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The Perception and Knowledge of Cardiovascular Risk Factors Among Chinese Americans

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The Perception and Knowledge of Cardiovascular Risk Factors Among Chinese Americans

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To My Parents

Lu-Yao Yu and Hsiu-Ling Chen

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The Perception and Knowledge of Cardiovascular Risk Factors Among Chinese Americans

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The purpose of this study was to evaluate Chinese Americans' perceptions and knowledge about cardiovascular disease (CVD) risk factors and to determine if acculturation has systematic effects on perception of illness. Perception about the cause, seriousness, curability, and controllability of CVD were investigated. Relationships between the demographic characteristics of the participants and cardiovascular knowledge and perception were examined. The conceptual framework for this study was based on Leventhal's (1970, 1984) Common Sense Model of Illness Representation. The influence of Kleinman's Explanatory Model about the cultural and social consideration of illness representation was incorporated.

A cross-sectional design was selected for this descriptive study with a convenience sampling technique. The target population was community-based Chinese Americans who live in the United States. Data collection was conducted using the

Internet to access a population. The sample of the study was comprised of 124 adults with 68% being female. The majority of participants retained a high Asian identity. Participants identified Chinese over English for speaking, reading, writing preferences. Instruments included the Illness Perception Questionnaire-Revised (IPQ-R), Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA) and the Healthy Heart IQ.

Findings included the following: the IPQ-R subscales were intercorrelated in a logical manner. Illness perceptions correlated positively with each other but were negatively correlated with optimistic perceptions like personal and treatment control. No difference was observed in the IPQ-R based on age, gender or educational level. Knowledge of CVD among Chinese Americans was lower than the general population. The level of acculturation had an impact on the illness perception. Acculturation level was significantly related to all seven illness perception dimensions of illness representation on the IPQ-R. There were significant relationships between acculturation level and knowledge of CVD. However, due to the low acculturation level presented by majority of participants, caution must be exercised in the interpretation of the study findings.

The findings of this study have important implications for nursing practice, education, and theory. These results also provide directions for future research. Suggestions for health care professionals who care for patients with ethnic cultural backgrounds were given.

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CHAPTER 1: INTRODUCTION

Cardiovascular disease (CVD), the most common form of heart disease, contributes to over sixteen million deaths throughout the world every year (American Heart Association [AHA], 2006). By 2010, it is predicted to be the leading cause of death in developing countries (World Health Organization [WHO], 2005). By 2020, it is estimated that there will be nearly 25 million CVD deaths worldwide with no geographic, gender or socioeconomic boundaries (WHO, 2005). Coronary heart disease (CHD) is the major component of cardiovascular morbidity and mortality in much of the industrialized world and is projected to be the same in many developing countries. Because coronary events are often rapidly fatal in affected individuals and have a high recurrence of risks, prevention of these events through interventions at both the individual and the population-wide level is advocated. Several long-term epidemiologic studies were undertaken in the United States (U.S.) and other countries beginning in the late 1950s, drawing on known concepts of CVD and facilitating the development of standard methods for diagnosis and classification of cases. These studies documented differences in mortality and incidence between populations as well as disparity in risks among individuals within populations.

The World Health Organization (WHO) MONICA (MONItor trends in CArdiovascular disease) project is the largest undertaking to date in CVD epidemiology and is evaluating the determinants of changes in incidences, case-fatality, and overall mortality from CVD in 21 countries, including China (WHO MONICA Project, 2005). The goal of the MONICA project is to identify factors that explain differences in rates of

occurrence of CVD between populations and differences in risks of coronary events among individual members within a population.

Tremendous progress has been made in reducing mortality due to heart disease. However, it remains the leading cause of death in the world, killing nearly 17 million people annually (SoRelle, 2004). Studies in several countries have investigated the pattern of CVD in Asia, and recent reviews have concluded that Asians are at increased risk (AHA, 2006). Furthermore, an increased prevalence of CVD has been recognized in Asian Americans, with diseases of the heart and strokes as the leading causes of death (AHA, 2006). Under the aegis of the Healthy People initiative, a national effort is being mobilized to reduce coronary heart disease deaths by the year 2010 (National Heart Lung and Blood Institute [NHLBI], 2006). To accomplish the objectives associated with heart disease, research is needed to facilitate a momentous change in the heart health status of minority populations.

Compared to total U.S. population growth of 13 percent, Asian Americans are the fastest-growing ethnic group in the U.S., with a 72 percent population increase since the 1990 census, (U.S. Bureau of the Census, 2004). In 2004 Census data, Asian Americans numbered approximately 10.2 million, nearly 4.2 percent of the U.S. population. The U.S. Bureau of the Census projects that this population will reach 34 million by 2050, representing roughly 9 percent of all Americans. The largest proportion of Asian Americans (24 percent) is Chinese (U.S. Bureau of the Census, 2004).

Reduction of cardiovascular risk factors has been advocated to decrease mortality, improve patient outcomes, and reduce the economic burden of heart disease (Zerwic, King, Wlasowicz, 1997). Despite the fact that some improvements have been made in

overall mortality caused by CVD for Caucasians in the U.S., there is no evidence that current CVD preventive interventions are affecting Asian Americans. To help people engage in health promoting behaviors, health care providers need to understand the processes involved in these behaviors. Researchers have suggested that health-promoting behaviors are largely a product of subjective perceptions (Keller, Ward, and Baumann, 1989). The majority of the available studies in this area focus on the perceptions of Caucasians, African Americans, and Hispanics. Only limited research related to Asian Americans' illness representations toward CVD could be found and those studies were conducted in Europe. Humans' perceptions about their own health and physical illness are a primary focus of nursing (American Nursing Association [ANA], 1995). Promoting positive outcomes for patients is a primary focus of nursing (ANA, 2006). Thus, research is needed to explore the phenomena of interest in this ethnic minority.

Purpose of the Study

The purpose of this study was to evaluate Chinese Americans' perceptions and knowledge about CVD risk factors and to determine if acculturation has systematic effects on perception of illness. Specifically, perceptions about the causes of CVD were investigated, along with perceptions about the seriousness, curability and controllability of CVD. In addition, knowledge about CVD risk factors was evaluated. Relationships between the demographic characteristics of the participants and cardiovascular knowledge and perception were examined. Data collection was conducted using the Internet to access this population of Chinese Americans. The conceptual framework for this study is based on Leventhal's Common Sense Model of Illness Representation (Leventhal, 1970; Leventhal, 1984; Leventhal & Cameron, 1987; Leventhal, 1990;

Leventhal, Idler, & Leventhal, 1999). The influence of Kleinman's Exploratory model is included.

Background and Significance of the Study

Although death rates in the U.S. have declined in the past two decades, CVD remains American's number one killer, still claiming more lives than the rest of major causes of death combined, which are cancer, chronic lower respiratory disease, accidents, diabetes mellitus, and influenza/pneumonia. (AHA, 2004). Based on the National Heart, Lung, and Blood Institute's (NHLBI) Framingham Heart Study (FHS) in its 44-year follow-up of participants and the 20-year follow-up of their offspring, the average annual rates of first major cardiovascular events rose from 7 per 1,000 men at ages 35-44 to 68 per 1,000 at ages 85-94 (Levy & Brink, 2005). Nearly 2500 Americans die of CVD each year, an average of 1 death every 35 seconds (AHA, 2006) Each year, over 13 million people in the U.S. are diagnosed with coronary artery disease (CAD) and 7.2 million will have an acute myocardial infarction (AMI) (AHA, 2006). Significant progress has been made in the treatment of CAD with various therapeutics, including thrombolytic agents, percutaneous transluminal coronary angioplasty (PTCA), and stent placement. However, the single leading cause of death in the U.S. today continues to be AMI (AHA, 2006).

Ethnicity-based research can identify new clues to pathogenesis of a disease and new approaches for health promotion, since the populations under study are heterogeneous in genetics and lifestyle characteristics. The evidence is increasing that rates of CVD vary between ethnic groups. Previous studies indicate that diseases of the heart and stroke have been the leading cause of death for Asian Americans (AHA, 2006). Cardiovascular disease now constitutes the major cause of mortality in many of the

countries of the Asian Region. Countries like Malaysia, Taiwan and China have continued an upward trend for CVD mortality. In China, Taiwan and Japan, death due to CVD remains a major cause of death, although the latter two countries have undergone a significant decline in stroke death rates since 1970 (Kohr, 1997).

The first step in reducing risk is to improve individual's ability to recognize risk factors. To address the variables that influence control of risk factors, several researchers evaluated the beliefs among the general public about the causes of heart disease. In the late 1970s, investigators documented a widespread lack of knowledge of the main causes of heart attacks in a sample of 617 adults (Shekelle & Liu, 1978). Only 28% of the subjects identified cigarette smoking, 21% identified high blood pressure, and 13% identified increased cholesterol or fat in the diet as CVD risk factors (Shekelle & Liu, 1978). More than one half of the subjects could not name any of these risk factors, and only 1% of the sample named all three. Studies conducted in the 1980s revealed an increased awareness and understanding of the risk factors for CHD, although the level of knowledge remained somewhat superficial. In a population-based study with 3122 adults, more than 70% of the sample correctly identified at least one of the three main modifiable risk factors; however, less than 5% of the respondents could name all three (Folsom, Sprafka, Luepker, & Jacobs, 1988). The response most frequently offered as a cause of heart disease was stress or worry.

Perceptions about the causes of CAD were studied in a sample of patients with AMI (n = 25) at the time of discharge from the hospital (Murray, 1989). Patients emphasized different causes of heart attacks depending on whether they were focusing on general risk factors or what they perceived to be their own personal risks. Smoking, being

overweight, and eating a fatty diet were the most frequently cited general causes of heart attacks. However, subjects most often attributed their own heart attack to causes such as overwork or overexertion and stress. Although it is useful to understand perceptions about the most common causes of CAD, the actual pattern of risk factors differs among individuals. It is necessary to examine not only the extent of patients' general knowledge but also the accuracy of their beliefs about their own personal risk profile. Identifying the accuracy of patients' knowledge may help health professionals understand patients' responses to risk reduction and therapy.

The economic impact of heart disease is staggering and is likely to escalate as increasing numbers of people are saved from premature death attributable to CVD (Funk & Krumholz, 1996). People are living longer and requiring more care than ever before. With major advancements in science and technology occurring at a rapid rate, the current technology greatly assists health care providers in saving the lives of many individuals who would otherwise die. Thus, it is necessary to care for surviving individuals over longer periods of times and through more cardiac episodes than ever before.

Statement of the Problem

Little research has been conducted about health issues of Asian Americans and data related to CVD is even more limited. Studies have found that Asian people living in the U.K. have a significantly high incidence of CVD with higher mortality and morbidity than the average population (Chaturvedi & Fuller, 1996; Lip et al., 1996). New studies were conducted to investigate the risk factors of CVD among Filipino and Vietnamese community (NHLBI, 2006). However, no national CVD mortality and morbidity rates have been published for Chinese Americans. Even though some research showed a low

percentage of reported known risk factors, CVD remains the number one killer among Asian Americans (AHA, 2006).

Chen (1993) showed that 85 percent of Asian immigrants did not know what could be done to prevent heart disease. Physical inactivity remains a problem among Asian Americans. Data from the AHA demonstrated that 24% of Asian males and 20.4% of Asian females lead a sedentary live (AHA, 2006). A study in UK also showed similar results of physical inactivity among Asian people (Lip et al., 1996). No conclusions can be drawn from current limited studies because of combining diverse sub-ethnic groups under one label and the limited number of subjects in each sub-ethnic group. However, the data indicate a need for culturally relevant research to explore the uniqueness of each sub-ethnic group. Chinese Americans were chosen for the present study because they are the most numerous among the diverse Asian subgroups (U. S. Bureau of the Census, 2004).

Research Questions

The following research questions were investigated:

1. What are the illness representations of Chinese Americans about the causes, seriousness, curability and controllability of cardiovascular disease?
2. How accurate is the knowledge of Chinese Americans about cardiovascular disease?
3. What is the influence of acculturation level on Chinese Americans' illness representation on cardiovascular disease?
4. What is the relationship between knowledge of cardiovascular and illness representation in Chinese Americans?

Conceptual/Theoretical Framework

The framework for this study is based on Leventhal's Common Sense Model of Illness Representation (Leventhal, 1970; Leventhal, 1984; Leventhal & Cameron, 1987; Leventhal, 1990; Leventhal, Idler, & Leventhal, 1999). The influence of Kleinman's Explanatory Model about the cultural and social consideration of illness representation will be briefly discussed. Nurses can derive interventions to modify patients' responses and coping skills with physical illness from the Common Sense Model of Illness Representation.

The Common Sense Model of Illness Representation emerged from a series of studies of fear communications which were conducted in the late 1960s by Leventhal and colleagues (Leventhal, 1970). In this extended series of studies, high fear messages were consistently more effective in changing attitudes toward a recommended health action in comparison to low fear messages (Leventhal, 1970). The data also showed that actions such as reducing and stopping smoking, or getting tetanus inoculations, occurred only when the participants exposed to the fear messages also received a second message which facilitated the development of an action plan (Leventhal, 1970). As the combination of action plan and high or low fear message produced an action over a period of days and sometimes weeks, and as subjective feelings of fear and fear-induced attitude change faded within 48 hours, it became clear that the action plan was linked, not to fear itself, but to some changed way of thinking about representing the health threat (Leventhal, 1970). The results of these studies formed the basis of the Common Sense Model of Illness Representation.

The Common Sense Model of Illness Representation is an information processing model of compliance behavior (Leventhal, Jones, & Trembly, 1967). People facing illness threats (e.g., people experiencing chest pain, patients with hypertension or heart disease), are playing active roles in seeking, implementing, coordinating, and evaluating their care (Leventhal, Idler, & Leventhal, 1999). They are active problem solvers or common-sense scientists constructing and testing the validity of their understanding of the threat by selecting, performing, and evaluating the efficacy of specific procedures for threat management and for regulating their emotional reactions (Leventhal, Diefenbach, & Leventhal, 1992). The perceived severity of an illness threat, and the specific coping procedures for managing it, reflect the individual's mental representation of features of the threat, evaluation of his or her ability to perform procedures for threat management, and expectations regarding consequences of the performed procedures (Leventhal, Idler, & Leventhal, 1999). Notions regarding causality of cancer (Taylor, Lichtman, & Wood, 1984), chronic illnesses such as arthritis, hypertension, and diabetes (Lowery, Jacobson, & McCauley, 1987), myocardial infarction (MI)(Johnson & King, 1995; Leventhal, Meyer, & Nerenz, 1980; Zerwic, King & Wlasowicz, 1997), maintenance of the chronic fatigue syndrome (Moss-Morris, 1997), and sexually transmitted diseases (Jadack, Keller, & Mims, 1991; Leventhal, Meyer, & Gutmann, 1985) have been studied.

Five substantive attributes of the representations of illness were uncovered from these multiple studies using this theory (Leventhal, Diefenbach, & Leventhal, 1992):

1. The identity of the disease, such as its somatic symptoms and illness associated labels.
2. Timeline such as onset, duration, and recovery time.

3. Perceived causes of the illness such as germs, or genetic mutation.
4. Consequences, including immediate and long-term impact of the illness, such as death, disability, pain, social and economic loss.
5. Controllability such as intractable versus susceptible to self-treatment, medication, surgery.

Bodily sensations, memories of past symptoms, illness experiences, and interaction with others are sources of information that can be used to construct an illness representation (Ward, 1993). Individuals interpret pieces of information and decide that they are symptoms of illness. Then, individuals may search for an illness label to apply to the symptoms (Baumann, Cameron, Zimmerman, & Leventhal, 1989). Taken together, these symptoms and labels comprise the identity component of the representations of the cognitive process (Baumann, Cameron, Zimmerman, & Leventhal, 1989). Cause refers to the individual's perceptions about the origin of an illness. Time-line concerns whether the illness is acute or chronic in nature. Consequences are the beliefs or ideas about the short and long term outcomes of the illness. Controllability refers to the ideas about how one recovers from an illness (Leventhal, Idler, & Leventhal, 1999).

The content and organization of these attributes may vary across and within individuals over time, as a function, in part, of underlying beliefs about disease in general and about the specific disease at issue. Data from many laboratories also show that the attributes of illness representations are experienced in abstract form (i.e., as declarative knowledge such as disease labels) and in concrete, episodic form (i.e., as somatic sensations or symptoms) (Leventhal, Idler, & Leventhal, 1999). Both the abstract and concrete components of a disease representation define or set goals and motivate

behavior. Abstract and concrete representations may be inconsistent with one another. In these cases, the compelling perceptual quality of somatic symptoms often appears to have a preemptory character that enables them to override abstract attributes of illness representations in generating behavior (Leventhal, Idler, & Leventhal, 1999). For example, people are told by health care providers that they are at high risk for getting CVD and that regular exercise and diet control can keep their weight and cholesterol level under control and avoid serious consequences such as a heart attack. People claim to agree with these truisms when asked how CVD is experienced by, and should be treated in other people. However, their beliefs and behavior frequently differ, and their own adherence to treatment is heavily influenced by prior experience. Adherence is good if the patient perceives the treatment as having a favorable impact on the concrete sensations that they attribute to their CVD risk factors (Leventhal, Meyer, & Gunmann, 1985). If they feel like their risks are unaffected by treatment, they are likely to be nonadherent and to drop out of treatment programs.

Leventhal (1984) identified representation, coping, and appraisal as three stages of the cognitive and emotional process that human beings utilize to regulate their behavior during a health episode. Representations of the cognitive process are structures used to organize, analyze, and make sense out of information. Coping in the cognitive process is the methodology that entails selecting and executing responses to the information contained in the representation (Ward, 1993). Although an array of coping responses may be available to an individual, one's representation determines how one copes. For example, an individual who considers middle chest pain to be epigastric distress due to over-eating may cope differently than an individual who considers such pain to be

cardiac in origin. The third stage, appraisal, represents the process an individual uses to evaluate the effectiveness of their coping activities. Figure 1 presents the stages of information and emotional processing within the common sense model (Leventhal, 1984).

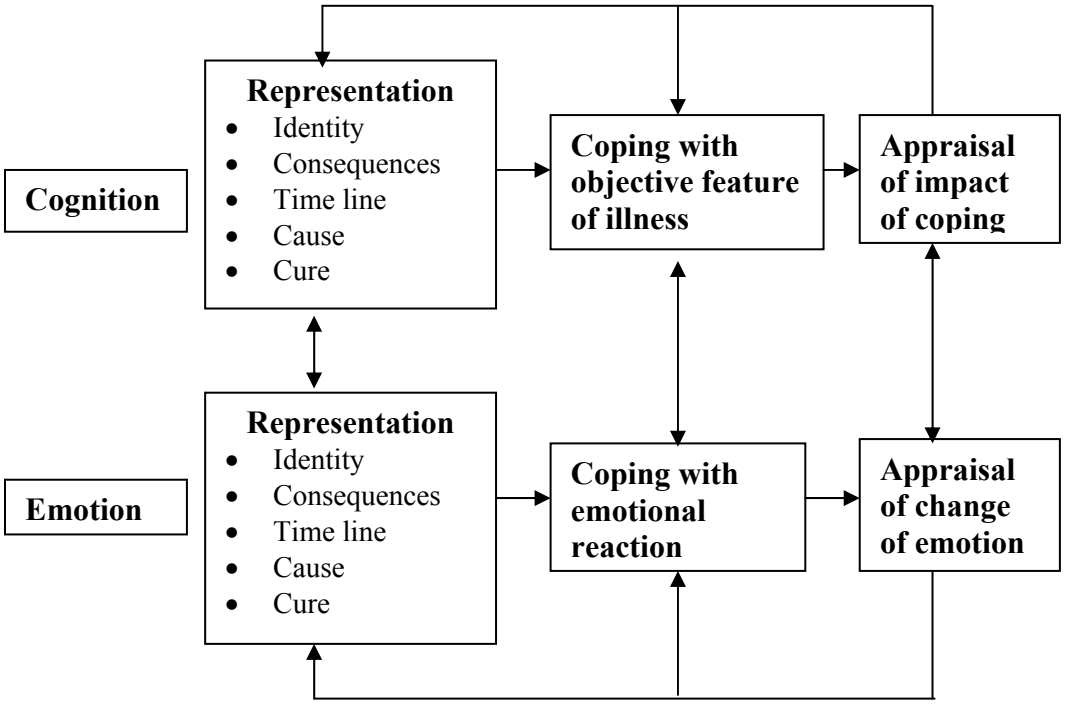

Figure 1. The Common Sense Model of Illness Representation (Leventhal, 1984).

Finally, in the last stage of the information-processing chain, the progress of the coping actions are evaluated and compared with expected outcomes (Leventhal, Idler, & Leventhal, 1999). This can be expressed in questions, such as "Did the medications alleviate my symptoms?" It is important to note that representation, coping, and appraisal stages are not unidirectional. The information flow may occur from the bottom-up or the top-down. Appraisal information updates the representational stage which might lead to new and different coping actions. For example, if a headache is not alleviated with a couple of aspirin, the initial self diagnosis of "headache" may be revised and an alternative explanation sought. This could encourage seeking social contact information

such as asking family and friends whether they have experienced similar symptoms, or seeking professional help (Leventhal, & Cameron, 1987).

In parallel and in association with the cognitive activity, health-relevant stimuli also evoke emotional responses. For example, the cluster of symptoms labeled "the flu" might elicit feelings of depression, annoyance, or anger. A sudden sharp pain in the chest can be interpreted as a torn muscle, which is unpleasant, but not anxiety provoking, or as a precursor to a heart attack, which is threatening and highly anxiety provoking. Thus, coping actions are performed and appraised with respect to the emotional reactions elicited by an illness threat, as well as by the cognitive activity generating the representations of the threat (Diefenbach & Leventhal, 1996).

The cultural aspect of the Common Sense Model is the least studied area due to the difficulty of observing the development of culture-wide illness representations. Kleinman's (1980) work on culture has relevance for the current study. A study conducted by Kleinman (1980) supports that illness representations are influenced by the cultural context in which we live. He provided a detailed description of the influence of Chinese culture on reporting symptoms and effects by citizens of Taiwan. Because psychological symptoms and the expression of negative affects, such as depression, are highly stigmatized in the Chinese culture, these individuals were less able to describe and communicate their emotional states when compared to individuals from Western cultures. Kleinman (1980) described the case of a woman who sought help for energy loss, late afternoon fatigue, headaches, and early rising without being able to go back to sleep. When she was asked to describe her "bad feelings" in greater detail, she was unable to do so and proceeded to complain about her physical symptoms. She would work until late,

eat dinner, and immediately go to sleep. Because she went to bed early, she woke up early. As these occasions repeated themselves, she developed headaches and became so debilitated that she was unable to distract herself with work, exacerbating her negative affect. Culture determines which of the many symptoms will be reported among those associated with a given disease (Kleinman, 1980). If somatic symptoms are more acceptable than psychological symptoms in a given culture, the former will be incorporated in the illness representations and the later will be excluded.

Kleinman's explanatory models represent how patients make sense of a given episode of illness and how they choose to evaluate certain treatments (Kleinman, 1980). Kleinman (1980) referred to disease and illness as explanatory concepts that a patient or provider may use to help explain their meanings of a certain sickness. McSweeney, Allan, and Mayo (1997) presented sound arguments as to why the framework is useful in nursing research and practice. First, it presents a patient's perspective of an illness, which is important as nurse care for persons from different socioeconomic backgrounds and cultural groups. As a conceptual guide, this framework help nurses to understand an individual's experiences, beliefs, and expectations from health care.

An example of compelling nursing research using Kleinman's (1980) framework was performed by Luyas (1991) in investigating the biological and cultural factors that influenced the adaptive ability of low-income Mexican-American women with diabetes mellitus. The findings from the sample of 19 women included valuable information about how these women culturally viewed their illness, narrative perceptions of how their illness affected their everyday lives, and how the women interpreted traditional medical treatments for diabetes.

The Common Sense Model of Illness Representation is believed to be capable of providing an explanation of Chinese American's perceptions related to heath and the threat of CVD. The influence of culture was examined in the present study.

Definitions

The variables of interest in this study are defined in this section.

