physically active people (Leon et al., 2005). The public has become well aware of this relationship and millions of Americans have embarked on voluntary exercise programs based upon the assumption that exercise will lead to effective prevention of CHD, however this study demonstrated that individuals may have unique barriers to exercise despite a concurrent understanding

of the benefits of exercise. Exercise training in the form of regular daily physical activities (eg, working around the house and yard, climbing stairs, walking or cycling for transportation or recreation) can be substituted for formal exercises as essential components in improving a cardiac patient's physical fitness. Practitioners can support CHD risk reduction by recommending and stressing the importance of regular physical exercise both as a primary and as a secondary measures (Albright & Thompson, 2006; Elley et al., 2007).

Diet. Individuals may feel that their diet is healthy, but a thorough assessment of the diet of individuals at risk for CHD or diagnosed with CHD is important. Despite an epidemic of Americans now considered overweight or obese, which complicates the treatment of CHD, only 43 percent have been advised to lose weight by a health professional (Fung et al., 2001). To fully assess an individual's diet and any potential barriers to a healthy diet, a diet diary would be beneficial. Asking about prior patient experiences with changing dietary habits will help the practitioner understand the patient's ability to implement dietary changes and overcome any perceived barriers. Past attempts that did not result in sustained beneficial change should be viewed as an opportunity to identify positive aspects of the experience, as well as those areas where the patient will likely require additional assistance to overcome barriers in order to make successful healthy changes in the future (Millen et al., 2004). Addressing the individual's diet can inform the health practitioner of the individual's perceived barriers to a healthy diet and provide the foundation for recommendations for dietary changes, and follow up

in subsequent visits. Based on the findings from this study, providing alternatives to eating for enjoyment may help patients meet dietary goals.

Smoking. The enormous health benefits of smoking cessation are now well established (Sutherland, 2003). Primary care practitioners have a vital role in motivating smokers to quit, whether diagnosed with CHD, at risk for CHD, or in individuals without CHD. A personalized approach when promoting services that are non-judgmental, include pharmacologic interventions, and flexible support may encourage more smokers to quit smoking (McBride & Ostroff, 2003). Screening and diagnostic testing, discussions of treatment options, treatment visits, and inclusion of family members in promoting smoking cessation are examples interventions that may help individuals quit smoking. Practitioners must opportunistically advise all smokers to stop during routine consultations, give advice on and/or prescribe effective medications to help them quite, and refer them to specialist cessation services in order to help smokers overcome barriers to cessation.

The decision to quit smoking success often depends on how much the individual wishes to quit, however quitting can be difficult. Usually, people make two or three tries, or more, before finally being able to quit. Utilizing multiple approaches, such as smoking cessation support groups or hotlines, quit-smoking contracts, medications, or behavioral counseling have been shown to be the most effective in helping individuals address tobacco dependence (West, McNeill, & Raw, 2000).

CHD Education. Patient education is essential in order for individuals with CHD to make informed decisions about adopting healthier lifestyles. One third of participants previously diagnosed with CHD in this study indicated that they had not received CHD education. The identification of major modifiable risk factors for CHD (dyslipidemia, hypertension, smoking, obesity, inactivity, and diabetes) is a prerequisite to the implementation of preventative interventions. If individuals diagnosed with CHD are not receiving education or adequate education regarding their disease, they are at an increased risk of subsequent cardiovascular events, including myocardial infarction, stroke, and death (National Cholesterol Education Program, 2002). Effective communication is implicit in the management of chronic diseases such as CHD. Practitioners must educate patients about their condition and treatments, including health promotion behaviors. In addition, practitioners should measure blood pressure, lipid profile components (LDL and HDL cholesterol and triglycerides), and weight as well as discuss issues of smoking, activity level, and diet on an ongoing basis with all patients with established CHD (Kabir et al., 2007).