1. Chinese Americans are persons of Chinese ancestry who reside in U.S. permanently.
2. First generation Chinese Americans are persons who were born in Asian or a country other than U. S. and reside in U.S. permanently. Second generation Chinese Americans are Chinese Americans who were born in U.S., with one or both parents having been born in Asian or country other than U.S.
3. Illness representations are conceptually defined as cognitive structures individuals used to organize and make sense out of information concerning an illness (Leventhal, Meyer, & Nerenz, 1980). Five aspects of illness representation have been identified: cause, timeline, identity, consequence, and cure (Leventhal, Meyer, & Nerenz, 1980). Cause refers to beliefs about why one contracts a particular illness. Timeline is the perception about whether the illness is acute or chronic. Identity encompasses the symptoms that are experienced along with the label (diagnosis) assigned to those symptoms. Consequence is the beliefs or ideas about outcomes of the illness, and cure related to beliefs about how one recovers (Leventhal, Meyer, & Nerenz, 1980). Illness representation was operationally defined as the score on the Illness Representation Questionnaire (Weinman, Petrei, Moss-Morris, & Horne, 1996).

4. Cardiovascular disease (CVD) is a term that refers to diseases of the heart and/or blood vessels (AHA, 2006). The principal components of CVD include heart disease and stroke (AHA, 2006). These conditions develop over time and can interrupt the flow of blood to the heart and brain, leading to heart attack, stroke, or other problems.
5. Acculturation is conceptually defined as selective adaptation of attitudes, beliefs, and behaviors because of contact between two or more autonomous cultural systems (SSRC, 1954). Acculturation level was operationally defined by the total score of the Suinn-Lew Self-Identity Acculturation Scale. The scale assesses the process of acculturation with the Asian population. In addition to cognitive and behavioral characteristics such as language, cultural customs, and practices, the scale also takes into account the values, ideologies, beliefs, and attitudes (Suinn, Khoo & Ahuna, 1995).
6. Knowledge of cardiovascular disease risk factors was operationally defined as information about risk factors associated with CVD. Cardiovascular disease risk factors are increasing age, male gender, heredity, smoking, high blood cholesterol, high blood pressure, physical inactivity, obesity and overweight, and diabetes mellitus (WHO, 2005). Knowledge of cardiovascular disease risk factors was operationally defined as the accuracy of each individual's answers to the Healthy Heart I.Q. (NIH, 1997).

Assumptions

The following assumptions were identified for this study:

1. Human behavior and experience are constructed by an underlying information system that integrates current stimulus information with both innate knowledge and memories (Leventhal, Nerenz, & Steele, 1984).
2. The same stimulus can lead to different representation of illness for different people and for the same person at different times (Leventhal, Nerenz, & Steele, 1984).
3. Study participants are willing and able to disclose their perceptions related to CVD risk factors.
4. Study participants will answer survey questions truthfully to their best knowledge.
5. The Internet offers great potential for data acquisition, including being able to reach large numbers of people, in a shorter period of time, and at a lower overall cost.

Limitations

The following limitations were identified for this study:

1. A convenience sample will be used in this study which will limit the ability to generalize results to the whole Chinese American population.
2. Answers to the survey questions may be biased for a variety of reasons. Social desirability and information bias as a result or peer pressure may affect subjects' answers and should be interpreted with caution.
3. The cross-sectional design used in this study represents the participants' perception and knowledge at one point in time in relation to the circumstances and experiences, and may not represent their perceptions and knowledge at another time.

4. Data collected via the Internet needs to be examined carefully in terms of representativeness of the sample, response rate, and data quality.

Summary

This chapter included the purpose, background and significance, statement of problem, research questions, definitions, theoretical framework, assumptions and limitations of the study. The purpose of this study was to evaluate Chinese Americans' perceptions and knowledge about CVD risk factors, and to determine the influence of their acculturation level on perception of illness. The conceptual framework for this study was based on Leventhal's Common Sense Model of Illness Representation (Leventhal, Meyer, & Gutmann, 1985). The construct of illness representation offers a more useful description of the individual's perception of illness. Understanding Chinese Americans' perceptions of CVD and the accuracy of their knowledge about CVD risk factors can contribute to designing a culturally sensitive cardiac health promotion program that is tailored to the needs of Chinese Americans.

CHAPTER 2: REVIEW OF THE LITERATURE

This chapter focuses on a literature review of studies related to the epidemiology and risk factors of cardiovascular disease (CVD) with specific emphasis on Chinese Americans, as well as studies related to knowledge of CVD risk factors and perception of illness. Each of these major concepts is further divided into subcategories for discussion.

Epidemiology of Cardiovascular Disease in the General Population and in Chinese Americans

Heart disease and stroke, the principal components of CVD, are the first and third leading causes of death in the U.S., accounting of nearly 40 percent of all deaths (CDC, 2005). About 927,000 Americans die of CVD each year, which amounts to one death every 33 seconds (CDC, 2005). Although CVD is often thought to primarily affect men and older people, it is a major killer of women and people in the prime of life. More than half of all CVD deaths each year occur among women.

A consideration of deaths alone understates the burden of CVD. More than 70 million Americans (over one-fourth of the population) live with CVD (CDC, 2005). Coronary heart disease is a leading cause of premature, permanent disability in the U.S. workforce (CDC, 2005). Stroke alone accounts for disability among more than 1 million Americans. The economic impact of CVD on the U.S. health care system continues to grow as the population ages. The cost of heart disease and stroke in the U.S. is projected to be $394 billion in 2005, including health care expenditures and lost productivity from death and disability (CDC, 2005).

Population based studies of CVD by ethnicity and region are rare. The MONICA project of the World Health Organization was established in the early 1980s with many

centers around the world to monitor trends in CVD, and to relate these to risk factor changes in the population over a ten year period. It was designed to explain the diverse trends in CVD mortality which have been observed since 1970s. There are total of 32 MONICA Collaborating Centers in 21 countries. The Beijing Heart, Lung, and Blood Vessel Research Institute in China is one of the collaborating centers to monitor the CVD epidemic. The data shows an average-to-high CVD risk levels and it is increasing (WHO MONICA Project, 2005).

It is well known that CVD is multifactorial in origin, and its risk factors may differ from country to country and between different ethnic groups (Stehle, Hinuhara & Gremer, 1991). Information on this topic remains scarce in Taiwan and China. However, results from studies conducted in Hong Kong and Singapore showed a similar etiology for CVD among Chinese and Caucasians (Hughes, Choo, Kuperan, Ong, & Aw, 1998; Ko, et al., 1996).

Prevalence

Prevalence, or the proportion of the population surviving with recognized CVD, is typically expressed in cases per 1000 population (Timmreck, 1998). Estimations of prevalence depend on knowledge of individual histories obtained through interview and examination surveys. They are commonly undertaken as a first step in study of CVD in a population (Timmreck, 1998). Prevalence does not include individuals who have died and may reflect factors influencing survival, therefore its interpretation warrants some caution. However, it indicates something of the magnitude of risk and is often useful in estimating health care needs in a population. More than seventy-one million Americans have one or more types of CVD according to current estimates (AHA, 2006). Based on

CVD statistics from the AHA (2006), there were an estimated 6,500,000 victims of angina pectoris (chest pain) and 7,200,000 suffered AMI (AHA, 2006). The estimated age-adjusted prevalence of CVD in adults for non-Hispanic Whites was 34.3 percent for men and 32.4 percent for women; for non-Hispanic Blacks, 41.1 percent for men and 44.7 percent for women (AHA, 2006).

In China during 1979–80, the average prevalence rate for people age 15 and older, including borderline cases, was 7.73%, about 50% higher than in 1958–59, and still rising (WHO, 2005). It is estimated that, by 2040, there will be 9.5 million deaths in China from CVD, half in the age range 35-64 (Leeder, Raymond, Greenberg, Liu, & Esson, 2004). Information on CVD and risk factors in Chinese Americans is sparse. A population based epidemiological study was launched in 2000 in United States to study CVD risk factors of Asian Americans. This study intentionally recruited a substantial proportion of this previously understudied minority group to explore their prevalence of risk factors and CVD risk (Bild et al., 2002). Participants of this study will be followed through 2008 for identification and characterization of CVD prevalence and mortality (Bild et al., 2002).

Mortality

Statistical information on CVD in the U.S. is provided by the AHA through annual publications and at www.amhrt.org on the Internet. CVD claimed 910,600 lives in the U.S. in 2003 (AHA, 2006). This is 41.2 percent of all deaths or 1 of every 2.4 deaths. With CVD at about 60 percent of the total all cause mortality of more than 2,000,000 deaths, CVD was listed as a primary or contributing cause on over 1,406,000 death certificates (AHA, 2006). Mortality rates for subgroups are 368.2 for white males and 49.0 for black males, and 419.2 for white females and 55.8 for black females (AHA,

2006). Preliminary data from the WHO MONICA project (2005) indicated the death rate for CVD in China to be 393 per 100,000 individuals, compared to the death rate of 389 per 100,000 population in U.S.. In China, the mortality rate attributable to CVD increased from 86.2 per 100,000 in 1957 (12.1% of total deaths) to 214.3 per 100,000 in 1990 (35.8% of total deaths in urban areas) (WHO, 2005). Data from the AHA indicates that CVD is the leading cause of death for Asian Americans, though no CVD mortality data has ever been published for Chinese Americans (AHA, 2006).

Incidence

Incidence data indicate the number of newly occurring cases usually expressed as per 1,000 to 100,000 individuals per year and includes both fatal and nonfatal cases (Timmreck, 1998). The special requirements for diagnosis and classification of these events result in more limited availability of incidence data but also add to their reliability when properly collected. In the U.S., only a few localities can provide such data due to the special requirements for ascertainment and standardized diagnostic validation of acute fatal and nonfatal coronary events, in the conduct of both long-term surveillance and cohort studies. Based on data from the National Heart, Lung, and Blood Institute's Framingham Heart Study (FHS) in its 44-year follow-up of participants and the 20-year follow-up of their offspring, the average annual rates of first major cardiovascular events rise from seven per 1,000 men at ages 35-44 to 68 per 1,000 men at ages 85-94 (AHA, 2006). For women, comparable rates occur 10 years later in life and the gap narrows with advancing age. This large-scale, long-term study of CVD studies began in 1948 with about 5,209 men and women between the ages of 30-62 from Framingham, Massachusetts. In 1971, the second generation group of 5, 124 were recruited to the study

and the third generation of participants were enrolled in 2002 to increase our understanding of CVD (Framingham Heart Study [FHS], 2006).

Risk Factors for Cardiovascular Disease

Cardiovascular risk factors have been identified in modifiable and nonmodifiable categories. Modifiable or partially modifiable risk factors include high blood pressure, smoking, elevated cholesterol level, physical inactivity, obesity, and diabetes (AHA, 2006). Non-modifiable risk factors include a family history of CVD (heredity), male gender, and increasing age (AHA, 2006). Since CVD risk factor data for Chinese Americans is not presumed to be different than that of published data for the U.S. population, studies of risk factors for CVD based on general U.S. population will be reviewed.

Heredity Including Race

Some people inherit a tendency to develop heart disease through a variety of mechanisms. The risk increases as much as five times greater for children who lose a parent from CVD, particular if a parent developed the problem before age 55 (The Ohio State University Medical Center, 2003). Specific testing has advanced genetic screening far beyond compiling an oral history of ancestral successes and failures. WHO's department of Noncommunicable Disease and Mental Health (NMH) has done extensive work on major diseases, like cancer, diabetes, CVD, asthma, and some mental illness. They discovered that CVD tends to manifest itself in specific ways unique to various communities. For example, African communities tend to have more strokes as a result of CVD, while south Asians tend to have heart attacks (WHO, 2005).

Geneticists are looking for mutated genes that may be expressing themselves as contributors to CVD. For example, 50% of cases with suppressed HDL cholesterol can be linked to genetic factors. A gene (AGB1), when mutated, appears responsible for increasing the risk of heart disease by lowering levels of HDL cholesterol. Michael Hayden, a professor of medical genetics at the University of British Columbia, reports that people with defects in ABC1 have as much risk of CVD because of too little HDL as individuals with high levels of LDL cholesterol (Cosgrove, 1999). Recent evidence in genomic discoveries shows that a variety of CVD is genetically complex. Some of the known diseases with a genetic basis include: elevated levels of LDLs, hypertension, thrombosis, cardiac arrhythmias, and hypertrophic cardiomypathy (Nabel, 2003).

Race also has hereditary considerations. African Americans have a greater risk of heart disease, because they have more hypertension than whites (AHA, 2006). Heart disease risk is also higher among Mexican Americans, American Indians, native Hawaiians, and some Asian Americans (AHA, 2006). This is partly due to higher rates of obesity and diabetes, both of which have genetic linkages. Most people with a strong family history of heart disease have one or more other risk factors (AHA, 2006).

Male Gender

Men have a greater risk of heart attack than premenopausal women do, and have them earlier in life. CVD death rates are highest for black males (62.1 per 100,000 population) (AHA, 2006). Though female death rates from heart disease increase with age, these are not as high as males until both groups reach their 80s (AHA, 2006). Men also tend to have more risk factors for CVD do than women. They tend to smoke and

drink alcohol more frequently than women and generally have less healthy life styles (CDC, 2005).

Increasing Age

CVD is often regarded as primarily affecting older people. About four out of five people who die of a heart attack are over 65 or older (AHA, 2006). At older ages, women are twice as likely as men to die within a few weeks of a heart attack (AHA, 2006).

Hypertension

High blood pressure (hypertension) affects about 50 million Americans and one billion people worldwide (Wolf-Maier et al., 2003). In a study of hypertension prevalence and blood pressure levels in 6 European countries, Canada, and the U.S., researchers concluded that the relationship between blood pressure and risk of CVD events is continuous, consistent, and independent of other risk factors (Wolf-Maier et al., 2003). The clinical definition of hypertension is an elevated systolic blood pressure over 140 mm Hg and/or a diastolic blood pressure over 90 mm Hg, taking antihypertensive medicine, or being told at least twice by a physician or other health professional that you have high blood pressure (The Seventh Report of the Joint National Committee [JNC VII], 2004).

Recent new recommendations for tighter control of high blood pressure may drastically reduce the number of individuals who die each year from hypertension-related illness, according to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC VII) (NIH, 2004). The new JNC VII guidelines highlight the importance of paying attention to blood pressure before it becomes high. There is recent evidence that those in the pre-

hypertension range are at higher risk than those with lower blood pressure and are much more likely to move into the hypertension range where medication is required (AHA, 2006). The new JNC VII guidelines also suggest a systolic pressure of 140 mm Hg or greater in people over age 50 should be treated regardless of the diastolic pressure level (JNC VII, 2004).

The estimated prevalence of high blood pressure for U.S. adults ages 20–74 (age-adjusted) was 25.2 for non-Hispanic white males and 20.5 for females (AHA, 2006). It is an important risk factor for CVD and a public health challenge in the U.S. because of its high prevalence (AHA, 2006). The relative risk for a heart attack or stroke increases as systolic and diastolic blood pressure rises. There is a linear relationship between the level of blood pressure and the likelihood of a cardiovascular event (AHA, 2006). A strong, consistent, graded, and independent association between blood pressure and the incidences of stroke and heart attack exists (Kannel, 1990). People with high blood pressure have three to four times of developing CVD as those do with normal blood pressure (AHA, 2006).

With the exception of a few relatively isolated societies, the average blood pressure tends to rise progressively with increasing age in almost all populations (Whelton, He & Klag, 1994). The prevalence and incidence of hypertension also increases with age (He & Whelton, 1997). In the Framingham Heart Study, the incidence of hypertension was measured over 30 years of follow up in 5,209 adults (FHS, 2006). The biennial incidence of hypertension increased with age in men from 3.3 at ages 30 to 39 to 6.2 at ages 70-79 and in women from 1.5 at ages 30 to 39 to 8.6 at ages 70-79 (Dannenberg, Garrison & Kannel, 1988).

Most people with hypertension only have symptoms as a consequence of their medications not the disease itself (Grueninger, 1995). Blood pressure reduction is a technique that can be used to reduce the likelihood of heart attack, stroke and renal failure (Alderman, 1995). Hypertension can be normalized, but will require chronic treatment. Although the efficacy of antihypertensive treatment for hypertension has been well established in clinical research, certain factors may influence the magnitude of benefit. Compliance with drug therapy may be limited by the inconvenience, side effects, and cost of medications (U.S. Preventive Services Task Force, 2004).

Data about hypertension in Asian Americans is inconclusive. One historical study found that Japanese Americans living in the U.S. reportedly had higher blood pressure than Japanese living in Japan (Kagan et al., 1974). Data on the prevalence of hypertension suggests that the weighted percentages of hypertension for Asian men, ages 18-50 or older, and for women, ages 50 or older, were higher than their White counterparts (Stavig, Igra, & Leonard, 1984). Between 1981 and 1983, the nutrition and health status of 346 Chinese immigrants in Boston, aged 60 to 96 years was analyzed for CVD risk factors. The results of this study showed a lower mean blood pressure for those participants in the study than general elderly (Choi, McGandy, Dallal, Russel, Jacob, Schaefer, & Sadowski, 1990). Data from the U.S. Department of Health and Human Services (1992) also showed a lower incidence of hypertension in Chinese Americans (18.9%) compared to those of Whites (19.3%). However, The International Collaborative Study of CVD in Asian (InterASIA) reported that 27.2 percent of the Chinese population age 35-74 years living in China, representing 129 million persons, had hypertension (Gu et al., 2002). The possible explanations are the potential lack of awareness of

hypertension, the paucity of data to guide diagnosis, and an ambiguous classification. However, the true prevalence hypertension among Asian Americans still remains unknown.

Smoking

Cigarette smoking increases the risk for sudden coronary death (Escobedo & Zack, 1996), as well as CVD in general. The life expectancy of smokers is 69.7 years for men and 75.6 years for women while the life expectancy of non-smokers is 77.0 years in men and 81.6 years for women (Barendregt, Bonneux, & Van Der Mass, 1997). Despite pervasive public education programs regarding the adverse effects of smoking, increasing monetary cost of smoking, social pressure to quit, and increasing number of policies designed to limit opportunities to smoke, some smokers still fail to acknowledge the importance of smoking cessation (Ratner, Johnson, & Bottorff, 1995). "In the case of most smoking related disease, reduction in smoking reduces mortality, creating new possibilities for morbidity from other disease in the years of life gained" (Barendregt, Bonneux, & Van Der Mass, 1997, p.1056).

Thun et al. (1995) conducted a study by comparing the data from two perspective studies that reported on death rates from lung cancer, CHD, and other major smoking related disease. The researchers were able to determine the attributable risk in smokers. They found that the proportion of all deaths attributable to cigarette smoking increased from 41.2% to 56.5% in men and 16.7% to 47.4% in women from the first study to the second (Thun, Day-Lally, Calle, Flanders, & Heath, 1995). These results, as well as those from other studies, have kept tobacco abuse in the forefront among health policy analysts.

Conflicting data are found about smoking rates among Asian Americans. The AHA reported smoking rates of 18.6% for Asian men and women age 18 and older (AHA, 2006). Some researchers found smoking rates among Asian men to be the highest reported of any racial group (CDC, 1992; Jenkins, McPhee, Bird, & Bonilla, 1990; Levin, Nachampassack, & Xiong, 1988; Woodward et al., 2005). The CDC reported a 28% smoking rate among Chinese in California (CDC, 1992). However, studies conducted in China showed a 61% smoking rate for males and 7% smoking rate for females in China and it is increasing rapidly in recent decades (WHO, 1995). Another study reported that 5% of women and 75% of men in China are occasional or daily smokers (WHO, 1995). A study conducted by researchers at Kaohsiung Medical College in Taiwan showed an average smoking rate of 31% based on 400,000 people lived in Kaohsiung County (The Health Bureau of Kaohsiung County Government, 2002).

Smoking is less prevalent among Asian American women in general with a range of 10% or less (AHA, 2006; Hawks, 1989). U.S. born women have statistically higher smoking rates than Asian born women (Chen, 1993). Odd ratios for U.S. born versus Asian born women were 2.4 for Chinese, 1.8 for Filipino, and 1.5 for other Asians (Klatsky, Tekawa & Armstrong, 1996). Acculturation may be an important factor in the increasing smoking rate.

Diet

During the past 25 years, epidemiological studies have consistently correlated diet as a factor in the etiology of the five leading causes of death in U.S., including CVD, certain types of cancer, stroke, non-insulin dependent diabetes mellitus, and atherosclerosis (Bidlack, 1996). Even though genetic predisposition increases susceptible

people's risk for many of these chronic diseases, these conditions may be diminished or prevented by improvements in the American diet (Bidlack, 1996). These chronic health conditions are extremely costly from an economic standpoint. National health care expenditures for 1990 totaled $666 billion of which 33% were attributed to inappropriate diet (Bidlack, 1996). Identification of external factors that contribute to premature death would aid preventive efforts, improve the quality of life, and reduce health care costs. Adult nutrition focuses on tissue maintenance, nutrient and energy needs, and disease prevention (Bidlack, 1996). As the population of elderly increase in number and greater age, nutritional needs must be met to minimize certain disease states and assure quality of life. Nutrition associated health risks have been identified for CHD, cancer and diabetes mellitus.

Dietary recommendations made by the AHA (2006) include decreasing the consumption of dietary cholesterol and saturated fatty acids, and increasing consumption of complex carbohydrates and dietary fiber. Policies to improve health require integration of nutrition needs with economic growth and development, agriculture and food production, processing, marketing, health care and education, and includes changing life styles and food choices (Bidlack, 1996).

To date, the majority of clinical intervention studies have indicated limited success in altering serum cholesterol by dietary change (Bidlack, 1996). One of the most successful studies to date was conducted in Finland. About 25 years ago, Finland had the highest rate of CVD mortality in the world (Keys, 1970), thus the researchers assessed the changes in diet in two provinces within the country. In their study, Pietinen, Vartiainen, Seppanen, Aro, & Puska (1996) found that CVD mortality has declined in

Finland by 55% among men and 68% among women between 1972 and 1992. About three quarters of this decline was explained by changes in the main coronary risk factors, the decrease in serum cholesterol being the most important one. Saturated fat content in the typical diet went from 21% to 16%, polyunsaturated fat from 3% to 5%, and the intake of cholesterol decreased by sixteen percent. Between 1972 and 1992, fruit and vegetable consumption dramatically increased. The Finnish diet used to be high in dairy fat and salt, but now has one of the lowest fat content in Europe and an average salt content (Pietinen et al., 1996). The researchers concluded that dietary changes seemed to explain the decrease in serum cholesterol levels. Together with a decline in smoking among males, as well as better blood pressure control, dietary changes contributed to the dramatic decline in CVD mortality in Finland (Pietnen et al., 1996).

In researching the estimated effects of reducing dietary saturated fat intake on the incidence and costs of CVD in the U.S., Oster and Thompson (1996) found that if Americans reduced saturated fat intake from current levels to 9% of total energy, about 100,000 first-time coronary events could be averted by the year 2005, with associated cost savings of approximately $13 millions (in 1993 dollars). According to their findings, reducing saturated fat by 1 to 3 percentage points would reduce the CVD incidence from 132,000 to 99,700 events (Oster & Thompson, 1996). It would also result in savings in medical expenditures and lost earnings ranging from 4.1 to 12.7 billion dollars over 10 years (Oster & Thompson, 1996).

More data about dietary patterns of Asian Americans has been published. A study of 399 Chinese Americans reported Chinese Americans increased consumption frequency of all seven food groups and Western foods while consumption frequency of

traditional Chinese foods decreased after immigration (Lv & Cason, 2004). Acculturation level also affected these Chinese Americans' dietary patterns (Lv & Cason, 2004). One cross-cultural study comparing Chinese middle school students in China and American Chinese middle school students found significant differences in dietary knowledge, attitudes toward diet, and dietary patterns (Sun & Chen, 1994). A recent study indicated that Chinese students living in New York City consumed more meat, dairy products, fat, sweets and snacks, and fast food, and consumed less fruits, vegetables, and starch than Chinese students living in China (Sun & Chen, 1994). A study in Taiwan found that the percent dietary fat in Taiwan increased from 16% to 36% between 1950 and 1987 (Lien et al., 1998).

Cholesterol

Elevated blood cholesterol has been established as an important risk factor for CHD (AHA, 2006). Approximately 99.9 million Americans have blood cholesterol levels of 200 mg/dl or higher, with approximately 38.3 million having high levels of 240 mg/dl and above (AHA, 2006). Cholesterol comes from two sources: it is produced in the body mostly by the liver and is also found in foods that come from animals, such as meats, poultry, fish, seafood, and dairy products. Foods from plants (fruits, vegetables, grains, nuts, and seeds) do not contain cholesterol. The AHA (2006) recommends that an average daily cholesterol intake of less than 300 milligrams. The average American male consumes about 337 milligrams of cholesterol per day (AHA, 2006).

A report by the Adult Treatment Panel of the National Cholesterol Education Program (NCEP), National Heart, Lung and Blood Institute (NHLBI, 2006) recommends that the total serum cholesterol level be measured in all adults aged 20 years and older at

least once every five years. The report specifies that a "desirable" total serum cholesterol level for adults is below 200 mg/dl and classifies persons with levels between 200 to 239 mg/dl as having "borderline" high blood cholesterol. Persons in their late teens to mid-40s with abnormal levels that are still below 200 mg/dl should also be alerted to their potential for future borderline high or high classification. Through dietary and exercise interventions, these individuals could begin to reduce their cholesterol before reaching borderline high levels.

Objectives 12 and 13 in Healthy People 2010 (HHS, 2000) aim to reduce the mean serum cholesterol level in adults. The target is 199 mg/dl. Educational efforts to attain this objective must focus on the total population to encourage people to know their cholesterol level, make dietary changes as appropriate, and if necessary, drug treatment (Health and Human Services [HHS], 2000). Since blood cholesterol levels greater than or equal to 240 mg/dl are associated with a substantially high incidence of CHD, reducing the prevalence of high blood cholesterol among adults will help decrease the risk of CHD (HHS, 2000).

Studies focused on cholesterol levels for Chinese Americans are limited. The limited number of Asian Americans who have their blood cholesterol checked indicates a gap in knowledge and access top information (NIH, 2004). Pinnelas, Torre, Pugh, Atrand, & Horowitz (1992) reported higher levels of total cholesterol for Chinese living in New York City Chinatown (male 206$\pm$ 38 mg/dL; female 224$\pm$ 45 mg/dL) than for those Chinese living in China (male 160$\pm$ 34 mg/dL; female 162$\pm$ 34 mg/dL). Applying NCEP guidelines, the borderline-high and high blood cholesterol levels for Chinese in Chinatown were 35% and 23% respectively (Pinnelase et al., 1992). The AHA reported a

high incidence of elevated cholesterol for both Asian men (26.6%) and Asian Women (20.2%) (AHA, 2006). A hospital-based study of CVD risk factors in Taiwan reported a strong association between low serum high-density lipoprotein cholesterol (HDL-C) concentration and incidence of CVD (Lien et al., 1998).

Physical Inactivity

Lack of physical activity is now clearly shown to be a risk factor for CHD (AHA, 2006). Quantitative estimates indicate that sedentary living is responsible for one-third of adult deaths due to CHD, colon cancer, and diabetes – three diseases for which physical inactivity is an established causal factor (Powell & Blair, 1994). An estimated 250,000 deaths per year in the U.S. – about 12 percent of total deaths – are due to a lack of regular physical activity (AHA, 2006). The benefits of physical activity have been reported in numerous studies.

In the Stanford exercise study, middle-aged men were evaluated to determine the effects of physical activity (running) on their plasma lipoproteins. After 1 year, the running group had become significantly fitter and leaner than the control group (Wood, 1993). A follow-up of 14 of the original 81 participants was conducted after the second year. These men averaged 12 miles/week (running) over this period. Their HDL level was increased, and their LDL cholesterol decreased significantly from sedentary levels at the 2 year point, indicating the relatively long-term effects of increased exercise (Wood, 1993). Investigators concluded that the addition of regular exercise to a hypocaloric NCEP diet in moderately obese men and women resulted in greater body fat loss, improved levels of HDL cholesterol, and decreased overall estimated CHD risk (Wood, 1993). Yet, many Americans fail to incorporate physical activities into their lifestyle.

This is demonstrated by the fact that according to the AHA (2006), only 30.1 percent of American adults get regular leisure time exercise to achieve cardiovascular fitness.

Data showed 21.2% of Asian American men and 27% of Asian American women reported no leisure-time physical activity (AHA, 2006). Research in U.S. and U.K. also showed a significantly low level of reported regular exercise activity among Asian Americans, especially Asian women (Hine, Fenton, Hughes, & Velleman, 1995; Lip et al., 1996). Results from a study of 232 housewives reported Asian women and their male partners had the lowest proportion of regular exercise compared to Whites and Afro-Caribbeans (Lip et al., 1996). Despite strong evidence that exercise protects against heart disease, Asian men and women still have low physical activity (Hine et al., 1995).

Obesity

Obesity is associated with 4 of the 10 leading causes of death in the United Stattes: disease of the heart, malignant neoplasm, cerebrovascular diseases, and diabetes mellitus (Gartner, Rosenberg & Wilson, 1996). Among adults ages 20–74, 59.6% of non-Hispanic white men and 45.5% of women are overweight. 20.0% of non-Hispanic white men and 22.4% of women are obese. Obesity is believed to be a major contributing factor for type 2 diabetes. Research conducted by Kanaders and Blackburn (1992) showed that small weight losses of 10-15% of initial body weight can generally help reduce these obesity-related comorbidities. However, the incidence of obesity appears to be on the rise. Managing obesity is arguably one of the most common health challenges in the U.S. today. In a report published in 2004 in the Journal of American Medical Association (JAMA), researchers compared data contained in four cross-sectional, nationally representative surveys, including the National Examination Survey (NHES I: 1960-1962)

and the National Health and Nutrition Examination Surveys (NHANES I: 1971-1974); NHANES II: 1976-1980; NHANES III: 1988-1994). For men and women aged 20-74 years, the prevalence of obesity (which was calculated as having a body mass index (BMI) of greater than or equal to 30), showed a large increase between NHANES II (1976-1980) and NHANES III (1988-1994) (NHANES II, 14.5% and NHANES III, 22.5%) (Flegal, Carroll, Kuczmarski & Johnson, 1998). Trends were generally similar for all age, gender, and race-ethnic groups (Flegal et al., 1998). The age-adjusted prevalence of overweight (BMI of 25.0 or higher) increased from 55.9 percent in NHANES III (1988-94) to 65.1 percent in NHANES (1999-2002) (Hedley et al., 2004). The prevalence of obesity (BMI of 30.0 or higher) also increased during this period from 22.9 percent to 30.4 percent. Extreme obesity (BMI of 40.0 or higher) increased from 2.9 percent to 4.9 percent (Hedley et al., 2004).

These findings are also in agreement with trends seen elsewhere in the world. Several variables may explain the results. The American diet has been examined, criticized, and determined to be high in fat. The fact that most people do not exercise may suggest that people do not consider exercise as a way of reducing obesity, controlling diabetes, or preventing CVD. Others may not consider obesity to be a significant risk factor for CVD.

In the longitudinal Nurse Health Study, the associations of dietary fat and obesity with risk of CHD among 78,778 women were examined (Oh, Hu, Manson, Stampfer, & Willett, 2005). Findings from this study continue to support an inverse relation between fat intake and CHD risk, particularly among younger and overweight women (Ohm et al., 2005).

The economic costs associated with obesity are astronomical and second only to smoking (Colditz, 1992). Obesity increases the annual health care costs by $47.5 billion dollars and Americans spend an additional $32 billion dollars on weight reduction products and programs each year (Colditz, 1992; Finkelsein, Fiebelkom, & Wang, 2004). The U.S. Department of Agriculture (1995) recommends that people who have problems linked to being overweight, including high blood pressure and heart disease, should try to reduce health risks through better eating and exercise habits.

A tendency towards central obesity, diabetes and insulin resistance has been observed in Asians living in U.K. (Lip et al., 1996). Data from the AHA reported an overweight rate of only 10.8% for Asian men in the U.S. and 10.1% for Asian women in the U.S. (AHA, 2006). However, surveys conducted in Beijing in 1988–89 indicate 35.2% of men and 39.5% of women are overweight (WHO, 2005).

Diabetes

Numerous studies have shown that individuals with diabetes who have an AMI are more likely than people without diabetes to experience another infarction or death from infarction (Cummings, King, Manious, & Geesey, 2006; Soedamah-Muthu et al., 2006; Yamagishi, Nakamura, Matsui, Takenaka, & Jinnouchi, 2006). In the Framingham heart study, men with diabetes who had an MI had a 40% increased risk of reinfarction within 2 years of their first infarction, whereas women with diabetes had three times the risk ($p<0.001$) compared to those without diabetes (FHS, 2006). Takazoe, Ogawa, Yasue, Sakamoto, Soejima, & Miyao (2001) conducted a 4 year study with 249 diabetes patients to investigate the recurrence of MI. When plasminogen activator inhibitor (PAI) was used as a marker of recurrence of MI, patients with higher PAI activity and diabetes had a 4.2

fold risk in comparison with the patients with lower PAI activity and no diabetes (Takazoe et al., 2001). In the Framingham cohort, death following an MI was significantly increased for individuals with diabetes from the time of their first hospitalization through 30 years of follow-up. (Wong, Cupples, Ostfeld, Levy, & Kannel, 1989; FHS, 2006). The Worcester Heart Attack Study also showed that persons with diabetes had twice the mortality risk 12 years later (Donahue, Goldbert, Chen, & Gore, 1993). Despite advances in care, these data show that absolute and relative risks of CVD remain extremely high in patients with type 1 diabetes. Women with type 1 diabetes continue to experience greater relative risks of CVD than men compared with those without diabetes (Soedamah-Muthu et al., 2006).

The prevalence of physician-diagnosed diabetes was 14.1 million and the prevalence of undiagnosed diabetes was 6 million (AHA, 2006). Since 1990, the prevalence of those diagnosed with diabetes increased 61 percent (AHA, 2006), in part because the diagnostic cutoff level of a fasting glucose 126mg/dl was established in 2002 (American Diabetes Association [ADA], 2002). The prevalence of diabetes for all age groups worldwide was estimated to be 2.8 percent in 2000 and a projected 4.4 percent in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 millions in 2030 (Wild, Roglic, Green, Sicree & King, 2004).

In the multicenter investigation of the Limitation of Infarct Size (MILIS) trial, insulin-treated diabetes was an independent risk factor for post-infarction congestive heart failure with a stronger effect in women than in men (Stone et al., 1989). In another study, cardiac function was compared in 125 patients with type 2 diabetes and 50 age and sex matched healthy controls. Echocardiography showed significantly increased septal

and posterior wall thickness and abnormalities in diastolic function in patients with diabetes (Illan et al., 1992). In another study, echocardiography was used to study 157 young patients who had type 1 diabetes and no cardiac symptoms. The patients had more ventricular dysfunction than 54 age and sex matched controls. Among persons with diabetes, diastolic dysfunction was more than twice as common as systolic dysfunction and occurred earlier (Raev, 1994).

Because having diabetes increases the risk for developing CHD, the growth of diabetes among the Chinese population may be an increasingly important risk factor for heart disease in the years ahead. The rate of diabetes is rising much faster in Asian Americans (10-15%) than in Caucasians (5%) (Joslin Diabetes Center, 2003). For this reason, intensive efforts are now focused on investigating the effects of diabetes on the development of atherosclerotic heart disease.

The incidence of diabetes in Asians and Pacific Islanders is growing at an alarming rate with 90-95% of people with diabetes having type 2 diabetes (Joslin Diabetes Center, 2003). The World Health Organization (WHO) estimated that the number of individuals affected by diabetes mellitus in 1995 had increased to 135 million from the 1985 estimate of 30 million, and it is projected that 300 million people will be affected by 2025 (WHO, 2002). Approximately half of this population will be Asians and Pacific Islanders. China is predicted to have the highest rise in prevalence rate (68%) followed closely by India (59%) and other Asian countries and Pacific Islands (41%) (WHO, 2002).

The dramatic rise in diabetes cases in the Asian Pacific area may be a result of industrialization, urbanization, mechanization and westernization. Indeed, previous

studies on Japanese-Americans in Seattle and Hawaii showed that the prevalence of diabetes was two to three times higher than that seen in Japan (Joslin Diabetes Center, 2003). The prevalence of diabetes in Chinese-Americans was also reported to be 5 - 7 times higher than that seen in China (WHO, 2002).

Notably, studies have also shown that although Asian-Americans were generally less obese compared to the U.S. white population, the prevalence of diabetes and impaired glucose tolerance was at least twice that of the white population, and this was seen among different ethnic Asian groups in Hawaii, including the Filipino, Chinese, Japanese and Korean (WHO, 2002). This phenomenon is in fact not limited to the U.S., as studies in the U.K. also revealed a five-fold difference in the prevalence of diabetes in Asians living in West London compared to an age-matched European population (WHO, 2002).

In recognition of the increasing health risks associated with obesity in Asian populations despite the relatively lower body mass index, the Western Pacific Regional Office of WHO in collaboration with the International Obesity Task Force and the International Association for the Study of Obesity has proposed new criteria to define obesity in the Asia-Pacific Region (WHO, 2002). Research has revealed an inverse relationship between birth weight and future risk of type 2 diabetes (WHO, 2002). In other words, the lower a person's weight at birth, more commonly encountered in Asians, the greater the risk of developing diabetes. Other risk factors for diabetes mellitus in the Asian population, including genetic factors, are not well characterized and need more attention.

Knowledge and Perception of Cardiovascular Disease

Knowledge of Cardiovascular Disease

Data from early studies showed that only a low percentage of participants (N=617) could identify main causes of heart attacks (Shekelle & Liu, 1978). In another study conducted in the 1980s, perceptions about the risk for CAD were examined in 80 unaffected siblings of persons who had recently been hospitalized for CAD and who were experiencing symptoms of it at a younger age (thus establishing high family risk). The siblings had moderate general knowledge of risk for CAD but were unaware of their family members' specific risk factors and did not perceive their own high relative risk for CAD (Becker & Levine, 1987).

Moran, Mazzocco, Fiscus, and Koza (1989) conducted a CHD risk assessment on 883 patients enrolled in two primary care rural practices in western Maryland to evaluate the relationship among the presence of CVD, major risk factors, and self-perception for CHD among the clients. Patients with pre-existing CVD other than peripheral vascular disease were more likely to perceive themselves at increased risk. However, 16% (39/246) regarded themselves to be at below average risk and these patients tended to have lower levels of income, education, and anxiety (Moran et al., 1989). Nineteen percent of patients without pre-existing CVDs regarded themselves to be at above average risk. These patients tended to be disabled, unemployed, and have increased anxiety levels. Regardless of the presence or absence of pre-existing CVD, a patient's self-perceived risk was not altered significantly by the presence of one or more risk factors other than a positive family history of CVD (Moran et al., 1989). Overall, the presence of risk factors in the subjects had little effect on their estimation of personal

vulnerability for CVD. Inadequate knowledge of risk factors and poor attitude toward preventability of CVD has been shown to contribute to these findings (Karlik & Yarcheski, 1987; Folsom, Sprafka, Luepker, & Jacobs, 1988).

Murray (1989) studied the causes of CVD in a sample of patients with acute MI (n=25) at the time of discharge from the hospital. Patients emphasized different causes of heart attack depending on whether they were focusing on general risk factors or what they perceived to be their own personal risks. Smoking, being overweight, and eating a high fat diet were the most frequently cited general causes of heart attacks. However, subjects most often attributed their own heart attack to causes such as overwork or overexertion and stress.

In another study of MI patients, the focus was an examination of the causes of CVD and the timeline of the disease among 105 patients hospitalized because of MI or for coronary angiography and receiving the diagnosis of CVD (Zerwic, King, & Wlasowicz, 1997). "Although 79% of subjects named at least one of three modifiable risk factors (smoking, hypertension, elevated cholesterol), only 7% identified all three modifiable risk factors" (Zerwic, King, & Wlasowicz, 1997, p.2). Sixty-four of smokers recognized smoking as a personal cause of their CVD, whereas only 15% of subjects with hypertension recognized it as a cause (Zerwic, King, & Wlasowicz, 1997). "Despite general knowledge about CVD, individuals with known risk factors continue to be largely ignorant of their personal risks and to some extent of the course of the disease" (Zerwic, King, & Wlasowicz, 1997, p.2).

The AHA has recently focused on physical inactivity as a major modifiable risk factor for CVD, in addition to smoking, hypertension, and elevated cholesterol level. In

the study conducted by Zerwic, King, and Wlasowicz (1997) with 105 participants, only 15% of the subjects recognized lack of exercise as a cause of CVD. Since physical activity has received so much attention in the popular press, one would expect that knowledge about the link between lack of physical activity and CVD would be much higher than the reported level.

Cheng and colleagues (2005) reported findings about blood pressure knowledge in 738 patients hospitalized with cardiac disease. Only two-thirds of them could recall their own systolic and diastolic pressure levels. Less than half could correctly name ideal blood pressure targets. This lack of knowledge was worse among females, those without college education, over age 60, with known diabetes, and without a history of hypertension. Patients in the highest risk group were no more knowledgeable about their levels and targets than low risk patients (Cheng et al., 2005).

Although the majority of subjects in Zerwic, King, and Wlasowicz (1997) could identify risk factors in general, they had difficulty determining their own risk factors. Twenty-seven percent of the sample stated they were unsure about the cause of their CVD. There are several possible explanations related to subjects' apparent lack of knowledge. First, individuals' understanding about the common causes of CVD may not translate into an understanding of the risk factors appropriate to their particular situation. Additionally, subjects may not have received information about risk factors that was applicable to their particular situation.

Davis, Winkleby and Farguhar (1995) conducted a study to analyze changes from 1980 to 1990 in knowledge of acquired cardiovascular risk factors, perceived knowledge of risk-reduction strategies, and interest in risk modification by socioeconomic status

using level of education (N=2,455). They found that individuals with more than 16 years of education knew almost twice as much about risk factors that affected cardiovascular health than did individuals with less than 12 years of education; the knowledge disparity continued to increase over the decade (Davis, Winkleby, & Farguhar, 1995). Well-educated individuals may interact in the information-rich environment in which social networks and the media may contribute to increased knowledge of CVD risk-reduction strategies. People with lower levels of education may not have the same peer-group environment and therefore may have decreased exposure to CVD risk reduction information (Davis, Winkleby, & Farguhar, 1995). This study showed that interest in changing risk factor habits was high across the 10-year study period for all education subgroups.

Information on the general knowledge level of Asian Americans about how to prevent heart disease remains scarce. The results from a study of 397 Southeast Asian immigrants residing in central Ohio showed that 85% of their sample did not know what could be done to prevent heart disease (Chen, 1993). For eight years, Gu et al. (2002) studied the effects of health promotion on CVD based on the changes in knowledge, attitude and behavior before and after an intervention in a rural population of Beijing (N=772). These researchers reported poor baseline knowledge of CVD, however, it was significantly improved community after 8 years of the health promotion program focused on CVD (Gu et al., 2002)

Illness Perceptions of Cardiovascular Disease

Illness perception and perception of health status of patients who have experienced CVD are not consistently defined. Four studies of perception of illness or

health after heart disease were reviewed which demonstrate the evolution of illness or health perception. These studies support the importance of examining the health or illness perceptions related to CVDs.

Garrity (1973) was among the first to examine the association between health perception and recovery from heart disease. He was interested in identifying predictors of return to work 6 months after AMI and measured health perceptions at the time of index event and six months later. Health perception was measured differently at the two time points. Health perception at baseline was measured using a two-point scale of heart attack severity. Health perception at six months was measured using a ten-point scale of overall health status. Of the fifty-right subjects in the study, sixty-seven percent had returned to work by six months. Multiple regression was used to explore the determinants of return to work after AMI. The findings of this small study suggested that return to work after AMI was predicted by a favorable perception of health at 6 months, high income and a lack of sense of control over fate. Perception of severity of heart attack at the time of AMI was unrelated to return to work (Garrity, 1973).

Cowie (1976) also examined perception of illness after MI and conducted semi-structured interviews approximately three weeks after the event. Subjects and their spouses were interviewed in the hospital and after discharge and asked to describe their illness experience and their work and family life. The researcher found that illness perception began with an interpretation of symptoms which involved reflection on ones past medical history and life in search of an explanation. Symptoms interpretation was followed by the decision to seek medical advise. This decision involved consultation with the spouse but was ultimately made by the patient. Subjects then moved on to the process

of accepting the diagnosis of a heart attack. This study demonstrated the multidimensionality of illness perception. A limitation of this study was the exclusion of single men and women from the study.

Reigel and Dracup (1992) examined health perceptions after AMI as part of a larger study of overprotection and cardiac invalidism. Health perception was defined as beliefs about health and severity of illness. Data were collected one and four months after AMI. Subjects were divided into two groups labeled as overprotected and inadequately supported based upon scores on the UCLA Social Support Inventory. At one month after AMI, no differences were found in health perceptions. At four months, overprotected subjects had significantly higher health perceptions than inadequately supported subjects. In this study, negative health perceptions was an outcome and was conceptualized as one of four concepts within the construct of cardiac invalidism.

Ladwig et al. (2000) examined gender differences in health perception and disability six months after a CAD diagnosis. Three hundred seventeen subjects were included in the final analysis of data, twenty-five percent (N=74) were women. Health perception was measured by an investigator-developed four-item tool that assessed perception of physical and mental health, perceived seriousness and anticipated outcomes of CAD. Emotional disability was measured by scores on the Hospital Anxiety and Depression Scale (HAD), scores on the Impact of Event Scale (IES) and the incidence of sleep disorders. Gender differences in emotional disability were found only for sleep disorders. Anxiety, depression and impact of illness scores did not differ significantly by gender. Negative health perception was significantly related to pre and post angina.

Subjects with a negative health perception also had significantly more sleep disorders, depression, anxiety and illness impact.

Asian Americans

Asian refers to people who have origins in the Far East, Southeast Asia, or the Indian subcontinent (U.S. Bureau of Census, 2003). It includes people who indicated their race or races as Asian Indian, Chinese, Filipino, Korean, Japanese, Vietnamese, or Other Asian, or wrote in entries such as Burmese, Hmong, Pakistani, or Thai (U.S. Bureau of Census, 2003). According to the 2000 census data, the five largest groups were Chinese, Filipino, Asian Indian, Vietnamese, and Korean, respectively (U.S. Bureau of Census, 2003). Of the 4.3 million from these five groups, 1,107,000 were from China, 748,000 were from India, 591,000 were from Korea, 1,132,000 were from the Philippines, and 770,000 were from Vietnam (U.S. Bureau of Census, 2003). The varied percentages of the different groups may influence their patterns of health services used because of cultural differences.

The demographics of Asians living in the U. S. have relevance for the current study. Of the total population of Chinese in the U.S., 40% live in California 17.5% in New York and 16% in Texas (U.S. Bureau of Census, 2003). Of those living in California, 33.6% live in Los Angeles and 15.6% live in San Francisco and the majority of those who live in Texas live in Houston metropolitan area (U.S. Bureau of Census, 2003). The population outside of these three states is sparse and widely distributed. Chinese Americans comprise the largest group and have a greater presence than many other Asian groups in the U.S.. They are the fastest growing Asian group in the U.S.,

comprising of more than 20% of the total Asian American population (U.S. Bureau of Census, 2003).

In 1998, Asians and Pacific Islanders had the highest median income ($46,637) of any racial groups (U.S. Bureau of Census, 2003). However, when income per household member was taken into account, as a group, the Asians and Pacific Islanders had a lower median income than the non-Hispanic White households (U.S. Bureau of Census, 2003). In 1999, the poverty rate for Asians and Pacific Islanders was 10.7%, and the number of Asians and Pacific Islanders who were poor was 1.2 million (U.S. Bureau of Census, 2003).

Forty-four percent of Asians and Pacific Islanders age 25 and over had a bachelor's degree or higher and eighty-six percent age 25 and over were high school graduates in 2000 (U.S. Bureau of Census, 2003). Approximately 1 million Asians and Pacific Islanders obtained advanced degrees in 2000, comprising a ratio of 1 in every 7 Asians and Pacific Islanders in graduate school in 1999 (U.S. Bureau of Census, 2003). There were 308,000 foreign students from Asian enrolled in U.S. colleges in the fall of 1998 (U.S. Bureau of Census, 2003).

Despite the size of the Chinese population in the U.S., there continues to be a scarcity of research studies relevant to this population. There is very little research on how cultural beliefs and practices of Chinese Americans influence health seeking behaviors. Thus, in order to provide culturally sensitive and effective services for this group, more research is needed.