To prevent further heart attacks or strokes in individuals with established CHD, lowering cholesterol levels and controlling blood pressure is imperative through comprehensive secondary prevention programs for cardiac patients including aggressive reduction of risk factors through nutritional counseling, weight management, and adherence to prescribed drug therapy (Smith et al., 2006). It is important that individuals with CHD lose extra body weight and maintain a normal weight, stop smoking, and follow a heart healthy diet in order to keep cholesterol levels and blood pressure under

control. Smoking cessation, increasing activity, and eating healthier or not goals that are impossible, but individuals will require assistance. Health promotion behaviors help the individual with CHD control blood pressure, assist with weight loss, and help lower blood cholesterol levels. If individuals with CHD understand the impact that health indicators such as smoking, inactivity, and unhealthy diet they be more able to overcome perceived barriers to achieving a healthier lifestyle and reduce their risk of CHD complications or even death.

Cardiac rehabilitation programs provide an important and efficient venue in which to deliver effective preventive care (Leon et al., 2005). Referral to cardiac rehabilitation programs are also be beneficial for individuals with established CHD. Cardiac rehabilitation are secondary prevention programs that include baseline patient assessments, nutritional counseling, aggressive risk factor management (ie, lipids, hypertension, weight, diabetes, and smoking), psychosocial and vocational counseling, and physical activity counseling and exercise training, in addition to the appropriate use of cardioprotective drugs that have evidence-based efficacy for secondary prevention. Candidates for cardiac rehabilitation services historically were patients who recently had had a myocardial infarction or had undergone coronary artery bypass graft surgery, but candidacy has been broadened to include patients who have undergone percutaneous coronary interventions; heart transplantation candidates or recipients; or have stable chronic heart failure, peripheral arterial disease, CHD, or other forms of CVD. Cardiac rehabilitation programs offer comprehensive strategies geared towards CHD risk factor

modification (Child, 2004; Leon et al., 2005; Stewart, Badenhop, Brubaker, Keteyian, & King, 2003).

Nursing Roles

Recent research has demonstrated public confusion about the various nursing roles and titles (Bryant-Lukosius, Dicenso, Browne, & Pinelli, 2004). In terms of education provided to participants with a previous diagnosis of CHD, most participants in this study indicated that they had received the education from a CNS. Interestingly, there were no CNSs utilized in the hospital and clinic where this study was conducted. However, the cardiologists and cardiac surgeons employ registered nurses (RN) that function as "specialized" cardiac nurses. Among these nurses' many roles is educating patients about medications, procedures, and CHD. Whether the sample population was not aware of the different levels of education and roles amongst nurses or that the participants were assuming they were receiving the education from a master's prepared CNS, this finding demonstrated a need for nurses to clearly identify their role when providing patient education. While the concept of advanced practice nursing (APRN) is still relatively new, distinct patterns of evolution from specialty practice to advanced practice nursing are evident over the last 100 years (Hanson & Hamric, 2003) . The definition of advanced practice nursing is important not only for the profession, but also for the patients in order to provide comprehensive and knowledge-based care. The role of the CNS as an advanced practitioner is based on autonomy of practice, in-depth theoretical nursing knowledge, clinical experience, and research application. There is a critical need for cohesion within the APRN profession regarding the definition and core

competencies of advanced practice and for increased dialogue among nursing colleagues in order to improve the public's understanding of APRN practice. To facilitate this, APRNs must work with state boards of nursing and the American Association of Colleges of Nursing to further differentiate and define the various roles of RNs and APRNs.

## Conclusion

This study highlighted the need for a personalized approach, continued structured external support, and focus on perceived barriers and benefits to health promotion. Furthermore, individuals may recognize the perceived benefits of CHD health promotion behaviors, however they may concomitantly perceive perceived barriers to accomplishing them. Perceived barriers are unique to the individual and the research findings indicated that gender differences should be taken into account when discussing health promotion behaviors.

CHD remains the number one killer in the U.S., despite advances made in diagnosis and therapy. A major shift to expand treatment beyond symptomatic obstructions and infarctions toward comprehensive therapies aimed at disease prevention and health promotion could decrease the rate and cost of CHD disease tremendously. Personalized approaches that promote healthy living, encourage healthy environments, and promote control of blood pressure and cholesterol levels are key to CHD prevention. Recognizing cardiac risk factors as causes of CHD is the first step for individuals to undertake in order to reduce their risk of CHD by making healthy lifestyle changes.