Acculturation

Acculturation has been defined in many different ways as far back as early 1880 (Berry, 1980). A classic definition by Redfield, Linton, and Herskovits (1936) states that acculturation occurs when two different cultures come into contact with one another and one or both culture change as a results of the contact. In 1954, the Social Service Research Council formulated the definition of acculturation as "culture change that is initiated by the conjunction of two or more autonomous cultural systems. Its dynamics can be seen as the selective adaptation of value systems, the processes of integration and differentiation, the generation of developmental sequences, and the operation of role determinants and personality factors" (Social Science Research Council, 1954, p.974). Initially, acculturation referred to a group-level phenomenon, but it is presently accepted as an individual-level phenomenon and is called psychological acculturation (Graves, 1967). At the individual level, acculturation is said to occur within the individual (overt and covert behaviors), whose group, as a whole, also undergoes acculturation (Graves, 1967). Since the construction of these definitions, the measurement of acculturation as a construct in research has undergone much change.

There are two major perspectives in the conceptualization of the theories of acculturation in the psychology literature, one stressing assimilation, while the other cultural pluralism or multiculturalism (Laroche, Kim, Hui & Joy, 1996; Mendoza, 1989; Suinn, Ahuna, & Khoo 1992). The assimilation perspective holds that changes in cultural attitudes, values, and behaviors are unidirectional, with the eventual absorption of the non-dominant group into the dominant group (Sayegh & Lasry, 1993). The other view, the cultural pluralism perspective, suggests that changes occur in varying degree in all

aspects of social and cultural domains such that ethnic groups retain their unique cultural identity as they adjust to the dominant environment (Laroche et al., 1996).

Acculturation is considered an orthogonal and multidimensional process rather than a linear or unidimensional (Berry, 1980; Berry, Kim, Minde & Mok, 1987; Chang, Tracey, Moore, 2005; Dona & Berry, 1994; Mendoza, 1989; Suinn et al., 1995). Chang, Tracey & Moore (2005) described acculturation as a multi multifaceted phenomenon consisting of multiple dimensions, factors, and constructs. Important components of acculturation are values, ideologies, beliefs, attitudes, and cognitive and behavioral characteristics (Chang, Tracey, Moore, 2005). Additionally, a number of studies have found evidence for the two-dimensional measurement of acculturation (Chang, Tracey, Moore, 2005; Kim, Brenner, Liang, & Asay, 2003; Laroche et al., 1996; Nguyen, Messe & Stollak, 1999; Sanchez & Fernandez, 1993).

Until recently, there were few valid and reliable measures of acculturation for Asian Americans. The Suinn-Lew Asian Self-Identity Acculturation Scale (Suinn, Ahuna & Khoo, 1992; Suinn et al., 1995; Suinn, Richard-Figueroa, Lew & Vigil. 1987) was developed to specifically measure levels of acculturation in Asian Americans. It also has recently been expanded to include additional items to better assess acculturation as a multidimensional and orthogonal process. However, these new items have yet to be found predictive of health behaviors (Tang et al., 1999). The scale measures the multidimensionality of acculturation by assessing cognitive, behavioral, and attitudinal components. Several outcomes can be anticipated when an individual is exposed to another culture. One outcome is assimilation whereby the individual relinquishes his or her parent culture and adopts the host culture's values, attitudes, and behaviors. A second

outcome is resistance to assimilation whereby the individual remains true to their parent culture and rejects the host culture. A third outcome is biculturalism whereby individuals may adopt some host culture behaviors (i.e., gender role behaviors) and retain other parent culture behaviors (i.e., behaviors toward elders and authority figures) (Suinn et al., 1992; Suinn et al., 1995; Suinn et al., 1987).

Summary

This chapter provided a literature review summary as a foundation to the present study. The epidemiology of CVD in the U.S. population was described, including prevalence, incidence and mortality data. Though CVD is the leading cause of death for Asian Americans, mortality data has not been published. CVD epidemiology information about Chinese Americans is relatively scarce. Research studies about the leading modifiable and non-modifiable risk factors for CVD were described for the U.S. population, and some of the known findings about Asian Americans and Chinese Americans were given. Several studies described inadequate knowledge and perception about CVD risk factors. The demographics of Asian Americans and the measurement of acculturation were described. Little is known about the overall impact of acculturation level of illness representation. Knowing how culture and acculturation levels influence Chinese Americans' illness representation would facilitate the design and examination of interventions to improve CVD prevention and promote cardiovascular health among Chinese Americans.

CHAPTER 3: METHOD

The purpose of this study was to assess illness representation and knowledge of risk factors with respect to cardiovascular health in a sample of Chinese American adults. Additionally, the influence of acculturation on illness representation was assessed and the knowledge regarding CVD risk factors was examined. This chapter describes the research design, rationale for methodology, identification and selection of participants, protection of human subjects, description of sample characteristics, data collection procedures, instruments, and statistical analysis.

Research Design and Rationale for Methodology

A cross-sectional design was used for this descriptive study (Polit & Becker, 2003). The target population consisted of individuals who are Chinese living in the U.S.. A convenience (nonprobability) sampling technique was used in this study. A web-based study was conducted. In order to achieve valid and reliable results, a carefully considered methodology was needed to ensure the recruitment of a large number of Chinese-speaking minority ethnic people. Three methods were used to obtain a sample of the population to provide sufficient respondents from the Chinese Community. First, flyers were posted with the web address at local Chinese-speaking churches in Austin, Texas, to invite Chinese Americans to participate in the study. There are two major Chinese-speaking churches in this community and each church has more than three hundred regular members. Second, the study was advertised in the regional Chinese newspaper (Texas Capital News). Third, banner advertisements at a popular national Chinese news web site were used to attract subjects (http://www.chinatimes.com). Potential participants were encouraged to go to the study website to respond to survey questions. However, 21

out of 124 participants chose to print out the questionnaires via study website, completed all of them and mailed back to the study investigator.

The Internet provides an opportunity to overcome geographic barriers when recruiting subjects. All the participants recruited using the above methods were asked to invite their family and friends to participate, a method of sampling using a snowball design. Snowball sampling is often used with the study of sensitive topics and most frequently used where the study group is hidden, elusive, deviant, or rare (Polit & Beck, 2003). Martin and Dean (1993) also suggested that if there are unremunerated populations where screening is not viable, then snowballing is the method of choice. Using recruitment from varied sources necessitates recognizing that the resulting sample will not be random but may include diverse segments of the population. In terms of creating a diverse sample, Biernacki and Waldorf (1981) suggested using multiple starting points and, as the research progresses, controlling the referral chains to attempt to ensure that that sample includes an array of respondents that in qualitative terms, if not in rigorous statistical ones, reflect what are thought to be the general characteristics of the desired population. Thus, local churches, the newspaper, and the Chinese Website (www.chinatimes.com) represented three different starting points used in this study.

Chinese Americans Internet usage rose from 66 percent in 2000 to 68% in 2003 and the number is still growing (KTSF, 2003). Robert B. Reich, a news journalist at CBS news, reported that Chinese people comprise the fastest growing population among all Internet users (Reich, February 25, 2006). He indicated there may be more Chinese using the Internet than Americans within a few years at the rate Internet usage is growing (Reich, February 25, 2006). In October 2005, the United States Census Bureau released a

report entitled “Computer and Internet Use in the United States: 2003” which showed that Asians household had the highest percentage of computer ownership and Internet access among all ethnicities (U.S. Census Bureau, 2005). These data provide support for using the Internet as a data collection tool for this study.

Identification and Selection of Participants

Any Chinese Americans who lived in the U.S. and met the inclusion criteria were invited to participant in the study. The inclusion criteria were: (a) adult 18 years of age or older, male or female; (b) able to read Chinese or English; and (c) their ancestors or themselves originated from China, Taiwan, or Hong Kong. A short questionnaire was provided to determine their eligibility.

The number of subjects needed in a sample is a major concern in a given study. There are sophisticated methods for developing sample size estimates using power analysis (Polit & Beck, 2003) which build on the concept of effect size. Important concepts for this study included illness representation, knowledge of CVD and acculturation. Related statistical knowledge are level of significance (α), desired power (1-β), and population effect size (gamma γ) (Cohen, 1988). Significance level (α) is an index of how probable it is that the findings are reliable, with the standard usually being an alpha level pf .05. This means that only 5 times out of 100 would the obtained result be spurious or haphazard. Power (1-β) is the ability of a research design to detect relationships among variables (Polit & Beck, 2003). A power of .80 is a conventional standard that corresponds to an acceptable risk of a type II error. With power equal to .80, there is a 20% risk of committing a Type II error. The effect size (gamma γ) is an estimate of the magnitude or strength of the relationship between the research variables

(Polit & Beck, 2003). The value of effect size can be calculated based on data from published studies on the same or similar problem. However, when there are no data that can reasonably be construed as relevant, the researcher is forced to use conventions based on whether the effect size is expected to be small, medium, or large. The statistical significance level selected was a p value less than .05, the desired power was .80 and the estimated effect size for this study was .60, to be conservative. According to Polit and Beck (2003), this set of conditions required 116 subjects.

Protection of Human Subjects

Potential participants were asked about their age and ethnicity to determine their eligibility. Eligible participants were directed to the consent form page with explanations of the details about the study (Appendix A). Each participant was asked to read through the consent form page then clicked "I agree to participate" or "I do not agree to participate". Those participants who clicked "I agree to participate" button were linked to the survey pages and those clicked "I do not agree to participate" button were redirected to an exit page with thank you message.

The moral principle of autonomy or respect for the individual is central in health care and nursing research. The goal of obtaining adequate informed consent to participate in a research study is to assist the person to come to a well-considered judgment about the nature and consequences of the risks and benefits to participate in a research (Polit & Beck, 2003). In addition, the decision to accept or reject participation should be substantially voluntary and free of coercion (Beauchamp & Childress, 1994).

Informed consent must contain certain elements that are clearly identified in the federal guidelines (U. S. Department of Health and Human Services, 1991). These

include a description of the purpose of the study and a statement that it involves research; the risks and discomforts; reasonable benefits; disclosure of appropriate alternative procedures or treatments, if any, that might be advantageous to a subject; how the data will be managed to maintain confidentiality; and the number of anticipated subjects. In the present study, the following efforts were made to ensure participants' confidentiality and anonymity was respected and protected. A consent form explaining the study and methods was provided (see Appendix A). Raw data was downloaded from the website and archived in a database housed on a server to ensure that there was no e-mail or IP address to divulge their identity. To ensure confidentiality and security of collected data, a daily downloading protocol was enforced and became part of the project. Thus, non-research personnel had fewer opportunities to access confidential data.

Anonymity can be a double edged sword. The anonymity afforded by the Internet may be a great asset for data collection because participants feel freer to answer truthfully without fear of consequences. Conversely, it also raises the concern of participants providing false information. Similar to the use of traditional (non-Internet) instruments, the participant may or may not lie or misrepresent the truth.

The researcher's email address was provided to those participants recruited via Internet. They were encouraged to contact the researcher via email for any possible questions they had regarding the research. Participants were informed that the results of the study could be posted on the study website once the research was completed. Only four participants indicated an interest in viewing the aggregate results.

In addition, there are special considerations regarding informed consent when the participants' cultural background differs from the dominant culture. Chinese American

culture values family, modesty, hardworking, respecting authorities and privacy (Chin, 1996). Chinese people are often shy and asking questions are usually seen as disrespectful. Out of respect, Chinese people may not ask questions, so it is important to assess understanding by asking clear questions. To address this concern, participants were encouraged to email researcher if they had any questions related this study.

Instruments

Translation of Instruments

Translation of previously developed instruments is often the choice when conducting research with groups whose language is not English. Many self-report instruments developed and validated in English have been translated into another language for measuring the variable of interest in other countries or culture. However, the constancy in validity and reliability should not be assumed by investigators. Ensuring the equivalence between the translated and original versions of a questionnaire is the most important issue when translating an instrument.

In translating a questionnaire into a second language, the distortion from the source culture needs to be reduced (Chang, Chau, & Holroyd, 1999). Language differences pose the most obvious distortion in translating questionnaires, thus requiring rigor in ensuring both linguistic and cultural equivalence (Chang, Chau, & Holroyd, 1999). Flaherty et al. (1988) proposed that a valid adaptation of a tool for such use requires consideration of several dimensions of cross-cultural equivalence: content, semantic, technical, criterion and conceptual. Equivalence is a form of validity that refers to the agreement between two measures of the same construct. Drasgow and Hulin (1987) further discussed the importance of first establishing measurement equivalence before

determining that relationships attributable to culture exists between the tool and other criteria and conceptual variables.

A number of procedures were used to meet the criteria for cross-cultural use (Flaherty et al., 1988). Prior to commencing translation, content equivalence or the relevance and sensitivity of the Healthy Heart IQ Questionnaire for Chinese Americans was established through discussion with bilingual nurse researchers. The translation and back-translation was undertaken by bilingual doctoral students who have studied both Chinese and English, thus sufficiently educated in both languages as recommended by Bracken and Barona (1991). The Healthy Heart IQ Questionnaire was first translated into Chinese by one doctoral student and back-translated into English by another doctoral student who had never before read the instrument. This forward and backward translation was done to establish semantic equivalence. Conceptual rather than literal meaning was the goal. The translator and back-translator then met with the English speaking, monolingual researcher to examine the differences found in the back-translation. It was expected to find instances where clarification of the original meaning of the English terms used in the original tool would be required. According to the results, no items and terms needed to be modified. A pilot study with 5 volunteers was conducted using this translated instrument for appraisal of the appropriateness of the translation.

The existing Chinese version of Illness Representation Questionnaire and Suinn-Lew Self-Identity Acculturation Scale provided by the authors of instruments were used. Content equivalence was evaluated by bilingual nurse researchers to ensure the appropriateness for cross-cultural use.

Instruments

Demographic Data

Demographic data collected included age, gender, marital status, history of CVD and cultural backgrounds (see Appendix B). Education was measured in years and employment status was measured as full time, part time, retired, or unemployed.

Illness Perception Questionnaire Revised

The Illness Perception Questionnaire (IPQ) (Weinman et al., 1996) was developed to provide a quantitative assessment of the five components of the illness representation – identity, consequences, timeline, control/cure and cause in Leventhal's Common Sense Model of Illness Representation (Leventhal et al., 1984, 1997). Since then, it has been used in studies of illness adaptation in patients with a wide range of conditions, including CHD (Petrie et al., 1996; Steed et al., 1999), rheumatoid arthritis (Murphy et al., 1999; Pimm and Weinman, 1998; Scharloo et al., 1999), cancer (Buick, 1997), psoriasis (Fortune et al., 2000; Scharloo et al., 2000a), chronic obstructive pulmonary disease (Scharloo et al., 2000b), chronic fatigue syndrome (Heijmans, 1998; Moss-Morris et al., 1996), diabetes (Griva et al., 2000) and Addison's disease (Heijmans, 1999). It has also been adapted for use with people undergoing investigations such as coronary angiography and genetic testing, and for spouses and of people with major health problems (Heijmans et al., 1999; McClenahan and Weinman, 1998; Weinman et al., 2000). The IPQ-Revised was developed by extending IPQ to include measures of illness coherence and the emotional representation of illness to improve measurement properties (Moss-Morris et al., 2002) (see Appendix C).

The evidence from various studies to date provide quantitative support for the structural relations between the five components of illness representation described by Leventhal (Leventhal et al., 1984, 1997), and for the expected links between illness perceptions and a range of psychological outcomes including coping (Heijmans, 1998, Heijmans & De Ridder, 1998; Moss-Morris et al., 1996; Scharloo et al., 1998, 2000a). Mood (Fortune et al., 2000; Murhy et al., 1999), functional adaptation (Heijmans, 1998, 1999; Moss-Morris et al., 1997; Petrie et al., 1996; Scharloo et al., 1998) and adherence to a rage of medical recommendations (Weinman et al., 2000).

The revised Illness Perception Questionnaire (IPQ-R) consists of seven subscales, five for each of the five attributes (identity, time line, controllability/cure, consequences and cause) of illness representation and two new subscales to measure illness coherence and the emotional representation of illness (Moss-Morris et al., 2002). Identity was measured using a list of 15 symptoms for which the subject is asked to note the symptoms they think they would experience if having a heart attack. Scores on this subscale range from 0 to 15. A higher score indicated a greater number of symptoms associated with the heart attack. Time-line, controllability/cure, consequences, illness coherence and emotions are measured using a thirty-eight-item Likert scale. Responses choices range from strongly disagree to strongly agree. Higher scores on the time-line scale indicate the belief that the illness will last a long time. High scores on the controllability/cure scale indicate the belief that the illness can be controlled or cured. Higher scores on the consequence scale indicate the perception of serious consequences related to having a heart attack (Petrie et al., 1996; Weinman et al., 1996). High scores on the illness coherence scale indicate the illness makes sense as a whole to the patient and

the high scores of the emotions scale indicate a positive emotional representations. Cause is measured using a eighteen-item Likert-type, five-point scale, ranging from strongly disagree to strongly agree. Subjects are instructed to rate their level of agreement with each item as a cause of the illness. Cause items indicate either an internal or external source as the cause of the heart attack. Items are scored from 1 to 5 with reverse scoring when appropriate. In the present study, each attribute score was summed separately and the total divided by the number of items.

The IPQ-R can be scored one of the two ways. Scores can be obtained for each of the attributes of illness representation, or as suggested by Petrie, Weinman, Sharpe, and Buckley (1996), the IPQ scores can be summed and used to quantify the subject's perception of illness as being more or less positive or negative in nature. Both approaches were used to examine data for this study. Higher scores indicating a larger number of somatic symptoms, a strong belief regarding internal causes of illness, belief that the illness will last a long time, greater perceived consequences of illness, and an inability to control or cure the illness, will be indicative of a negative perception of illness.

Having a positive illness representation means that the person accurately identifies symptoms and the cause of the illness, believes the problem is curable or controllable, the course of the disease is intermittent and that the level of disability or seriousness of the disease is low (Petrie et al., 1996; Scharloo et al., 1999). The IPQ-R has been used by a variety of subjects with heart disease and MI (Moss-Morris et al., 2002). The IPQ-R has been found to be reliable (Cronbach's alpha .75-.82) and stable across time (test-retest .46-.88, $p<.001$) (Moss-Morris et al., 2002).

Concurrent, discriminant and predictive validity have been established with MI subjects (Moss-Morris et al., 2002). Concurrent validity in MI patients was established by correlations with other measures of each of the attribute of illness representation. The attributes scores of the IPQ were found to discriminate among various disease processes. Attribute scores were found to be predictive of expected outcome measures at three to six months after an MI (Moss-Morris et al., 2002).

The target population for the present study was a healthy, community-dwelling sample who may or may not have experienced MI. With approval of authors of both IPQ and IPQ-R, some changes in wording were made. Because of the consideration of Chinese culture, the wording was changed to ask participants to imagine how people may view heart disease if they experienced a heart attack (see Appendix D).

Suinn-Lew Asian Self-Identity Acculturation Scale

The Suinn-Lew Self-Identity Scale (SL-ASIA) (Suinn et al., 1992; Suinn et al., 1995; Suinn et al., 1987) is a widely used instrument to assess the process of acculturation with the Asian American population. In addition to cognitive and behavioral characteristics such as language, cultural customs, and practice, the scale also takes into account values, ideologies, beliefs, and attitudes.

The SL-ASIA (Suinn et al., 1992; Suinn et al., 1995; Suinn et al., 1987) is a 21 item multiple-choice questionnaire using a Likert scale (see Appendix E for English version and F for Chinese version). The scale covers language (4 items), identity (4 items), friendship choice (4 items), behaviors (5 items), generation/geographic history (3 items), and attitudes (1 item). The scale asks how long participants have lived in the U.S., how long they have lived in a non-Asian neighborhood, how many years they have

attended school in the U.S., their age upon beginning school in the U.S., and their age on arriving in the U.S. Participants are asked whether English is their first language or not, and to rate their "primary values" on a five point scale, with 1 for very Asian to 5 for highly Western (Suinn et al., 1992).

A total value is obtained by summing across the answers for all 21 items. A final acculturation score is calculated by dividing the total value by 21. A score can range from 1.00 (low acculturation) to 5.00 (high acculturation). People who are highly acculturated or Western identified or assimilated represent a score of 5; those who are low in acculturation or Asian-identified represent a score of 1; and those who are bicultural represent the middle score of 3 (Suinn et al., 1992).

Suinn et al. (1987) tested the SL-ASIA 21-item sub-scale on a sample of students from two large universities in the U.S.. Reliability was calculated using an alpha coefficient (0.88) on all 21 items (Suinn et al., 1987). This indicates a good level of stability for the scale and a high internal consistency among the items. Validity was evaluated in three ways. The first was to examine the answer to question 20, "How would you rate yourself?" as if it were a separate self-rating scale. An analysis of variance was significant (F= 15.55, p<.0001). The means were: "very Asian" 2.49 (N=2); mostly Asian" 2.91 (N=10); "bicultural" 3.36 (N=8); "mostly Anglicized" 3.81 (N=29); and "very Anglicized" 4.14 (N=4) (Suinn et al., 1987).

Suinn et al. (1992) reported that the Cronbach's alpha for the SL-ASIA was .91 for the 21-item sub-scale based on a sample of 284 Asian American University students from Colorado. Concurrent validity was evaluated by performing a correlation between SL-ASIA scores and demographic information: total years attending school in the U.S.

The correlation and analysis of variance data confirmed the concurrent validity as a measure of acculturation for Asian Americans. Items with eigenvalues above 1.0 and factor loading above .50 were retained. Five factors were identified variance, Affinity for Ethnic Identity and Pride (6.6% of the common variance), Generational Identity (5.9% of the common variance), Food Preference (69.7% of the common variance), Reading, Writing, and Cultural Preference (45% of the common variance), Ethnic Interaction (10.7% of the common variance) (Suinn et al., 1992).

Suinn et al. (1995) found that the 21-item SL-ASIA sub-scale confirmed similarities between Singapore Asians and U.S. Asians on acculturation factors. Cronbach's alpha was .79. Singapore Asians achieved a score indicative of Asian identity, where Asian Americans obtained a mean score indicative of higher Western acculturation. Analysis was also done in this study using principal components analysis and eigenvalues of greater than 1.00. Resultant factors matched closely the five factors found in Suinn et al. (1992) and accounted for 65% of the variance. Reading/Writing/Cultural Preference accounted for 24% of the variance; Ethnic Interaction for 17%; Generational Identity, 9.5%; Ethnic Affinity and Pride, 8.2%, and Food Preference, 5.6% (Suinn et al., 1995).

Ponterotto, Baluch, and Carielli (1998) reviewed the psychometric strengths and limitations of the SL-ASIA 21 items sub-scale by looking at 16 studies that have used this instrument. Nine of the 16 studies together reported 12 coefficient alphas ranging from a low of .68 to a high of .91. Only one alpha level was below .70. The modal, alpha range was in the .80's. The coefficient alphas of the SL-ASIA across racial/ethnic groups (including combined Asian American groups, Chinese Americans, Korean Americans, and Japanese Americans) from 9 studies ranged from .83 to .91. (Ponterotto, Baluch, &

Carielli, 1998). However, the internal consistency was lower for English-speaking Asians in Singapore (coefficient alpha = .79), Japanese temporary residents (coefficient alpha = .72), and Cambodian/Vietnamese refugees (coefficient alpha = .68) (Ponterotto, Baluch, & Carielli, 1998).

Construct validity with convergent methods were also reported (Ponterotto, Baluch, & Carielli, 1998). Five studies showed strong and consistent convergent-relate evidence. Correlational and group mean differences methods were used to find that the SL-ASIA scores predictably related to years of schooling in the U.S., years living in non-Asian neighborhoods, self-rating of acculturation, generational level, English as a first or second language, total years living in the U.S., age upon entering the U.S., and country of residence (Ponterotto, Baluch, & Carielli, 1998).

Ownbey and Horridge (1998) tested the Sl-ASIA 21-item subscales with a non-student Asian Americans (Chinese Americans and Filipino Americans) sample (N=124) and reported Cronbach's alpha of .89. Concurrent validity was performed by correlating acculturation with the six demographic variables, years in school attendance in the U.S. and age upon beginning school in the U.S. accounted for the greatest variance in acculturation level. The study conducted by Suinn et al. (1992) showed similar results.

Healthy Heart IQ

The Healthy Heart IQ instrument (NHLBI and NIH, 1997) (see Appendix G) was developed by The National Heart, Lung, and Blood Institute and National Institute of Health to assess knowledge of heart disease and its risk factors and it is widely used online by various institutions (Johns Hopkins Bayview Medical Center, http://www.jhbmc.jhu.edu/healthy/stayinghealthy/lifestyle/heartiq.html; American Red

Cross, http://www.yc-arc.org/healthy_heart_iq.htm; University of Pittsburgh Health Sciences, http://www.health.pitt.edu/academic/MM1999/Heart10.5.99/quiz/cardioqu.htm; National Institute of Health Office of Science Education, http://science-education.nih.gov/homepage.nsf/0/CBF76C8E019AA26C852566F100758AB3?opendocument; Infoplease http://www.infoplease.com/ipa/A0762279.html). The Healthy Heart IQ is a 14 item true/false questionnaire. This scale asks questions related to modifiable risk factors of heart disease (1 item), symptoms of high blood pressure and high cholesterol (1 item), blood pressure (3 items), blood cholesterol (4 items), smoking (3 items), and weight (1 item).

Despite an extensive search (including contact with NIH and NHLBI), no published data about the reliability and validity of the original instrument was found. Thus, content validity was established with an expert panel consisting of 5 CVD experts (4 PhD prepared and 1 master's degree prepared). Lynn (1986) recommends a minimum of 5 experts to provide a sufficient level of control for chance agreement among experts examining the testing items. Waltz, Strickland, and Lenz (1991) recommend that content experts (a) link each item to the identified dimensions, (b) assess the relevance of the items to the content of the dimension, and (c) judge whether the item adequately represents the content of the dimension. For the present study, the experts were asked to follow these guidelines. They were asked to look at each item to determine if the item assessing knowledge of heart disease risk factors, then answer each question and provide a rationale for their answer to see if they were congruent with the published answer and rationale.

The selection of content experts should be based on clinical expertise, a history of publishing in referred journals, national presentations, and research on the phenomena of interest (Grant & Davis, 1997). The criterion used to select the content experts for the development of this instrument was clinical expertise in CVD and experience with providing care for cardiac patients.

Prior to completing the content validity scale, each member of the panel was provided information on the conceptual underpinnings of the instrument development (Grant & Davis, 1997). The five experts were given the content validity scale with an instructional note that listed the intended purpose of the instrument and provided directions that delineated what was expected of the expert. They were asked to determine the validity of the items, which assessed the content and relevancy of each item. The experts were also asked to judge whether the item adequately represented the content of the dimension. The experts rated each item using a 5-point Likert scale: (0) not applicable, (1) strongly disagree, (2) somewhat disagree, (3) agree, (4) somewhat agree, and (5) strongly agree. To judge the representativeness of each item, the experts were asked to circle true or false to indicate whether the item represented the dimension. The content validity scale also provided space for the expert to provide a written rationale for the answer given for each item to see if the rationale experts provided matched the original rationale came with the instrument.

To accept an item as valid, three of the five experts had to agree to strongly agree that it was a valid item (Lynn, 1986). The Content Validity Index (CVI) for the instrument was obtained by determining the proportion of the total number of items rated as valid by the experts over the total number of items in the instrument (Waltz, Strickland

& Lenz, 1991). The CVI for the entire scale was 0.93. Thirteen items of 14 items were rated as valid.

A pilot study was conducted to further establish validity and reliability in the Chinese American. This questionnaire was administered as an interview to five Chinese American volunteers. After reviewing each item, they were asked questions such as "what comes to mind when I ask you this question?" It was agreed to make all illness terms consistent with terms used in official publications in Taiwan.

Description of Sample

The sample for the study was comprised of 124 adult participants who completed all questionnaires. Eight participants chose the English version of the survey and 116 participants chose the Chinese version. A summary of the demographic characteristics of the subjects is presented in Table 1. A comparison of demographic variables by gender are presented in Table 2. Of the total 124 subjects, 40 (32.3%) were males and 84 (67.7%) were females. Their ages ranged from 25 to 73 with a mean of 43.46 years (SD = 9.452). Of the 21 subjects who returned the survey via U.S. mail, 7 (33.3%) were males and 14 (66.7%) were females, ages 25 to 60 with a mean of 46.33 years (SD = 9.345).

The educational level of the study participants was high with 37.9% (N=47) holding a graduate degree. Ten (8.1%) subjects had less than high school education level, thirty (24.2%) were high school graduates, and thirty-seven (29.8%) were college graduates. Employment status showed that majority of subjects worked full time (84.7%, N=105). Only 8.1% (N=10) of subjects worked part time, 4.8% (N=6) of participants were retired and 2.4% (N=3) answered "other" with no further explanation. The majority

of participants (N= 100, 80.6%) were married. The others were single 17 (13.7%), separated or divorced 2 (1.6%), or widowed 5 (4%). Ninety-nine (79.8%)

Table 1. Characteristics of participants.

Gender		
Male	40	32.3%
Female	84	67.7%
Age		
20-29	3	2.4%
30-39	49	39.5%
40-49	41	33.1%
50-59	27	21.8%
60-69	3	2.4%
70-79	1	0.8%
Age Range = 25-73		
Mean Age = 43.46 (S.D. = 9.4520		
Marital Status		
Married	100	80.6%
Single	17	13.7%
Separated/Divorced	2	1.7%
Widowed	5	4.0%
Other	0	0%
History of Cardiovascular Disease		
No	99	79.8%
Yes	25	20.2%
Family History of Cardiovascular Disease		
No	61	49.2%
Yes	63	50.8%
Education Level		
Less than high school	10	8.1%
High school graduate	60	24.2%
Some college	0	0%
College graduate	37	29.8%
Graduate school	47	37.9%
Employment		
Full time	105	84.7%
Part time	10	8.1%
Retired	6	4.8%
Unemployed	0	0%
Other	3	2.4%

reported no previous history of heart disease and 25 (20.2%) reported having a history of heart disease. Sixty-three (50.8%) participants reported a positive family history of heart disease and 61 (49.2%) participants reported no family history of heart disease.

Table 2. Demographic variables between men and women.

	Male	Female
Age	43.37 ± 11.20	43.52 ± 8.40
Marital Status		
Married	63.2%	90.1%
Single (Never married)	28.9%	4.9%
Separated or divorced	2.6%	1.2%
Widowed	5.3%	3.7%
History of Heart Disease		
Yes	7.9%	24.7%
No	92.1%	75.3%
Family History of Heart Disease		
Yes	50%	49.4%
No	50%	50.6%
Educational Level		
Less Than High School	5.3%	9.9%
High School Graduate	34.2%	21%
Some College	0%	0%
College Graduate	31.6%	29.6%
Graduate Degree	28.9%	39.5%
Employment Status		
Full Time	86.8%	82.7%
Part Time	5.3%	9.9%
Retired	5.3%	4.9%
Unemployed	2.6%	2.5%

This study was advertised online on a national Chinese News website, in a Chinese newspaper, and on flyers at Chinese-aggregated churches. Because of the nature of this methodology, the return rate can not be estimated. All participants completed questionnaires within an 8 months time frame. Among the 124 sets of questionnaires returned, twenty-one participants printed out the survey online voluntarily, completed the survey and mailed back to the study investigator. Demographic variables between the Internet sample and mail sample are presented in Table 3. Levene test was performed to

determine if the variance in the two groups was equal (homogeneity). The Levene's tests for age and gender were not significant therefore equal variances should be assumed (Levene, 1960). The results showed similar ages (mean age of 42.87 for online group and 46.33 for mail group) and gender (68% female for online group and 66.7 % female for mail group). T-test statistic procedure was performed to compare means between online and mail groups. There were no significant differences in illness perception scores based on age, gender, history of CVD, or educational level.

The description of the sample in the present study was similar to those in other online studies. The majority of the subjects were female, married, highly educated with

Table 3. Demographic variables between Internet and Mail Group.

Variable	Internet	Mail
Gender		
Male	32%	33.3%
Female	68%	66.7%
Age	42.87±9.41	46.33±8.06
Marital Status		
Married	79.6%	93.8%
Single	13.6%	6.3%
Separated/Divorced	1.9%	0%
Widowed	4.9%	0%
History of Cardiovascular Disease		
No	78.6%	93.8%
Yes	21.4%	6.3%
Family History of Cardiovascular Disease		
No	55.3%	93.8%
Yes	44.7%	6.3%
Education Level		
Less than high school	9.7%	0%
High school graduate	29.1%	0%
College graduate	24.3%	68.8%
Graduate school	36.9%	31.3%
Employment		
Full time	81.6%	100%
Part time	9.7%	0%
Retired	5.8%	0%
Unemployed	0%	0%
Other	2.9%	0%

relatively younger age (Burnfield & Rogelberg, 2003). The demographics of study participants are consistent with the profile of U.S. online population. Recent data from Harris Interactive revealed a similar profile of online population of young female with high education and high household income (Taylor, 2003). A similar profile was also reported by Jupiterresearch.com (Sehgal, 2004). Other demographic figures from Nielsen/NetRatings (September, 2003) indicated that women were responsible for the majority of Internet traffic – 51.4 percent vs. 48.6 percent.

Data Collection Procedure

Written approvals for the study were obtained from the School of Nursing Departmental Review Committee and the Institutional Review Board (IRB) of the University of Texas at Austin. Potential subjects were asked to fill out a short questionnaire to determine their eligibility. Qualified subjects were requested to read through a consent form explaining in details the nature and possible consequences of the study and to click "I Agree" before they continued participating in the study. Participants were asked to answer questions from four different instruments: demographic data sheet, the Hearthy Health IQ, Acculturation Scale (SL-ASIA), and Illness Perception Questionnaire – Revised (IPQ-R).

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) (SPSS Inc., 2000). Sociodemographic data was described using frequencies, percentages, means and standard deviations as appropriate. The reliability coefficients (Cronbach's alpha) for internal consistency of the instruments were calculated. Pearson-Product Moment Coefficient was used to describe the relationship among major variables

obtained from the demographic data, Healthy Heart IQ, the Illness Perception Questionnaire, and Acculturation scale. The association among the variables was analyzed using a simple correlation matrix ($\alpha \leq 0.05$).

Research Question 1: What are the illness representations of Chinese Americans about the causes, seriousness, curability and controllability of cardiovascular disease?

This question was answered using descriptive statistics to describe illness identity, cause, time-line, consequences, controllability, illness coherence and emotional representations of CVD as measured by Illness Perception Questionnaire - Revised.

Research Question 2: How accurate is the knowledge of Chinese Americans about cardiovascular disease?

This question was answered using descriptive statistics to describe the accuracy of participants' answer to each of the 14 questions presented in the Healthy Heart IQ questionnaire.

Research Question 3: What is the influence of acculturation level on Chinese Americans' illness representation on knowledge of cardiovascular disease?

Pearson Product Moment Correlation was used to analyze the relationship between acculturation level and participants' illness representation score.

Research Question 4: What is the relationship between knowledge of cardiovascular disease and illness representation in Chinese Americans?

Pearson Product Moment Correlation was used to determine the association between illness representation and knowledge of CVD while controlling for relevant sociodemographic factors (i.e. gender, age, and marital status) and history of CVD.

Summary

A cross-sectional design was used in this descriptive study to study the illness representation of Chinese Americans and their knowledge about CVD risk factors, and to explore the relationships among illness representation and acculturation level. A convenience sampling process was used to recruit study subjects online. A description of the sample was included in this chapter. Illness representation was measured using Revised Illness Perception Questionnaire (IPQ-R) (Weinman et al., 1996). Knowledge of CVD was measured using Healthy Heart IQ (NHLBI, 1997). Acculturation level was measured using Suinn-Lew Asian Self-Identify Acculturation Scale (SL-ASIA) (Suinn et al., 1995). Descriptive statistics, Pearson-Product Moment Coefficient and correlation were used to analyze the data.

CHAPTER 4: PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

In this chapter, the results of data analysis are presented, beginning a preliminary analysis of data, followed by analysis of research questions. An interpretation of the data is provided.

Preliminary Analysis of Data

This section presents the results from the study instruments – the Illness Perception Questionnaire - Revised (IPQ-R), the Acculturation scale (SL-ASIA) and the Healthy Heart IQ. Correlations among the major variables are also presented.

Results from the Study Instruments

The Illness Perception Questionnaire-Revised (IPQ-R)

The Illness Perception Questionaire – Revised (IPQ-R) was used to measure patients' cognitive and emotional representations of their illness (Moss-Morris et al., 2002). The first part of questionnaire measures the illness identity dimension with a list of 15 commonly occurring symptoms: fatigue, nausea, difficulty breathing, chest pain, dizziness, anxiety, headache, upset stomach, irregular heart beat, flu-like symptoms, sweats, tingling, coughing, and loss of strength (Appendix C). Participants were asked to rate whether they thought people with heart disease would have experienced each symptom and whether they believed the symptoms to be specifically related to heart disease (yes or no). The summed yes-rated items on the second question form the illness identity scale with higher scores indicating a stronger belief that the experienced symptoms are part of the patient's illness.

The second part of the IPQ-R consists of 38 statements using 5-point Likert scales (range "strongly agree" to "strongly disagree") and provides separate scores for the consequences, time line (divided into the subscales of cyclical timeline and acute/chronic timeline), control (divided into personal control subscale and treatment control subscale), illness coherence, and emotional representation scales. High scores indicate stronger beliefs in serious consequences of the disease, a chronic long-term disease, illness or symptoms as cyclical in nature, the patients' own ability to control symptoms, and the effectiveness of treatment in controlling the illness. Higher scores on the illness coherence scale indicate a higher degree to which people believe they have a coherent model of the illness, and higher scores on the emotional representations scale indicate a stronger emotional response to illness.

The third part includes questions about causal attributions and it uses the same 5-point scale and consists of 18 items. The author recommends that only the causal attributions that were endorsed by more than 20% of the group be included in analysis and that each item should be examined separately. Means ($\pm$ SD) and reliability coefficients (Cronbach's α) for the IPQ-R scales are shown in table 4. Reliability coefficients ranged from 0.70 to .94, indicating satisfactory internal consistency. In order to allow a comparison of the present sample's illness representations with those of other illness groups, the IPQ-R was re-scored so that it replicated the IPQ. As recommended by the authors, items from the original IPQ scale were included unchanged in the IPQ-R (Moss-Morris et al., 2002). Direct comparison of the two questionnaires verified this claim. Therefore, transforming the IPQ-R into the IPQ was acompalished by

Table 4. Mean scores (± SD) and internal reliability scores (Cronbach's α) of the Illness Perception Questionniare-Revised (IPQ-R) scales

Scales IPQ-R	Mean ± SD	Cronbach's α
Illness identity		
Experienced symptoms	7.02 ± 4.15	0.94
Consequences	19.14 ± 3.52	0.84
Timeline Cyclical	11.98 ± 2.09	0.71
Timeline Acute/chronic	17.28 ± 3.37	0.80
Control		
Personal	20.26 ± 2.77	0.72
Treatment	16.36 ± 2.19	0.70
Illness coherence	14.76 ± 3.16	0.82
Emotional representations	16.02 ± 2.65	0.86

excluding the newly added items. The four casual attribution subscales from the IPQ-R were deconstructed and each belief treated as a separate scale (Except for "other people's behavior" which wasn't included in the IPQ-R). The following subscales were re-scored and are equivalent to those found in the IPQ: identity, consequences, timeline, control, and causal attributions (7 subscales).

Data analysis revealed that correlations between the IPQ and IPQ-R subscales for the identity, consequences, and timeline subscales exceeded .95 ($p < .0$, two-sided). Cure/controllability produced a correlation of .80. Correlations between the causal attribution subscales were not performed due to substantial differences in item aggregation. However, re-scoring necessitated the exclusion of coherence, emotional representations, and timeline (cyclic) and did not allow differentiation between treatment and personal control. Thus, IPQ-R scores are also included in the discussion since the measure represents a fuller explication of the illness representation construct.

The first part of the IPQ-R measured identification of symptom experience. The identity scores refer to perceived number of symptoms and are divided into number of actual symptoms and CVD related symptoms. The mean actual symptoms was 7.02 (SD = 4.15) with range from 0 to 15 and the mean CVD related symptoms was 5.81 (SD = 5.41).

The most frequently cited symptoms that participants believed that people with CVD have included palpitation (86%), chest pain (84%), shortness of breath (79%), tiredness (61%), and dizziness (53%). The most frequently cited symptoms that the participants identified as related to CVD included palpitation (81%), chest pain (74%), shortness of breath (70%), and fatigue (53%).

The mean score of consequences subscale indicated the belief in degree of seriousness of the disease. Participants of the present study had a mean consequences score of 19.14 (S.D. = 3.52) which indicated that Chinese Americans who participated in this study had relatively high consequences scores, similar to patients with cancer (19.43 $\pm$ 4.28) (Scharloo, Baatenburg de Jong, Langeveld, Velzen-Verkaik, & Akker, et al., 2005) and cardiac patients (19.90 $\pm$ 4.43) (Grace, Krepostman, Brooks, Arthur, & Scholey et al., 2005). High consequences scores indicated stronger belief in serious consequences of heart disease. Results from the consequences subscale indicated Chinese Americans who participated in this study strongly believed heart disease is serious and will have a significant impact to their life.

Scores on the acute/chronic timeline dimension of the IPQ-R reflect expected duration of the illness. The mean score for Timeline dimension was 17.28 $\pm$ 3.37, higher than cancer patients (16.52 $\pm$ 3.79) (Scharloo, et al., 2005) and lower than patients with

chronic illness such as diabetes (18.8 ± 3.0) (Barnes, Moss-Morris & Kaufusi, 2004). A lower score indicates that the perceived duration of the illness is short and that the illness will improve in time, whereas a higher score indicates perceptions that the illness is more likely to be permanent rather than temporary. The scores on cyclical timeline of the IPQ-R reflect how unpredictable the illness and its symptoms are perceived. For the cyclical timeline subscale, participants of this study had a high mean score of 11.98 with S. D. of 3.52, compared to patients with head and neck cancers (9.92 ± 3.06) (Scharloo, et al., 2005) and cardiac patients from other studies (10.80 ± 3.17) (Grace et al., 2005). High scores in the cyclical timeline subscale indicated a strong belief that illness or symptoms are cyclical in nature. Participants of this study strongly believed heart disease and heart disease symptoms might come and go for a long period of time.

Participants had medium personal control scores (20.26 ± 2.77) compared to head and neck cancer patients (18.77 ± 3.78) or cardiac patients (24.48 ± 3.49) (Grace et al., 2005). Personal control scores indicated perceived personal ability to control symptoms. Because of the nature and prognosis of the illness, it's logical that people had higher perceived control over heart diseases than over cancer. However, participants from this study were from a community sample with or without history of heart disease. It's possible that participants had higher personal control scores compared to cardiac patients because of their lack of experience with heart disease.

Mean scores of the treatment control subscale indicated the beliefs of the effectiveness of treatment in controlling the illness. Participants had lower scores (16.36 ± 2.19) than cancer (17.46 ± 2.86) (Scharloo, et al., 2005) and cardiac patients (19.69 ± 2.67) (Grace et al., 2005). Even though cardiac patients are expected to have higher

perceived control over effectiveness of treatment than cancer patients, their knowledge and experiences about available treatments may explain the low scores. The subscale had the lowest internal reliability scores compared to other subscales. A further evaluation of fit for this subscale among healthy community subjects is needed.

Higher illness coherence scores indicate a more coherent model of illness. Participants of this study had slightly lower coherence scores (14.76 $\pm$ 3.16) than patients with head and neck cancers (15.79 $\pm$ 3.78) (Scharloo et al., 2005). Lower scores indicated participants of this study had a less coherent model towards heart disease and the illness made sense to the participants in a less strong sense compared to cancer patients. Scores of emotional representations subscale indicate the degree of emotional response to illness. Participants of this study had lower emotional representations mean scores (16.02 $\pm$ 2.65) compared to cancer patients (19.21 $\pm$ 5.54) (Grace et al., 2005). Lower emotional representations mean score indicated less emotional response towards heart disease. It's uncertain whether this lower degree of emotional response was due to the community sample versus patients with known heart disease.

Suinn-Lew Asian Self Identify Acculturation Scale (SL-ASIA)

Acculturation styles were assessed using SL-ASIA (Suinn, Rickard-Figueroa, Lew & Virgil, 1987). This instrument originally consisted of 21 items, and used a 5-point scale to assess participants' preferences across a number of areas, including language (What language can you speak?), identity (How do you identify yourself), friendships (What was the ethnic origin of your friends and peers you had?), behaviors (What is your music preference?), generational and geographic background (Where were you raised?), and attitudes. Five items were later added that address values (rate yourself

on how well you fit when you are with other Asians of the same ethnicity), and self-identification (Which one of the following most closely describes how you view yourself?). However, 10 questions were deleted to decrease the length of the questionnaire to suit the custom of an online study (Dyson, 2004; Shaikh, 2005). Short questionnaires and short line length facilitated faster reading and promoted a longer attention span (Dyson, 2004). These 10 deleted questions were viewed as repeated questions that measured the same areas (2 from language area, 2 from identity area, 3 from friendships area, 2 from geographic background area, and 1 from attitude area). For example, question number 1 ask "What language can you speak" and question 2 asked "what language do you prefer". The researcher felt that a person's preference of language is the choice of language and that it better reflects that person's level of acculturation than the person's capability with languages. Therefore, question number 1 was deleted. Another example is from the identity area. Questions number 4 and 5 were deleted because they asked the identity of father and mother. It's more important to know how participants identify themselves than to know about their parents' identity. As a result, question number 3 was kept for this study to assess the identity area of participants.

Possible scores of the SL-ASIA can range from a low of 1.0 to a high of 5.0. The original method of interpretation suggested by Suinn, et al., (1987) placed individuals on a continuum from Asian-identified to western-identified, on the basis of a single summary score, obtained by computing the mean of all items. A person retaining a high Asian identity (Asian-identified) is one whose values, behaviors, preferences, and attitudes reflect the traditional Asian cultural practice. A person with a high Western

identity (Western identified) is one whose values, behaviors, preferences, and attitudes reflect the Western cultural practice. Bicultural individuals are those who obtain scores in the mid-range, although the authors have provided no specific cut-off scores for such classification.

The SL-ASIA scale reflects an orthogonal, multidimensional perspective of acculturation and is the most widely used measure to study acculturation among Asian Americans (Abe-Kim, Okazaki & Goto, 2001; Costigan & Su, 2004). However, using the original scoring methods, the scale has been used as a measure to assess one's degree of acculturation as a linear, continuous construct. This scale also contains limitations in identifying some salient aspects of acculturation processes, particularly the phenomena in which individuals identify with both or neither Western or Asian culture (Costigan & Su, 2004). Mean scores of the SL-ASIA and its distribution are presented in Table 5.

Table 5. Mean scores and percentage of the SL-ASIA

Acculturation Scale Mean	**N**	**Percent**
1.00-1.99	52	41.94%
2.00-2.99	64	51.61%
3.00-3.99	8	6.45%
4.00 and above	0	0%
Total	124	100%

Responses on the SL-ASIA scale ranged from a low of 1.71 to a high of 3.41. The mean SL-ASIA score was 2.23, with a standard deviation of .45. Nearly half (41.94%) of participants reported low acculturation or Asian-identified, with the SL-ASIA scale score below 2, and another 51.61% of the sample population with their SL-ASIA scores falling between 2 and 2.99. Eight of 124 participants (6.45%) scored greater than 3 on the SL-ASIA scale. In summary, the majority of participants of this study retained high Asian identity with traditional Asian cultural practice and these people are considered less acculturated. Slightly over half (51.61%) of participants obtained a mid-range mean score on Acculturation Scale and are in the category of bicultural group. They are somewhat acculturated but still retain some degree of traditional cultural practice. Only 6.45 percent (N=8) scored higher than 3 indicating that these individuals have high Western identity and are the most acculturated group of all participants.

Questions 1, 9 and 10 represented language preferences and the results are presented in Table 6. Forty-six (37.1%) participants only spoke Chinese and 41 (33%) of participants identified themselves as speaking mostly Chinese and some English. A quarter of participants (25%) reporting using equal amount of Chinese and English in their daily life and only 1% identified themselves as English only person. Question 9 asked for reading preferences. Thirty four (27.4%) participants could read only Chinese, and 65 participants (52.4%) said reading Chinese was easier than reading English. Nineteen (15.3%) participants indicated they could read English as well as read Chinese and only one percent said they could read English only. Question 10 asked about writing preferences and similar results were found in questions 1 and 9. Thirty six (29%) participants could only write in Chinese, 76 (61.3%) reported they could write in Chinese

better than they in English, 5 participants (4%) said they could write in English as well as they could in Chinese, and only 2% of participants said they could write either only in English or they write better in English than in Chinese.