Making prevention the primary approach to treatment will require increased resource allocation, use of health provider teams, integration of healthcare delivery systems, expanded emphasis on educating patients about prevention, and information on risk reduction for those diagnosed with CHD. In order to develop effective interventions, it is important to understand the individual and his or her unique characteristics including gender, socioeconomic status, and education level in relation to his or her perceived barriers and benefits to health promotion. Nurse practitioners and other primary care providers can incorporate this knowledge into future strategies to reduce or eliminate barriers, increase perceived benefits, and promote health promotion behaviors in individuals who are at risk for developing CHD. Advocating for health promotion behavior adoption and CHD risk modification offer a very important and practical tool for providers to help individuals address and lower risk factors as well as prevent CHD and treat individuals with established CHD.

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# APPENDICES

# APPENDIX A

## BARRIER ASSESSMENT SCALE (BAS)

*BARRIER ASSESSMENT SCALE DIRECTIONS: The following questions ask about your beliefs. Please indicate how strongly you agree or disagree to each statement. There are no right or wrong answers as the statements measure beliefs. Please answer according to your actual beliefs and not how you think you should believe or how you think others want you to answer.*

| | **Strongly Disagree** | **Disagree** | **Agree** | **Strongly Agree** |
|---|---|---|---|---|
| 1. Family can often get in the way when I want to make healthy changes | SD | D | A | SA |
| | | | | |
| 2. I enjoy eating too much to change my diet. | SD | D | A | SA |
| | | | | |
| 3. Even though it is a good idea, I don't take time to exercise. | SD | D | A | SA |
| | | | | |
| 4. A low fat diet takes too much time to prepare | SD | D | A | SA |
| | | | | |
| 5. If I feel healthy there is no need to change my diet. | SD | D | A | SA |
| | | | | |
| 6. In the long run I will die anyway so I need not bother to change my habits. | SD | D | A | SA |
| | | | | |
| 7. Low fat diets are too unappetizing to follow for long periods. | SD | D | A | SA |
| | | | | |
| 8. I am not convinced of the benefits of regular exercise. | SD | D | A | SA |
| | | | | |
| 9. I do not exercise because it is not safe in my neighborhood. | SD | D | A | SA |
| | | | | |
| 10. I am too busy with my family to exercise regularly. | SD | D | A | SA |
| | | | | |
| 11. If I stopped smoking I will gain weight, so I may as well smoke. | SD | D | A | SA |
| | | | | |
| 12. It will be too stressful for me to stop smoking. | SD | D | A | SA |

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# APPENDIX B

## BENEFIT ASSESSMENT SCALE (BES)

BENEFIT ASSESSMENT SCALE (BES)BENEFIT ASSESSMENT SCALE

DIRECTIONS: The following questions ask about your beliefs. Please indicate how strongly you agree or disagree to each statement. There are no right or wrong answers as the statements measure beliefs. Please answer according to your actual beliefs and not how you think you should believe or how you think others want you to answer.

| | **Strongly Disagree** | **Disagree** | **Agree** | **Strongly Agree** |
|---|---|---|---|---|
| 1. Regular exercise may decrease my chances of a heart attack. | SD | D | A | SA |
| 2. Even if I eat a low fat diet I will not reduce my chance of heart disease. | SD | D | A | SA |
| 3. Regular exercise helps reduce tension and stress. | SD | D | A | SA |
| 4. Regular exercise can help me maintain a normal weight. | SD | D | A | SA |
| 5. Lowering salt in my diet may lessen my chance of high blood pressure. | SD | D | A | SA |
| 6. Annual check ups will help me learn my risk for heart disease. | SD | D | A | SA |
| 7. Regular exercise may help prevent high blood pressure. | SD | D | A | SA |
| 8. Research now shows that it is probably okay to eat a high fat diet. | SD | D | A | SA |
| 9. Losing weight may help control high blood pressure | SD | D | A | SA |
| 10. Regular exercise can make me feel I have more energy. | SD | D | A | SA |
| 11. If I stopped smoking I will lower my change of heart disease. | SD | D | A | SA |
| 12. If I have smoked for many years it is too late to stop now | SD | D | A | SA |

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