Table 6. Language preferences results.

Language Preferences	N	Percent
Speaking Language Preferences		
Chinese Only	46	37.1%
Mainly Chinese, some English	41	33%
Equally well in Chinese and English	31	25%
Mainly English, some Chinese	1	0.8%
English only	0	0
Reading Language Preferences		
Chinese Only	34	27.4%
Mainly Chinese, some English	65	52.4%
Equally well in Chinese and English	19	15.3%
Mainly English, some Chinese	0	0
English only	1	0.8%
Writing Language Preferences		
Chinese Only	36	29%
Mainly Chinese, some English	76	61.3%
Equally well in Chinese and English	5	4%
Mainly English, some Chinese	1	0.8%
English only	1	0.8%

Question 2 represented identity. The majority of the participants (87.9%, N=109) identified themselves as Chinese, one participant identified as Asian, 7 participants (5.6%) identified as Chinese American and only 1 (0.8%) identified as American.

Question 3 focused on friendship. Over half of participants (63.7%, N=79) said all of their friends are Asians or Asian Americans, 10 (8.1%) said most of their friends are Asians or Asian Americans, 14 (11.3%) said half of their friends are Asians and half are non-Asian Americans, 13 (10.5%) said all of their friends are non-Asian Americans.

Question 4, 5 and 8 examined participants' acculturation level in the behavioral aspects of music, movie and food preferences. Results are presented in Table 7.

Table 7. Behavioral preferences from SL-ASIA.

Behavioral Preferences	N	Percent
Music		
Chinese music only	70	56.5%
Mostly Chinese music	21	16.9%
Equal amount of Chinese music and English music	22	17.7%
Mostly English music	3	2.4%
English music only	3	2.4%
Movie		
Chinese movie only	50	40.3%
Mostly Chinese movie	17	13.7%
Equal amount of Chinese movie and English movie	10	8.1%
Mostly English movie	41	33.1%
English movie only	1	0.8%

Food		
Chinese food only	82	66.1%
Mostly Chinese food	8	6.5%
Equal amount of Chinese food and American food	13	10.5%
Mostly American food	1	0.8%
American food only	0	0%

Over 90% of the participants identified themselves as first generation immigrants – foreign born immigrants (Table 8). One identified himself/herself as 2nd generation – U.S. born children of immigrants. Five selected do not know or others. The results from question 7 coincided with the generational question. One hundred fifteen (92.7%) reported lived in Asia for one or more years and only 4 (3.2%) reported going to Asia once a while.

Questions 11, 12 and 13 were related to an attitude of acculturation. Detailed results are presented in Table 6. Over half (55.6%, N=69) were very proud of their Chinese culture, and no one reported a negative attitude toward their Chinese background. Question 12 asked how participants rated themselves on level of acculturation. Sixty-nine (55.6%) rated themselves as very Chinese, only 6 rated themselves as bicultural and only 1 rated himself/herself as mostly Westernized. Question 13 asked participants how often they would participate in traditional occasions. Results from this question revealed a somewhat different pattern compared to two previous questions. Forty-three (34.7%) participants reported participation in most Chinese occasions while more than half (N=71, 57.25%) reported very limited involvement in

Table 8. Generational and geographic information from SL-ASIA.

	N	Percent
Generation of Immigrants		
1st generation	118	95.2%
2nd generation	1	0.8%
Do not know	2	1.6%
Others	3	2.4%
Geographic Background		
Lived in Asia for one or more years	115	92.7%
Lived in Asia for less than one year	0	0%
Travel to Asia once a while	4	3.2%
Have contacts in Asia	0	0%
No contacts with Asia	0	0%
Did not answer	5	4%

Chinese occasions. Of these, 71 participants (57.25%), 25 (20.2%) said they participated in only a few Chinese occasions, and 22 (17.7%) said they do not go to any Chinese occasions. This may be explained by the availability of Chinese events and occasions in different geographical areas.

Reliability of the scale was estimated using Cronbach's alpha. For this study, the Cronbach's alpha calculated for SL-ASIA was .83, comparable to the internal-consistency estimates of .91 reported by Suinn et al. (1992), .88 reported by Suinn et al. (1987), and .89 reported by Atkinson and Gim (1989). According to Nunnally's

recommendations (1978), a reliability level of .83 is considered acceptable for the type of research conducted in the present study.

Healthy Heart IQ

The Healthy Heart IQ is a 14-item questionnaire to assess knowledge of heart disease and its risk factors. The questions are provided in a true/false question format. After completing all questions, participants saw the answers with rationale for each answer. This scale is categorized into the following groups: risk factors of heart disease (1 item), symptoms of high blood pressure and high cholesterol (1 item), blood pressure (3 items), blood cholesterol (4 items), smoking (3 items), weight (1item), and general information (1item). In order to establish the content validity of the Healthy Heart IQ, a panel of experts was selected to evaluate each question. The Content Validity Index (CVI) was the proportion of the total number of items rated as valid by the experts over the total number of items in the instrument (Waltz, Strickland, & Lenz, 1991). The CVI for the entire scale was 0.93 and thirteen items from original 14 items were rated as valid. All 14 items from the original questionnaire were selected for this study because of the high CVI. Results for all questions are displayed in Table 10. There were 21 missing or incomplete data sets for this scale. Those 21 participants answered other questions but they left this questionnaire blank. There was no pattern observed so it was uncertain why 21 participants decided to omit some questions for this survey. However, it is possibly due to long length of the survey (7 web pages) and Healthy Heart IQ was on the last web page of the survey.

Every participant who answered the question (N=103 with 21 missing data) knew that a blood pressure greater than or equal to 140/90 mmHg is considered to be high.

Table 9. Attitude of acculturation.

Attitude	N	Percent
How much pride do you have in your culture group?		
Very proud of Chinese culture	67	54%
Somewhat proud of Chinese culture	18	14.5%
A little proud of Chinese culture	3	2.4%
Not feeling proud but no negative feeling	31	25%
Not proud and feel negative about Chinese culture	0	0%
Do not answer	5	4%
How would you rate yourself?		
Very Chinese	69	55.6%
Mostly Chinese	43	34.7%
Bicultural	6	48%
Mostly Western	1	0.8%
Very Western	0	0
Do not answer	5	4%
Do you participate in Chinese occasions?		
Nearly all	43	34.7%
Most of them	5	4%
Some of them	24	19.4%
A few of them	25	20.2%
None of all	22	17.7%
Do not answer	5	4%

Participants understood that the best ways to treat and control blood pressure are to control weight, exercise, eat less fat, restrict alcohol intake and take blood pressure medicine (N=103 with 21 missing data). All participants answered the following three questions correctly: lowering blood cholesterol levels can help people who had a heart attack, quitting smoking can help reduce chances of having a second heart attack, and the best way to loss weight is to increase physical activity and eat fewer calories.
Sixty four (62.14%) participants indicated that the modifiable risk factors included high blood pressure, high blood cholesterol, smoking, obesity and physical inactivity. The majority of participants (N=102, 99%) realized that a stroke is often the first symptom of high blood pressure, and a heart attack is often the first symptom of high blood cholesterol. Even though participants knew the normal range of blood pressure and ways to control high blood pressure, only 15.53% (N=16) knew high blood pressure is more common in blacks than whites.

Questions 6, 7, 8 and 9 tested knowledge related to cholesterol. Participants knew lowering blood cholesterol can help people who have had a heart attack, but only 30% (N=31) knew the recommended blood cholesterol level. Most of the participants (N=87, 84.46%) knew the most effective way to lower blood cholesterol is to eat food low in saturated fat. See complete Healthy Heart IQ questionnaire, answers and rationale for each question in Appendix G.

There were 43.69% (N=45) of participants who knew children from high risk families with high cholesterol need to have their blood cholesterol levels checked. Questions 10, 11 and 12 tested knowledge related to smoking. Over 72% of participants

Table 10. Results of the Healthy Heart IQ (Valid sample = 103)

Healthy Heart IQ	N	Percent Answering Correct
Q1. The risk factors for heart disease that you can do something about are: high blood pressure, high blood cholesterol, smoking, obesity, and physical inactivity.	64	62.14%
Q3. A blood pressure greater than or equal to 140/90 mm Hg is generally considered to be high.	103	100%
Q4. High blood pressure affects the same number of blacks as it does whites.	16	15.53%
Q5. The best ways to treat and control high blood pressure are to control your weight, exercise, eat less salt (sodium), restrict your intake of alcohol, and take your high-blood-pressure medicine, if prescribed by your doctor.	103	100%
Q6. A blood cholesterol of 240 mg/dL is desirable for adults.	31	30%
Q7. The most effective dietary way to lower the level of your blood cholesterol is to eat foods low in cholesterol.	87	84.46%
Q8. Lowering blood cholesterol levels can help people who have already had a heart attack.	103	100%
Q9. Only children from families at high risk of heart disease need to have their blood cholesterol levels checked.	45	43.69%
Q10. Smoking is a major risk factor for four of the five leading causes of death including heart attack, stroke, cancer, and lung diseases such as emphysema and bronchitis.	75	72.81%
Q11. If you have had a heart attack, quitting smoking can help reduce your chances of having a second attack.	103	100%
Q12. Someone who has smoked for 30 to 40 years probably will not be able to quit smoking.	16	15.53%
Q13. The best way to lose weight is to increase physical activity and eat fewer calories.	103	100 %
Q14. Heart disease is the leading killer of men and women in the United States.	88	85.43%

(N=75) understood smoking is a major risk factor for heart attack, stroke, cancer, and lung disease. Only 15.53% (N=16) agreed that older smokers are more likely to succeed at quitting smoking than younger smokers. Eighty-five percent of participants selected true for question 14 of heart disease is the leading killer of men and women in the U.S., similar to a 90% finding reported in another recent survey (Margellos-Anast, Estarziau, & Kaufman, 2006). Overall, scores ranged from 42.86 to 71.43. More than half (54.4%) scored 55 or lower with a mean score of 57.76 (SD = 12.73).

Analysis of Research Questions

This section presents the findings with an analysis for each research question. The significance level set for this study was $p<.05$. Descriptive statistics were used to answer question 1 and 2 and Pearson Product Moment Correlation was performed to answer question 3 and 4.

Research question 1

What are the illness representations of Chinese Americans about the causes, seriousness and controllability of CVD?

This question was answered by conducting descriptive statistics on the data collected using the Illness Representation Questionnaire. The results indicated that there were no strongly held beliefs about the number of symptoms attributed to CVD. Potential causes of CVD were identified as: stress and worry, hereditary, germ or virus, diet or eating habits, chance or bad luck, poor medical care in the past, pollution in the environment, people's own behavior, mental attitude, family problems, overwork, emotional state, aging, alcohol, smoking, accident or injury, personality, and altered immunity. Participants perceived stress, food or diet habits, overwork and altered

immunity as the greatest causes of their CVD. Men were more likely to attribute causation to stress and overwork and women more likely to blame stress and heredity. There were no significant differences in causes of illness perception based on whether participants had personal history or family history of heart disease. In contrast to the study conducted by Davis, Winkeby, and Farguhar (1995), there were no differences in the beliefs of perceived causes for CVD based on educational level. However, it is interesting to note that participants with less than high school education had stronger beliefs about heredity and aging being causes of CVD. Participants with college or high education believed stress and heredity are more likely to be the causes of CVD than any other causes listed in the questionnaire. The causes of CVD were derived from IPQ-R items C1 to C18 and results are displayed in Table 11.

Beliefs about perceived causes of CVD were diverse. Nearly 80% of participants said they agreed or strongly agreed that stress (C1) is a cause of heart disease and a similar percentage of participants (71%) believed people's emotional state such as feeling down, lonely, anxious or empty could cause a heart attack. Ninety-eight percent of participants agreed or strongly agreed genetic or family history is an important risk factor for getting heart disease. Almost 67% did not believe bacteria or virus infection are related to heart disease, while 20.9% of participants were not sure. The majority of participants (72.5%) believed diet or eating habit is one of the reasons to have heart disease. Only 12.9% believed having heart disease had anything to do with chances or bad luck. About half of participants (54.8%) believed heart disease is a result of poor medical care in the past though 29.8% disagreed. Forty-six percent said environmental pollution is a cause of heart disease while 41.1% of participants disagreed. More than

seventy percent (70.9%) of participants believed people's own behavior is one of the causes for heart disease with 28.2% who disagreed. Fifty-five percent of participants agreed or strongly agreed people's mental attitude such as thinking about life negatively is a possible cause of heart attack. There were 66.2% who believed family problems or worries could cause heart attack while 12.9% disagreed.

Ninety-one percent of participants believed aging is a precipitating factor with 5.6% answered neither agree or disagree and 2.4% answered disagree. The majority of participants (83.9%) agreed overwork can cause a heart attack and only 58% of

Table 11. Perceived causes of cardiovascular disease.

Causes	1=Strongly Disagree	2=Disagree	3=Neither Agree or Disagree	4=Agree	5=Strongly Agree
C1. Stress or Worry	0%	0.8%	21.8%	25.8%	51.6%
C2. Heredity – it runs in the family	0.8%	0%	0.8%	82.3%	16.1%
C3. A germ or virus	10.5%	56.5%	20.9%	3.2%	8.9%
C4. Diet or eating habits	0%	17.7%	9.7%	45.9%	26.6%
C5. Chance or bad luck	29.8%	42.7%	14.5%	12.9%	0%
C6. Poor medical care in the past	2.4%	27.4%	15.3%	47.5%	7.3%
C7. Pollution in the environment	2.4%	38.7%	12.9%	37.9%	8.1%
C8. People's own behavior	12.1%	16.1%	0.8%	59.6%	11.3%
C9. People's mental attitude, e.g. thinking about life negatively	0%	13.7%	31.4%	45.2%	9.7%
C10. Family problems or worries	0.8%	12.1%	20.9%	57.3%	8.9%

C11. Overwork	0%	2.4%	13.7%	61.3%	22.6%
C12. People's emotional state, feeling down, lonely, anxious, empty	0%	12.1%	16.9%	61.3%	9.7%
C13. Aging	0.8%	2.4%	5.6%	82.3%	8.9%
C14. Alcohol	0%	38.7%	3.3%	47.5%	10.5%
C15. Smoking	0%	39.5%	1.6%	46.7%	12.1%
C16. Accident or injury	11.3%	27.4%	12.9%	39.5%	8.9%
C17. Personality	0.8%	50%	3.2%	37.1%	8.9%
C18. Altered immunity	8.1%	3.2%	5.6%	69.3%	13.7%

participants agreed alcohol or smoking (58.8%) can cause a heart attack. It's interesting to note that 48.4% agreed accident or injury is a possible cause of heart attack while 51.6% of participants answered neither agree or disagree or disagree/strongly disagree. Another factor that had similar percentage of agree (46%) and disagree (50.8%) was personality. However, most of participants (83%) thought altered immunity had little to do with having a heart attack.

The relatively high timeline score (17.28 $\pm$ 3.37) indicates participants think CVD is a chronic condition. Participants had high mean consequence scores (19.14 $\pm$ 3.52) which is an indication for linking negative consequences with CVD.

In the cyclical dimension, participants had low cyclical scores (11.98 $\pm$ 2.09) suggesting they do not believe in a cyclical nature of the condition. They lack strong beliefs that CVD involves illness that come and go. High scores on personal control (20.26 $\pm$ 2.77) and treatment control (16.34 $\pm$ 2.19) are congruent with the assumption that CVD can be controlled and high personal and treatment control scores represent

positive beliefs about the controllability of the illness. Participants had low coherence dimensions mean score (14.76 $\pm$ 3.16) representing low personal understanding of the condition in study. The pattern of scores from seriousness and controllability subscale are comparable with other studies of cardiac patients or cancer patients (Grace et al., 2005). The findings of this study is congruent with the Common Sense Model of Illness Representation that each individual has his/her own explanation of a given illness.

Research question 2

How accurate is the knowledge of Chinese Americans about cardiovascular disease?

Descriptive statistics on the Healthy Heart IQ were used to answer this question. The mean knowledge score was 57.76% (ranged from 42.86% to 71.43%) with possible range or 0-100. Even though there are no other published data to compare, it seems reasonable to interpret 57.76% as a very low average score. A low mean score represents a lack of understanding of CVD. Only 62.1% of participants knew that high blood pressure, high blood cholesterol, smoking, obesity, and physical inactivity are modifiable risk factors for heart disease. Every participant knew the definition of high blood pressure (100%) and the consequences of high blood pressure (99%). However, only 12.9% knew high blood pressure is more common in blacks than whites.

Compared to knowledge of blood pressure, participants had lower accuracy level on their knowledge regarding cholesterol. Even though every participant knew lowering blood cholesterol levels can help people who have already had a heart attack, only 25% of participants knew a blood cholesterol level of 240 mg/dl is too high. About 70% (70.1%) knew eating food low in cholesterol is not the most effective way to lower the

level of blood cholesterol. Eating food low in saturated fat is considered the most effective dietary way to lower blood cholesterol (NHLBI, 2006). Results from question 9 indicated participants were not clear about screening schedules for cholesterol evaluation. Only 36.3% knew that children from families at high risk of heart disease need to have their blood cholesterol levels checked. Children from high risk families, in which a parent has high blood cholesterol (240 mg/dL or above) or in which a parent or grandparent has had heart disease at an early age, should have their cholesterol levels tested beginning at a young age (NHLBI, 2006).

While every participant knew quiting smoking can help reduce risk of having a second heart attack, only 60.5% agreed that smoking is a major risk factor for four of the five leading causes of death including heart attack, stroke, cancer, and lung disease such as emphysema and bronchitis. Only 12.9% of participants agreed that older smokers are more likely to succeed at quitting smoking than younger smokers.

Every participant agreed that the best way to lose weight is to increase physical activity and eat fewer calories. The last question asked if heart disease is the leading killer of men and women in the U.S. Eighty-five percent answered this question correctly. Even though there are no published data for Chinese Americans, this percentage seems similar compared to the general population (Margellos-Anast, Estarziau, & Kaufman, 2006).

The findings about knowledge from this study are comparable to those of Chen (1993), Chang et al. (2005), Shekelle & Liu (1978), and Zerwick, King, and Wlasowicz (1997). They are in contrast to the study by Davis, Winkleby, and Farguhar (1995), who found a statistical difference in knowledge levels in more educated individuals.

Research question 3

What is the influence of acculturation level on Chinese Americans' illness representations ?

This question was answered using Pearson Product Moment correlation. Acculturation level had significant correlations with timeline, timecycle, personal control, illness coherence, and emotional representations ($p<0.05$).

Participants of this study had a low mean acculturation score of 2.23 (S.D. = 0.45) with possible range of score of 1-5 (1 = very Asian and 5= highly Western). More than 40 percent of participants reported an acculturation score of 2 or less indicated low acculturation level or Asian-identified culture. The author of SL-ASIA questionnaire suggested classifying acculturation into 3 groups: low acculturation, bi cultural and Western-identified or assimilated (Suinn et al., 1992). However, the author also encouraged using different ways to interpret the scores. Since the majority of participants of this study had low acculturation levels with little variation, the researcher chose to use the raw scores from the SL-ASIA questionnaire to run the statistical analysis.

The correlations between SL-ASIA scores and Illness Perception Questionnaire (Table 12) showed that the more acculturated they were (high SL-ASIA score), the more likely participants were to think CVD is a chronic condition despite their level of education. Participants with low acculturation level were less likely to think the condition comes and goes. The more Asian identified by the participants, the more likely they were to have positive beliefs about the controllability of CVD. The stronger they were Asian-identified, the more likely they were to have better personal understanding of the illness and less likely to have high emotional stress over CVD. Even though the culture aspect of

illness representation is the least studied area, Kleinman's work (1980) on culture supports that illness representations are influenced by the cultural context. The results of the present study are congruent with Kleinman's (1980) explanatory model.

The acculturation process including its implication for illness perception (i.e. attitude toward heart disease and utilization of health services) (Ly, 2001; Pham & Harris, 2001) is particular relevant for Asian Americans and Chinese Americans who have relocated to the U.S. Even second-generation minorities are affected by the acculturation process, as they have been raised in homes with first generation parents (Pham & Harris, 2001). There may be conflicts between traditional cultural norms and values and the cultural customs of the host country that may create difficulties.

Table 12. Correlations between the SL-ASIA and the Illness Perception Questionnaire

	Pearson Correlation with SL-ASIA scores	Significant Level
Timeline	.180	.045
Timecycle	-.209	.020
Consequence	-.211	.019
Personal control	.211	.018
Treatment control	-.291	.001
Illness coherence	.523	.000
Emotional response	-.375	.000

Research question 4

What is the relationship between knowledge of cardiovascular disease and illness representation in Chinese Americans?

This question was answered using Pearson Product Moment correlation. The Healthy Heart IQ total score had significant correlations with time cycle, consequences of

illness, personal control, treatment control, illness coherence, and emotional representations.

With a growing awareness and knowledge of CVD, it is unknown if increasing knowledge is associated with preventive action. In his Common Sense Model of Illness Perception, Leventhal (1980) explained that people possess implicit schema for specific illness. The model hypothesized that people form illness representations when confronted with illness-related information that constitute a threat to health. If an individual's representation of the illness is interpreted as being sufficiently threatening, it is expected that he or she will adopt a coping strategy or procedure to manage the threat. This question was concerned with whether an individual's knowledge about CVD would affect that person's illness perception.

The knowledge of CVD was estimated using the correct percentage of Healthy Heart IQ. Correlations between Healthy Heart IQ scores and Illness Representation scores were calculated (Table 13). The higher the Healthy Heart IQ scores, the less likely participants perceived CVD as a condition that comes and goes (at 0.01 level). This indicates that the more an individual knew about CVD, the less likely he/she was to believe that the symptoms associated with CVD were cyclical in nature. However, when people knew more about CVD, they had stronger beliefs in the serious consequences of CVD (0.01 level). There was a significant relationship between the Healthy Heart IQ scores and personal control or treatment control scores. Participants who had better knowledge on CVD were less likely to believe their own abilities to control CVD and they held less stronger beliefs in the effectiveness of treatment (at 0.01 level).

Table 13. Correlations between the Healthy Heart IQ and Illness Perception Questionnaire

	Pearson Correlation with Healthy Heart IQ scores	Significant Level
Timeline	-.166	.095
Timecycle	-.166	.000
Consequence	-.750	.000
Personal control	-.611	.000
Treatment control	-.628	.000
Illness coherence	-.203	.040
Emotional response	.208	.035

Given the lack of literature on the relationship between knowledge and illness representation, it is difficulty to compare the strength of this relationship yielded from this study with other studies. However, based on the study conducted by Gu et al. (2002), improving knowledge of CVD may change an individual's perception of a given illness. The findings are consistent with the result reported by Gu et al. (2002).

Summary

The findings from the study instruments were reported. An analysis of each research question was provided. The results are consistent with Leventhal's Common Sense Model of Illness Representation. Data also confirmed that culture influences an individual's illness representation, consistent with Kleinman's model. Cronbach's alpha coefficients were computed to examine the internal consistency reliabilities of the Illness Representation Questionnaire, SL-ASIA, and Healthy Heart IQ. Pearson Product Moment Correlations were performed to examine the correlations among major study variables.

CHAPTER 5: SUMMARY, CONCLUSION, AND RECOMMENDATIONS

This chapter presents an overview of the study, discussion of study findings, discussion of the methodological issues, and conclusions drawn from the data. Implications of the results for nursing practice, education, and theory are discussed. Recommendations for future research are made.

Overview of the Study and Discussion of Study Findings

The purpose of this study was to evaluate Chinese Americans' perceptions and knowledge about CVD risk factors and to determine if acculturation had systematic effects on perception of illness. A descriptive study with a cross-sectional design was conducted. The theoretical framework for this study was based on Leventhal's Common Sense Model of Illness Representation (Leventhal, 1970; Leventhal, 1984; Leventhal & Cameron, 1987; Leventhal, 1990; Leventhal, Idler & Leventhal, 1999) and influenced by Kleinman's Explanatory model.

A convenience sampling technique was used. Subjects for this study were recruited from three sources: flyers at local churches, advertisement in a regional newspaper, and banner on a national Chinese news website. Potential subjects were asked to browse the study website to participate, and those who met the inclusion criteria were invited to participate. This study sample (N=124) included a high percentage of women (68%) who were well-educated. These characteristics were consistent with data gathered from other studies conducted online. Studies found that women are more likely to participate in online research despite the conventional wisdom that the web is male dominated (Reips, 2000; Baron, 2000). The age of participants ranged from 25-73 years old, with a mean age of 43.46 (S.D. = 9.5). The majority of the participants were married

(80%) and employed full time (84.7%). Almost 68% of the study participants had college or higher education, consistent with 2002 census report for Asian and Pacific Islanders (U.S. Bureau of Census, 2003). About half of the participants had a family history of CVD (50.8%) with only 20% personally reporting a history of CVD. The non-random nature of the convenience sampling method used in this study limits the generalizability of the findings.

The instruments used in the study included the demographic Data Sheet, the Illness Perception Questionnaire (IPQ) (Weinman, et al., 1996), Acculturation scale (SL-ASIA) (Suinn et al., 1992) and Healthy Heart IQ (NHLBI & NIH, 1997). Participants' perception of illness was obtained using Illness Perception Questionnaire. The Healthy Heart IQ was used to collect participants' knowledge of CVD. The Acculturation Scale was used to collect data about participants' acculturation level.

Data were analyzed using descriptive statistics, Pearson Product Moment Correlations and factor analysis were used. The results of the study were presented and discussed in chapter four.

Key findings are summarized here. In general, the Chinese Americans in this study believed symptoms indicative of CVD were palpitation, chest pain, shortness of breath, tiredness and dizziness. A low mean number of symptoms indicated participants believed there were low number of symptoms associated with heart disease. Participants in the study had high time-line scores (21) representing the belief that CVD will last a long time. A high personal control and treatment control score revealed that they believed that CVD can be controlled or cured. Participants had high scores on the consequences scale, showing the perception of serious consequences related to having a heart attack.

However, they had medium scores on the illness coherence scale and the emotional scale, indicating that they were not certain if CVD itself made sense as a whole. Study participants had lower scores on the emotional scale, representing a lower emotional stress due to CVD compared to cardiac patients or patients with cancer (Anagnostopoulos & Spanea, 2005).

Participants had low Healthy Heart IQ scores (Mean score = 57.77, S.D. = 12.73) indicating poor understanding of heart disease. Only 62.14% of participants knew the modifiable CVD risk factors are high blood pressure, high blood cholesterol, smoking, obesity, and physical inactivity.

Participants had better knowledge on items related to blood pressure and it's symptom than on items asking about prevention of CVD. Participants had low scores on items related to prevalence of heart disease and CVD related risk factors. Demographic factors including age, sex, marital status, education level and employment status did not show a significant difference on Healthy Heart IQ scores. Participants who had a history of CVD had similar Healthy Heart IQ compared to those who had no history of CVD. Family history of CVD did not affect their Healthy Heart IQ scores.

Other researchers found that individual's knowledge of CVD varied according to their history, level of education and socio-economic status (Montano, 2006; Mosca, Ferris, Fabunmi, & Robertson, 2004). Individuals with college or higher education knew almost twice as much about risk factors that affected cardiovascular health than did individuals with high school education level (Davis, Winkleby, & Farguhar, 1995; Mosca, Ferris, Fabunmi, & Robertson, 2004). More than 60% of the participants in the

present study had at least a college degree, yet the average knowledge scores remained low (Mean score = 57.77, S.D. = 12.73).

The effects of culture were measured using Suinn-Lew Asian Self-Identity Acculturation Scale (SL-ASIA), a widely used instrument to measure level of acculturation for the Asian American population which includes both cognitive and behavioral characteristics. Since 10 questions were deleted from the original questionnaire to reduce the length and to minimize repetition, the reliability of the questionnaire should be evaluated. Cronbach's alpha calculated for SL-ASIA scores was 0.85, slightly lower but comparable to the internal-consistency estimates of .88 reported by Suinn et al. (1987), .89 reported by Atkinson and Gim (1989). According to Nunnally's recommendation (1978), the reliability level of .85 is considered acceptable for the type of research conducted in the present study.

The questions of language preference had a significant relationship with the SL-ASIA mean score ($p<0.01$). The mean SL-ASIA score for those who preferred English as their first language showed higher acculturation level compared to those who preferred Chinese as their first language. Other SL-ASIA items which were closely associated with acculturation involved a language preference and generational identity. SL-ASIA items associated less with acculturation in the present study were related to food preference, affinity or ethnic identity and pride, ethnic interaction, and Asian contact.

Acculturation is a complex issue and it is generally agreed that multiple variables impact acculturation rates and levels. A variety of researchers and industry practitioners representing different fields have concluded there are linkages between acculturation and other important constructs and concerns relevant to their particular fields of study or

practice. For example, Gim, Atkinson, and Whiteley (1990) reported that acculturation, gender, and ethnicity were all related to the types of concerns (e.g., relationship, academic or career, financial, insomnia) that Asian Americans experience and their willingness to see a counselor for these concerns. In a study of Chinese-American fifth and sixth graders, Leong and Tata (1990) reported on sex and acculturation differences in the occupational (work) values of children, with educational, counseling, and career choice implications included in their discussion. Lee (1994) examined the relationship between levels of acculturation and consumer attitudes toward advertising-related variables in a cross-cultural study and generated marketing and managerial recommendations based on cultural issues. Lee and Tse (1994) investigated how Hong Kong immigrants to Canada changed their media (advertising) consumption upon moving to a new culture and the relationship of acculturation to these changes. Wong (1993) reported that businesses awakening to the potential of the Asian-American market were trying to tap into this market with great difficulty. She suggested we should not assume all Asians are alike or assume those who speak English and seem "westernized" have completed adopted American cultures and values (Wong, 1993).

Clearly, significant need has been established for instruments that accurately measure acculturation levels so that studies in various fields which attempt to test relationships between acculturation and other constructs can generate meaningful measures. Overall, the present study confirmed that SL-ASIA is a promising measure of acculturation for use with Asian Americans. However, future studies with large samples of Asian-Americans are recommended. In addition, studies of the SL-ASIA focusing on sub-groups of the Asian American population such as Chinese, Korean, Japanese,

Filipino, and Vietnamese Americans are also recommended since each of these subgroups has unique qualities.

Research Question 1

What are the illness representation of Chinese Americans about the causes, seriousness and controllability of cardiovascular disease?

Descriptive statistics were used to analyze this question. As suggested by Weinman and Moss-Morris (2002), items C1 to C18 asking the causes of heart disease should not be used as a scale (see Appendix C for questions). Therefore, each item was analyzed individually to explore Chinese Americans' belief about the causes of heart diseases.

Participants of this study believed that heredity (98.4%), aging (91.2%), overwork (83.9%), altered immunity (83%), stress or worry (77.4%), diet or eating habits (72.5%), and emotional state (71%) were contributing factors for CVD. The causes that were least agreed to be contributing factors of heart disease were germ or virus and chance or bad luck. Moderate alcohol consumption is known to be associated with a lower risk of CVD, and with increasing high-density lipoprotein cholesterol (Djousse, Herbert, Wilson, D'Agostino, Cupples, Karamohamed, & Ellison, 2005). However, just over half (58%) of participants believed or strongly believed alcohol could be a cause of heart disease. While the link between smoking and CVD has been well established (AHA, 2006), only a little over half (58.8%) of the sample perceived smoking as a possible contributing factor. A significant percentage (39.5%) of participants believed smoking had very little to do with having a heart attack. Further investigation is needed to examine Chinese Americans' perception of smoking to confirm the need for education in this area.

Respondents' IPQ scores for consequences (seriousness) and controllability closely approximated those generated by chronic fatigue syndrome patients tested by Weinman et al. (1996). Compared to cognitive representation scores obtained from patients with diabetes (N=88), rheumatoid arthritis (N=22), and chronic pain (n=60), the respondents in the present study considered the consequences most serious (mean = 19.14) and marginally lower score for personal control/cure when compared to the other illness groups (Weinman et al., 1996). A lower personal control score represented a less optimistic perception towards heart attack. However, participants had lower treatment control mean scores (Mean = 16.36) than other illness or ethnic group indicating they perceived less controllability over treatments for heart disease.

Research question 2

How accurate is the knowledge of Chinese Americans about cardiovascular disease?

Descriptive analysis was used to measure the knowledge of Chinese Americans about CVD. The average score for participating Chinese Americans was 57.76 (SD=12.73). Given the possible range of 0-100, the average was lower than expected. All participants answered five of the questions correctly which were related to normal value of blood pressure, best ways to control and treat blood pressure, benefit of lowering blood cholesterol and quitting smoking, and best way to loose weight.

While every participant knew that lowering blood cholesterol levels can help people who have already had a heart attack, only 25% of participants (N=31) knew the desirable blood cholesterol level for adult. Only 36.3% (N=45) of participants knew that only children from families at high risk of heart disease need to have their blood

cholesterol levels checked. Every participant knew if you have had a heart attack, quitting smoking can help reduce your chances of having a second heart attack. However, only 60.5% knew smoking is a major risk factor for heart attack, stroke, cancer, and lung diseases. Question 12 had a low correct rate (12.9%). However, the item also had low content validity from the expert panel. The other question that had the same low correct rate (12.9%) asked if it's true that high blood pressure affects the same number of blacks as it does whites. One positive finding was that 85% of the present sample knew that CVD is the leading cause of death in the U.S. for both men and women, similar to the 90% reported by others (Margellos-Anast, Estarziau, & Kaufman, 2006).

Research question 3

What is the influence of acculturation level on Chinese Americans' illness representation ?

Acculturation level was found to be significantly related to all seven illness perception dimensions of illness representation at either 0.05 or 0.01 level, and time line, time cycle, consequence and personal control variables at the 0.05 level. Time line and personal control variables were positively and significantly related to acculturation level while time cycle and consequence variables were negatively correlated with acculturation level. Correlation statistics revealed the more westernized (higher acculturation scores) the participants were, the stronger their beliefs that heart disease will last a long time but can be controlled or cured.

Time cycle and consequence variables were found to be negatively and significantly related to acculturation level. High time cycle represents a belief that the illness is cyclical in nature. Higher consequence score represents higher severity of the

illness. Statistical analysis indicated that individuals with higher level of acculturation (westernization) believed that the effect of heart disease would be less severe and they did not believe heart disease would be come and go (cyclical nature).

Treatment control, illness coherence, and emotional representation were found to be significantly related to acculturation at the 0.01 level. Illness coherence measures the degree to which individuals feel they have a coherent understanding of their condition. Emotional representation measures the distress people experience in relation to their illness. Results from this study indicated individuals with higher acculturation perceived heart disease made sense as a whole, were more likely to believe that their treatment could control their illness, but they were less emotionally distressed by heart illness.

Research question 4

What is the relationship between knowledge of cardiovascular disease and illness representation in Chinese Americans?

Significant relationships were found for six of the illness perception dimensions. Time cycle, personal control and treatment control were negatively related to Healthy Heart IQ total scores at the 0.01 level. Participants with higher Healthy Heart IQ scores indicated they have better understanding of heart disease. With regards to time cycle, participants who scored higher for Healthy Heart IQ had less strong beliefs about the cyclic nature of heart disease than those who scored low for Healthy Heart IQ. Participants who had better understanding of heart disease had greater perceived consequences of heart disease and had strong beliefs about their ability to control or cure heart disease. Participants who had more knowledge of heart disease had a less strong

feeling that heart disease made sense and had higher emotional distress related to heart disease.

Discussion of Methodological Issues

Two issues warrant additional comments:

1. The questionnaire was too long for an online survey.
2. Internet study features.

The survey was likely too long for an online study. Even though ten questions were deleted from the original acculturation scale to decrease the length of the study, it still took 8 web pages to display all the questions and consent form. Every questionnaire used was examined carefully and no other question could be altered without affecting the validity and reliability. Most online surveys available are about one page long. Short questionnaires and short line length facilitates faster reading and promotes a longer attention span (Dyson, 2004). The longer length of the survey might cause participants to lose interest and attention. There were 341 hits to the study website, 220 of those clicked "I agree to participate" button, and 103 participants completed the survey. This was also reflected in some email feedback received by the researcher. There were more than 25 emails sent to the researcher stating the survey was too long or they would have participated. There were also 21 missing data sets from the Healthy Heart IQ questionnaire, the last instrument which was displayed at end of the survey.

There were more female participants (68%, N=84) than male participants (32%, N=40) which is consistent with most online studies. No gender differences were observed on knowledge and perception of heart disease. Sociodemographic and health history data were obtained to monitor for bias. Sociodemographic and health history data were

obtained to monitor for bias. As described in other studies, online survey participants have higher educational level. For the present study, there were 8.1% (N=10) participants had less than high school education. Twenty-four percent (N=30) of participants were high school graduates. A little more than sixty percent (66%, N=84) of participants had college degree or higher. This percentage is higher than average population but it's comparable with data from 2002 census on Asians and Pacific Islanders' educational attainment (Census Report, 2003). In 2002, 87 percent of the Asians and Pacific Islanders aged 25 and older had earned at least a high school diploma and 60 percent had earned at least a bachelor degree (U.S. Bureau of the Census, 2003).

As indicated in many studies (Fawcett & Buhle, 1995; Frandsen, 1997), research conducted using Internet attracts a specific group of people and excludes certain groups of people. For the present study, potential participants who might be unintentionally excluded included those Chinese Americans who did not have computers, did not use Internet, did not browse the website with the study advertisement banner, and those who were not comfortable with online studies. Another issue documented by other studies (Baran, 1997) is language. For this study, both Chinese and English were used. The Internet survey was conducted without any known problems related to language. However, there were two participants sent an email to contact the researcher because the Chinese fonts could not be displayed which forced those individuals to use English version of the survey.

With the Internet, participants had better opportunities to become informed about the research than traditional quantitative research methods. In this regard, research

participants could easily self-determine to participate. Participants could fill out questionnaires at any time, anywhere, and with potential assistance from unknown others.

Even though authentic interaction between researcher and research participants are assumed, questions can be raised as to how authentic the phenomena reported through the Internet are in reality (Im & Chee, 2002). It is important to validate that participants were the type of subjects the researcher is seeking for a given study. A short questionnaire was administered to determine participants' eligibility and participants were recruited based on their self-reports about their age and ethnicity.

Confidentiality is always a concern for an Internet study and this issue was addressed through security of stored data on the server. Ensuring privacy and confidentiality were always top priorities in conduct of the study. This study was developed while conforming to the guidelines and policies of the institution where the researcher was affiliated. The website was deployed on an stand-alone server and linked to the researcher's website on the institution's server. The server was an independent computer under a subnet of the institution where the researcher was affiliated and it was housed in a secure office. The researcher reviewed all the access records on the daily basis. During the study period, no hacking attempt was suspected. It was necessary to protect the participants and data collected and precaution measures were done to ensure security. The operating system was updated and upgraded whenever security patches were available to maintain highest possible level of security. However, there is no completely secure interaction online, nor is the data ever completely safe from intrusion (Im & Chee, 2002).

Anonymity is important but is usually not a critical concern for Internet studies. Data collecting through the Internet is usually originated as an anonymous communication because researcher and respondents typically lack knowledge of each other (Fawcett & Buhle, 1995). When participants submit data through the Internet, the Internet Protocol Address (IP Address) is the only link to identify the origin of the data. Even though it's possible to identify a person by tracking the IP address, this is uncommon. It is also the policy of the institution which the researcher is affiliated with to prevent any attempt to record or track anyone's identity using IP address. Some participants chose to email comments to the researcher and did not seem concerned about disclosing their identity. Their suggestions were recorded without name or email addresses.

Conclusions

Based on the findings of this study, the following conclusions are made:

1. The IPQ-R subscales were intercorrelated in a logical manner. Illness perceptions like timeline, consequences, coherence, and emotional representations correlated positively with each other but were negatively correlated with optimistic perceptions like personal and treatment control.
2. Knowledge of CVD among Chinese Americans was lower than the general population.
3. Level of acculturation did have an impact on the illness perception of individuals.
4. There were significant relationships between acculturation level and knowledge of CVD among Chinese Americans who participated in the present study.

However, due to the low acculturation level presented by the majority of participants, caution must be exercised in the interpretation of the study findings.

Implications and Recommendations

The findings of this study have important implications for nursing practice, education and theory. These results also provide directions for future research.

Implications for Nursing Practice, Education and Theory

The findings of this study reinforce the need for health care practitioners to be aware of the meaning and significance of how individuals perceive a given illness. The data demonstrated a need for nurses to be sensitive to the psychological as well as physical aspects of illness. Nursing interventions directed at increasing patients' active participation in self-care and a personal sense of responsibility for health need to be routinely included in the illness prevention activities. Nursing education initiatives to enhance knowledge and sensitivity to ethnic and cultural differences is needed to ensure a future work force capable of effective care.

The findings also suggested the need to increase Chinese Americans' knowledge of risk factors for prevention of CVD. Despite the extensive local and national cardiovascular health promotion campaigns implemented to improve knowledge of risk reduction, Chinese Americans who participated in this study showed disparity in their knowledge of CVD risk factors and risk-reduction strategies. Recent improvements in our understanding of the pathophysiology of heart disease have led to significant advances in both prevention and treatment. However, in order for those methods to be effective, people must be knowledgeable about CVD risk factors, symptoms, and warning signs. Most of the study participants had a lower level of acculturation with Chinese as their

preferred choice of language. Communication may pose a barrier that impacts on their knowledge of CVD. Educational materials in Asian or Chinese languages are limited. The findings of this study indicate a need to develop and evaluate health educational programs and materials for Chinese Americans. Such resources would give health care providers more effective means by which to convey information to Chinese Americans patients. However, it is equally imperative that providers are educated on the unique aspects of Chinese Americans' perception of CVD and other illness along with the communication barriers faced by this population.

The findings of this study regarding the influence of culture on illness representation was congruent with Kleinman's (1980) work. He described how culture determined which of the many symptoms would be reported and perceived to be health threatening with a given illness (Kleiman (1980). The results of the present study showed a significant relationship between acculturation level and illness representations.

Leventhal's Common Sense Model of Illness Representation has been used extensively to study cognitive and affective factors associated with illness perception among various diseases (Cameron, Booth, Schlatter, Ziginskas, Harman, & Benson, 2005; Ryan & Zerwic, 2003). Results from the present study provided evidence that Leventhal's Common Sense Model of Illness Representations could be used to guide studies involved community sample with or without a given illness. Leventhal's model was used to study many ethnic minorities including Chinese (Jayne & Rankin, 2001). Results of this study may also provide some validity to explain Chinese Americans' cognitive and emotional process of interpreting symptoms.

Recommendations for Future Research

Further research regarding Chinese Americans' knowledge and illness representation is needed. This study needs to be replicated in a larger sample of Chinese Americans in the healthy population as well as in those with CVD. This study examined outcomes with a community sample who may or may not have experienced CVD. It is important to examine outcomes beyond the community setting. Using instruments appropriate to the ethnic group is essential in studies of CVD knowledge among Chinese Americans and Asian Americans. While conventional CVD risk factors such as smoking, blood pressure and total cholesterol predict risk within ethnic groups, they do not fully account for the differences in risk between ethnic groups, suggesting that alternative explanations might exist. Although the rates of CVD are lower among the Chinese when compared with Caucasians, death rates from CVD have been increasing in China and Taiwan, in contrast to the declining levels among western populations (Woo & Donnan, 1989). By researching specific ethnic groups, a greater understanding and knowledge of individual group differences can be discovered and eventually converted into practical and operational use.

The results of the present study needed to be interpreted very carefully because the demographic characteristics of the sample and can not be assumed to represent the general Chinese Americans population. Asian Americans have varying socioeconomic characteristics, levels of acculturation, immigration history, and health profiles. The Asian and Pacific Islander population is extremely diverse. Its members have ancestral ties to approximately 50 Asian and Pacific Islander nations. Even though heart disease remains the leading cause of death among these groups, the impact of heart disease on

each group varies. This study provided some insight into the Chinese American community's perception and knowledge of heart disease. Studies are needed about the motivation to make life style changes among these diverse ethnic groups. With such research efforts, we should be able to move towards culture-specific guidelines on primary and secondary prevention of CVD as well as its appropriate management.

Summary

This chapter presented an overview of the study and discussion of the study findings. Methodological issues were discussed including concerns about Internet research methods. Implications for nursing practice, education and theory were given. Conclusions were drawn from the study findings.

Appendixes

APPENDIX A: CONSENT FORM

CONSENT FORM

Title of Study: Knowledge and Perception of Cardiovascular Disease Risk Factors for Chinese Americans

You are invited to participate in a study that involves a web-based survey designed to evaluate the perception and knowledge of cardiovascular disease risk factors among Chinese Americans. My name is Erica Teng-Yuan Yu and I am a doctoral student at The University of Texas at Austin School of Nursing. This study is part of my dissertation work to help explore how Chinese Americans view cardiovascular disease. You are invited to be a possible participant in this study because you are a Chinese American. You may be one of 98 participants in this study.

This study has been approved by The University of Texas at Austin Institutional review Board. No deception is involved and the study involves no risk to participants. A possible benefit to you for taking part in the study is the satisfaction of providing more knowledge about the health beliefs of Chinese Americans.

If you decide to participate, you will be asked to provide some personal information including age, marital status, history of heart disease, educational level and employment status. You'll also be asked to complete 4 surveys relating to demographic information, your perception of cardiovascular disease, level of acculturation and knowledge of cardiovascular disease risk factors. Participation in this study typically takes less than 30 minutes to complete the questionnaire and is strictly confidential. After you complete the questionnaire, nothing else will be needed from you.

All responses are treated as confidential and in no case will responses from individual participants be identified. To ensure participants' privacy while online, no attempt will be made to collect or track IP (Internet Protocol) address, the route the file took between servers, email address, or name and address of the owner of your domain and network. Any information that is obtained in connection with this study will be disclosed only with your permission. The results of the study will be reported as group data. Your answer on the questionnaires will not be connected to your name.

Your participation in this study is completely voluntary. You have the right to withdraw from the study anytime without any penalty. There is no cost and no compensation to you for participating in this study.

You are making a decision whether or not to be in this study. By selecting "Yes, I agree" button indicates that you have read the information provided above and have decided to participate.

If you want to talk to anyone about this study because you think you have not been treated fairly or you have any other questions about this study, Please feel free to contact me or my supervising professor at the following address, email, or phone number. You can print a copy of this form for your own record.

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APPENDIX B: DEMOGRAPHIC DATA SHEET

Age: _____

Gender: 1. Male 2. Female

Marital status: 1. Married 2. Single (never married)

3. Separated or divorced 4. Widowed 5. Other: _____

History of heart disease: 1. Yes 2. No

Family history of heart disease: 1. Yes 2. No

Educational level: 1. Less than high school 2. High school graduate

3. Some college 4. College graduate 5. Graduate degree

Employment Status: 1. Full time 2. Part time 3. Retired 4. Unemployed.

APPENDIX C: ILLNESS REPRESENTATION QUESTIONNAIRE REVISED (IPQ-R)

ILLNESS PERCEPTION QUESTIONNAIRE (IPQ-R)

***Date*……**

YOUR VIEWS ABOUT SYMPTOMS

Listed below are a number of symptoms that people may or may not have experienced if they have a heart attack. Please indicate by circling *Yes* or *No*, whether you think people with history of heart attack will have experienced any of these symptoms, and whether you believe that these symptoms are related to heart attack.

	I think people with a heart attack have experienced this symptom		**This symptom is *related to heart attack***	
Fatigue	**Yes**	**No**	**Yes**	**No**
Nausea	**Yes**	**No**	**Yes**	**No**
Breathlessness	**Yes**	**No**	**Yes**	**No**
Chest Pain	**Yes**	**No**	**Yes**	**No**
Dizziness	**Yes**	**No**	**Yes**	**No**
Irritability	**Yes**	**No**	**Yes**	**No**
Headaches	**Yes**	**No**	**Yes**	**No**
Upset stomachs	**Yes**	**No**	**Yes**	**No**
Loss of strength	**Yes**	**No**	**Yes**	**No**
Irregular heartbeat	**Yes**	**No**	**Yes**	**No**
Muscle cramps	**Yes**	**No**	**Yes**	**No**
Flu-like symptoms	**Yes**	**No**	**Yes**	**No**
Increased perspiration	**Yes**	**No**	**Yes**	**No**
Numbness	**Yes**	**No**	**Yes**	**No**
Coughing	**Yes**	**No**	**Yes**	**No**

BELIEFS ABOUT HEART ATTACK

We are interested in your own personal views of how you now see the experience of having a heart attack, both how it would be when it happened, and in the future. Please indicate how much you agree or disagree with the following statements about this heart condition by clicking the appropriate box.

		Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
IP1	**Heart attack will last a short time**					
IP2	**Heart attack is likely to be permanent rather than temporary**					
IP3	**Heart attack will last for a long time**					
IP4	**Heart attack will pass quickly**					
IP5	**Once people have heart attack, I expect them to have this illness for the rest of their life**					
IP6	**Heart attack is a serious condition**					
IP7	**Heart attack has major consequences on people's life**					
IP8	**Heart attack does not have much effect on my life**					
IP9	**Heart attack strongly affects the way others see people with this illness**					
IP10	**Heart attack has serious financial consequences**					
IP11	**Heart attack causes difficulties for those who are close to people with heart attack**					
IP12	**There is a lot which people can do to control their symptoms**					
IP13	**What people do can determine whether their illness gets better or worse**					
IP14	**The course of the illness depends on those people who have this illness**					
IP15	**Nothing people do will affect their illness**					
IP16	**People have the power to influence their illness**					
IP17	**People actions will have no affect on the outcome of their illness**					
IP17	**People actions will have no affect on the outcome of their illness**					

		Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
IP18	**This illness (heart attack) will improve in time**					
IP19	**There is very little that can be done to improve people's illness**					
IP20	**The available treatment will be effective in curing heart attack**					
IP21	**The negative effects of heart attack can be prevented (avoided) by treatment**					
IP22	**The available treatment can control heart attack**					
IP23	**There is nothing which can help people with heart condition**					
IP24	**The symptoms of heart condition are puzzling to me**					
IP25	**Heart attack is a mystery to me**					
IP26	**I don't understand heart attack**					
IP27	**Heart attack doesn't make any sense to me**					
IP28	**I have a clear picture or understanding of heart condition**					
IP29	**The symptoms of heart attack change a great deal from day to day**					
IP30	**Symptoms of heart attack come and go in cycles**					
IP31	**Heart attack is very unpredictable**					
IP32	**People go through cycles in which heart attack gets better and worse**					
IP33	**I get depressed when I think about heart attack**					
IP34	**When I think about heart attack I get upset**					
IP35	**Having heart attack will make me feel angry**					
IP36	**The possibility of having heart attack does not worry me**					
IP37	**The possibility of having heart attack makes me feel anxious**					
IP38	**The possibility of having heart attack makes me feel afraid**					

CAUSES OF HEART ATTACK

We are interested in what you consider may be possible causes of heart attack. As people are very different, there is no correct answer for this question. We are most interested in your own views about the factors that cause heart attack rather than what others including doctors or family may have suggested to you. Below is a list of possible causes for heart attack. Please indicate how much you agree or disagree that they were causes for you by ticking the appropriate box.

		Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
C1	**Stress or worry**					
C2	**Hereditary - it runs in the family**					
C3	**A Germ or virus**					
C4	**Diet or eating habits**					
C5	**Chance or bad luck**					
C6	**Poor medical care in the past**					
C7	**Pollution in the environment**					
C8	**People's own behavior**					
C9	**People's mental attitude e.g. thinking about life negatively**					
C10	**Family problems or worries caused heart attack**					
C11	**Overwork**					
C12	**People's emotional state e.g. feeling down, lonely, anxious, empty**					
C13	**Ageing**					
C14	**Alcohol**					
C15	**Smoking**					
C16	**Accident or injury**					
C17	**Personality**					
C18	**Altered immunity**					

In the table below, please list in rank-order the three most important factors that you now believe caused heart attack. You may use any of the items from the box above, or you may have additional ideas of your own.

The most important causes for me:

1. _____
2. _____
3. _____

Thank you for your participation!

APPENDIX D: ILLNESS REPRESENTATION QUESTIONNAIRE REVISED (IPQ-R) CHINESE VERSION

ILLNESS PERCEPTION QUESTIONNAIRE (IPQ-R)

繁體中文

姓名_____ 日期_____

您本人對患病的看法及觀感

以下是在一般患病過程中，可能會出現的症狀，有些症狀您可能經歷過，有些則或許您從來也沒經歷過。為了增進我們的了解，我們希望您能根據您的情況，圈出，第一，您是否有過以下症狀；第二，您認為您的症狀與您目前所患的疾病是否有關。

	在患病後我有(無)此症狀			此症狀和我目前的病有(無)關	
疼痛	有	無	_____	有	無
喉嚨痛	有	無	_____	有	無
噁心作嘔	有	無	_____	有	無
呼吸困難	有	無	_____	有	無
體重減輕	有	無	_____	有	無
疲倦	有	無	_____	有	無
關節僵硬	有	無	_____	有	無
眼痛	有	無	_____	有	無
頭痛	有	無	_____	有	無
胃部不適	有	無	_____	有	無
睡眠問題	有	無	_____	有	無
頭暈	有	無	_____	有	無
全身乏力	有	無	_____	有	無

除了您的症狀以外，我們也希望能了解，您個人對目前病情的看法。

以下問題，請在符合您想法的空格內打勾 “ˇ”。

	我認為我的病.....	完全不同意	不同意	沒意見	同意	非常同意
IP1*	將在短時間內痊癒					
IP2	是永久性而非短時間的					
IP3	會拖很長一段時間					
IP4*	應該很快就會好了					
IP5	會跟著我一輩子，永遠好不了					
IP6	情況非常嚴重					
IP7	對我的一生，帶來嚴重的後果					
IP8*	對我的人生沒什麼大影響					
IP9	嚴重影響到別人對我的看法					
IP10	為我帶來十分沉重的經濟負擔					
IP11	對我身邊的 人帶來很多困難					
IP12	應該有很多方法可以控制住我的症狀					
IP13	我的病情的好壞，決定於我個人所作所為					

IP14	我的個人因素，可以改變整個患病的過程					
IP15*	無論我怎麼做都影響不了我的病					
IP16	我認為我有力量可以改變我的病					
IP17*	不管怎麼做，最終對我的病，都沒什麼幫助					
IP18*	病情將會隨著時間而有所改善					
IP19*	要改善眼前病情，實在所能做的十分有限					
IP20	目前的治療方法，會有效的治好我的病					
	我認為我的病.....	完全不同意	不同意	沒意見	同意	非常同意
IP21	目前治療方法，可以預防或避免因疾病造成的不良後果					
IP22	目前的治療方法，可以控制住我的疾病					
IP23*	已經是再也沒什辦法，可以改善我的情況了					
IP24	有很多症狀讓我很不解					
IP25	對我來說跟謎一 樣，十分神秘					
IP26	對我來說，我是一點概念也沒有					
IP27	我實在無法理解我的病					
IP28*	所有的病情及變化，我都很了解					

IP29	病況變化很大，似乎每天都有所不同					
IP30	症狀總是反反覆覆、來來去去的					
IP31	完全沒法子預測					
IP32	我已經歷了多次來來回回、好好壞壞的病情					
IP33	事實上只要一想到病，我就感到很憂鬱					
IP34	每當想到我的病時，我就感到很沮喪					
IP35	我對自己得這個病非常生氣					
IP36*	我一點也不擔心我的病					
IP37	事實上，得這個病讓我十分煩惱焦慮					
IP38	其實我心裡十分害怕我得的這個病					

您患病的原因

人們對為什麼生病有不同的看法，我們想知道您的看法如何。請注意，以下問題並沒有一定的答案，因此，不論医生、或是您的家人怎麼說，我們想知道的，只是您自己的看法。以下問題請您勾“ˇ”上與您想法最接近的答案。

	我認為讓我生病的原因是 ……..	完全不同意	不同意	沒意見	同意	非常同意
C1	壓力或煩惱					
C2	遺傳 (家族性)					
C3	細菌或病毒引起					
C4	食物或飲食習慣					
C5	純粹個人運氣，可能是我倒楣					
C6	過去不良的醫療結果					
C7	環境汙染					
C8	由於我自己的行為所導致					
C9	我的心態問題，例如，我對人生想法太悲觀					
C10	家庭問題、或過度煩惱所致					
C11	工作過勞					
C12	由於我情緒不好，比如說我常感覺沮喪、寂寞、焦慮、或空虛					
C13	自然的老化過程					
C14	飲酒					
C15	抽煙					
C16	意 外或受傷					
C17	因為我個人的性格所導致					
C18	因為我的免疫力不如從前					

最後，在以下空格中，請依次填入三個您認為最可能導致您生病的因。您可以自上頁所列因素中選擇，或是填入其他您認為最可能的因素。

我認為最有可能使我患病的原因是:

第一 _____

第二 _____

第三 _____

APPENDIX E: SUINN-LEW ASIAN-SELF-IDENTITY ACCULTURATION SCALE (SL-ASIA)

SUINN-LEW ASIAN-SELF-IDENTITY ACCULTURATION SCALE (SL-ASIA)

INSTRUCTIONS: The questions which follow are for the purpose of collecting information about your historical background as well as more recent behaviors which may be related to your cultural identity.

Check the one answer which best describes you.

1. What language can you speak?

- ☐ 1. Asian only (for example, Hindi, Urdu, Bengali, Tamil, Sinhalese, Malayalam, etc.)
- ☐ 2. Mostly Asian, some English
- ☐ 3. Asian and English about equally well (bilingual)
- ☐ 4. Mostly English, some Asian
- ☐ 5. Only English

2. What language do you prefer?

- ☐ 1. Asian only (for example, Hindi, Urdu, Bengali, Tamil, Sinhalese, Malayalam, etc.)
- ☐ 2. Mostly Asian, some English
- ☐ 3. Asian and English about equally well (bilingual)
- ☐ 4. Mostly English, some Asian
- ☐ 5. Only English

3. How do you identify yourself?

- ☐ 1. Indian, Pakistani, Sri Lankan, Bangladeshi, Nepali, etc.
- ☐ 2. Asian
- ☐ 3. Asian-American
- ☐ 4. Indian-American, Pakistani-American, etc.
- ☐ 5. American

4. Which identification does (did) your mother use?

- ☐ 1. Indian, Pakistani, Sri Lankan, Bangladeshi, Nepali, etc.
- ☐ 2. Asian
- ☐ 3. Asian-American
- ☐ 4. Indian-American, Pakistani-American, etc.
- ☐ 5. American

5. Which identification does (did) your father use?

- 1. Indian, Pakistani, Sri Lankan, Bangladeshi, Nepali, etc.
- 2. Asian
- 3. Asian-American
- 4. Indian-American, Pakistani-American, etc.
- 5. American

6. What was the ethnic origin of the friends and peers you had, as a child up to age 6?

- 1. Almost exclusively Asians, Asian Americans
- 2. Mostly Asians, Asian Americans
- 3. About equally Asian groups and Anglo groups
- 4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
- 5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

7. What was the ethnic origin of the friends and peers you had, as a child from 6 to 18?

- 1. Almost exclusively Asians, Asian Americans
- 2. Mostly Asians, Asian Americans
- 3. About equally Asian groups and Anglo groups
- 4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
- 5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

8. Whom do you now associate with in the community?

- 1. Almost exclusively Asians, Asian Americans
- 2. Mostly Asians, Asian Americans
- 3. About equally Asian groups and Anglo groups
- 4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
- 5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

9. If you could pick, whom would you prefer to associate with in the community?

- 1. Almost exclusively Asians, Asian Americans
- 2. Mostly Asians, Asian Americans
- 3. About equally Asian groups and Anglo groups
- 4. Mostly Anglos, Blacks, Hispanics, or other non-Asian ethnic groups
- 5. Almost exclusively Anglos, Blacks, Hispanics, or other non-Asian ethnic groups

10. What is your music preference?

- 1. Only Asian music (for example, Hindi, Urdu, Bengali, Tamil, Malayalam, Sinhalese, etc.)
- 2. Mostly Asian
- 3. Equally Asian and English
- 4. Mostly English
- 5. English only

11. What is your movie preference?

- 1. Only Asian-language movies
- 2. Mostly Asian-language movies
- 3. Equally Asian/English English-language movies
- 4. Mostly English-language movies only
- 5. English-language movies only

12. What generation are you? (Check the generation that best applies to you:)

- 1st Generation = I was born in Asia or country outside the U.S.
- 2nd Generation = I was born in U.S., either parent was born in Asia or country outside the U.S.
- 3rd Generation = I was born in U.S., both parents were born in U.S, and all grandparents born in Asia or country outside the U.S.
- 4th Generation = I was born in U.S., both parents were born in U.S, and at least one grandparent born in Asia or country outside the U.S. and one grandparent born in U.S.
- 5th Generation = I was born in U.S., both parents were born in U.S., and all grandparents also born in U.S.
- Don't know what generation best fits since I lack some information.

13. Where were you raised?

- ☐ 1. In Asia only
- ☐ 2. Mostly in Asia, some in U.S.
- ☐ 3. Equally in Asia and U.S.
- ☐ 4. Mostly in U.S., some in Asia
- ☐ 5. In U.S. only

14. What contact have you had with Asia?

- ☐ 1. Raised one year or more in Asia
- ☐ 2. Lived for less than one year in Asia
- ☐ 3. Occasional visits to Asia
- ☐ 4. Occasional communications (letters, phone calls, etc.) with people in Asia
- ☐ 5. No exposure or communications with people in Asia

15. What is your food preference at home?

- ☐ 1. Exclusively Asian food
- ☐ 2. Mostly Asian food, some American
- ☐ 3. About equally Asian and American
- ☐ 4. Mostly American food
- ☐ 5. Exclusively American food

16. What is your food preference in restaurants?

- ☐ 1. Exclusively Asian food
- ☐ 2. Mostly Asian food, some American
- ☐ 3. About equally Asian and American
- ☐ 4. Mostly American food
- ☐ 5. Exclusively American food

17. Do you

- 1. Read only an Asian language
- 2. Read an Asian language better than English
- 3. Read both Asian and English equally well
- 4. Read English better than an Asian language
- 5. Read only English

18. Do you

- 1. Write only an Asian language
- 2. Write an Asian language better than English
- 3. Write both Asian and English equally well
- 4. Write English better than an Asian language
- 5. Write only English

19. If you consider yourself a member of the Asian group (Asian, Asian American, Indian American, etc., whatever term you prefer), how much pride do you have in this group?

- 1. Extremely proud
- 2. Moderately proud
- 3. Little pride
- 4. No pride but do not feel negative toward group
- 5. No pride but do feel negative toward group

20. How would you rate yourself?

- 1. Very Asian (Indian, Pakistani etc.)
- 2. Mostly Asian
- 3. Bicultural
- 4. Mostly Westernized
- 5. Very Westernized

21. Do you participate in Asian occasions, holidays, traditions, etc.?

- ☐ 1. Nearly all
- ☐ 2. Most of them
- ☐ 3. Some of them
- ☐ 4. A few of them
- ☐ 5. None at all

22. Rate yourself on how much you believe in Asian (Indian, Pakistani etc.) values (e.g., about marriage, families, education, work):

do not believe <<-- 1☐ 2☐ 3☐ 4☐ 5☐ -->> strongly believe in Asian values

23. Rate your self on how much you believe in American (Western) values:

do not believe <<--1☐ 2☐ 3☐ 4☐ 5☐ -->> strongly believe in American (Western) values

24. Rate yourself on how well you fit when with other Asians of the same ethnicity:

do not fit <<-- 1☐ 2☐ 3☐ 4☐ 5☐ -->> fit very well

25. Rate yourself on how well you fit when with other Americans who are non-Asian (Westerners):

do not fit <<-- 1☐ 2☐ 3☐ 4☐ 5☐ -->> fit very well

26. There are many different ways in which people think of themselves.

Which ONE of the following most closely describes how you view yourself?

☐ 1. I consider myself basically an Asian person (e.g., Indian, Pakistani, Bangladeshi, Sri Lankan, Etc.). Even though I live and work in America, I still view myself basically as an Asian person.

☐ 2. I consider myself basically as an American. Even though I have an Asian background and characteristics, I still view myself basically as an American.

☐ 3. I consider myself as an Asian American, although deep down I always know I am an Asian.

☐ 4. I consider myself as an Asian American, although deep down, I view myself as an American first.

☐ 5. I consider myself as an Asian American. I have both Asian and American characteristics, and I view myself as a blend of both.

APPENDIX F: SUINN-LEW ASIAN-SELF-IDENTITY ACCULTURATION SCALE (SL-ASIA) CHINESE VERSION

個人背景問卷調查

說明: 下面問題是要收集一些與你的文化背景有關的資料, 包括你的過去歷史和最近的行爲請選出一個最適合你的答案.

1. 你能講那種語言?
   A. 只講華語
   B. 以華語爲主 少數英語
   C. 華語和英語程度相同 (雙語)
   D. 以英語爲主少數華語
   E. 只講英語
2. 你喜歡講那種語言?
   A. 只講華語
   B. 以華語爲主 少數英語
   C. 華語和英語程度相同 (雙語)
   D. 以英語爲主少數華語
   E. 只講英語
3. 你如何認同你自己?
   A. 中國人
   B. 亞洲人
   C. 亞裔美國人
   D. 華裔美國人
   E. 美國人
4. 你母親如何認同她自己?
   A. 中國人
   B. 亞洲人
   C. 亞裔美國人
   D. 華裔美國人
   E. 美國人
5. 你父親如何認同他自己?
   A. 中國人
   B. 亞洲人
   C. 亞裔美國人
   D. 華裔美國人
   E. 美國人
6. 在你六歲以前你的朋友和玩伴的種族背景是什麼?
   A. 幾乎全是亞洲人 亞裔美國人 東方人
   B. 大部分是亞洲人 亞裔美國人 東方人
   C. 大約亞洲人和白人各一半
   D. 大部分是白人 黑人 講西班牙語的人或其他亞洲種族的人
   E. 幾乎全是白人 黑人 講西班牙語的人或其他亞洲種族的人
7. 在你六歲到 18 歲之間 你的朋友和玩伴的種族背景是什麼?
   A. 幾乎全是亞洲人 亞裔美國人 東方人
   B. 大部分是亞洲人 亞裔美國人 東方人
   C. 大約亞洲人和白人各一半
   D. 大部分是白人 黑人 講西班牙語的人或其他亞洲種族的人
   E. 幾乎全是白人 黑人 講西班牙語的人或其他亞洲種族的人

8. 你目前和些什麼人來往?
   A. 幾乎全是亞洲人 亞裔美國人 東方人
   B. 大部分是亞洲人 亞裔美國人 東方人
   C. 大約亞洲人和白人各一半
   D. 大部分是白人 黑人 講西班牙語的人或其他亞洲種族的人
   E. 幾乎全是白人 黑人 講西班牙語的人或其他亞洲種族的人
9. 如果你可以選擇 你喜歡和什麼樣的人來往?
   A. 幾乎全是亞洲人 亞裔美國人 東方人
   B. 大部分是亞洲人 亞裔美國人 東方人
   C. 大約亞洲人和白人各一半
   D. 大部分是白人 黑人 講西班牙語的人或其他亞洲種族的人
   E. 幾乎全是白人 黑人 講西班牙語的人或其他亞洲種族的人
10. 你的音樂愛好是什麼?
   A. 只有亞洲音樂 (例如 中國的 日本的 韓國的 等等)
   B. 以亞洲音樂爲主
   C. 亞洲的和英語系的差不多
   D. 以英語系音樂爲主
   E. 只有英語系音樂
11. 你的電影愛好是什麼?
   A. 只有亞洲語電影
   B. 以亞洲語電影爲主
   C. 亞洲的和英語系的電影差不多
   D. 以英語系電影爲主
   E. 只有英語系電影
12. 你在那裡出生?
   A. 美國
   B. 亞洲
   C. 其他地方 請說明_____
   D. 不知道

   你父親在那裡出生?
   A. 美國
   B. 亞洲
   C. 其他地方 請說明_____
   D. 不知道

   你母親在那裡出生?
   A. 美國
   B. 亞洲
   C. 其他地方 請說明_____
   D. 不知道

   你父親的父親在那裡出生?
   A. 美國
   B. 亞洲
   C. 其他地方 請說明_____
   D. 不知道

你父親的母親在那裡出生?

A. 美國
B. 亞洲
C. 其他地方 請說明_____
D. 不知道

你母親的父親在那裡出生?

A. 美國
B. 亞洲
C. 其他地方 請說明_____
D. 不知道

你母親的母親在那裡出生?

A. 美國
B. 亞洲
C. 其他地方 請說明_____
D. 不知道

根據上面的回答 請選一個最適合你的代別

A. 第一代 我出生在亞洲或美國以外的其他地方
B. 第二代 我出生在美國 父母中有一位出生在亞洲或美國以外的其他地方
C. 第三代 我出生在美國 父母也出生在美國 祖父母都出生在亞洲或其他地方
D. 第四代 我出生在美國 父母也出生在美國 而至少有一個祖父母都出生在亞洲或其他地方個祖父母出生在美國
E. 第五代 我出生在美國父母和祖父母都出生在美國
F. 因爲資料不足 不知道我適合那一代
G. 其他 請說明_____

13. 你在那裡長大?

A. 只在亞洲
B. 大部分在亞洲 小部分在美國
C. 在亞洲和在美國的時間差不多
D. 大部分在美國小部分在亞洲
E. 只在美國

14. 你和亞洲有些什麼接觸或聯繫?

A. 在亞洲住過一年或一年以上
B. 在亞洲住過不到一年
C. 偶爾到亞洲去
D. 偶爾和住在亞洲的人有聯繫
E. 和住在亞洲的人沒有接觸或聯繫

15. 你在家裏喜歡吃什麼食物?

A. 完全是亞洲食物
B. 大部分亞洲食物 小部分美國食物
C. 亞洲和美國食物差不多
D. 大部分美國食物 小部分亞洲食物
E. 完全是美國食物

16. 你在餐館裏喜歡吃什麼食物?

A. 完全是亞洲食物
B. 大部分亞洲食物 小部分美國食物
C. 亞洲和美國食物差不多
D. 大部分美國食物 小部分亞洲食物
E. 完全是美國食物

17. 你是否

A. 只能讀一種亞洲文
B. 閱讀亞洲文比英文好
C. 閱讀亞洲文和英文程度相同
D. 閱讀英文比亞洲好
E. 只能讀英文

18. 你是否

A. 只能寫一種亞洲文
B. 寫亞洲文比英文好
C. 寫亞洲文和英文程度相同
D. 寫英文比亞洲好
E. 只能寫英文

19. 如果你認爲自己是亞洲種族 (東方人 亞洲人 亞裔美國人 華裔美國人 等等) 的一份子你爲此感到驕傲的程度如何?

A. 非常驕傲
B. 中等程度的驕傲
C. 一點點驕傲
D. 不感到驕傲 但對亞洲種族的人沒有不好的感覺
E. 不感到驕傲 而且對亞洲種族的人有不好的感覺

20. 你會如何評量自己

A. 非常亞洲化
B. 大部分亞洲化
C. 雙文化
D. 大部分美國化
E. 非常美國化

21. 你是否參加亞洲人的聚會 節日 及傳統的節日等等

A. 幾乎全部
B. 大部分
C. 一些
D. 很少
E. 完全沒有

APPENDIX G: HEALTHY HEART IQ

HEALTHY HEART I.Q.

Answer "true" or "false" to the following questions to test your knowledge of heart disease and its risk factors. Be sure to check the answers and explanations on the back of this sheet to see how well you do.

1. The risk factors for heart disease that you *can do something about* are: high blood pressure, high blood cholesterol, smoking, obesity, and physical inactivity. T F
2. A stroke is often the first symptom of high blood pressure, and a heart attack is often the first symptom of high blood cholesterol. T F
3. A blood pressure greater than or equal to 140/90 mm Hg is generally considered to be high. T F
4. High blood pressure affects the same number of blacks as it does whites. T F
5. The best ways to treat and control high blood pressure are to control your weight, exercise, eat less salt (sodium), restrict your intake of alcohol, and take your high blood pressure medicine, if prescribed by your doctor. T F
6. A blood cholesterol of 240 mg/dL is desirable for adults. T F
7. The most effective dietary way to lower the level of your blood cholesterol is to eat foods low in cholesterol. T F
8. Lowering blood cholesterol levels can help people who have already had a heart attack. T F
9. Only children from families at high risk of heart disease need to have their blood cholesterol levels checked. T F
10. Smoking is a major risk factor for four of the five leading causes of death including heart attack, stroke, cancer, and lung diseases such as emphysema and bronchitis. T F
11. If you have had a heart attack, quitting smoking can help reduce your chances of having a second attack. T F
12. Someone who has smoked for 30 to 40 years probably will not be able to quit smoking. T F
13. The best way to lose weight is to increase physical activity and eat fewer calories. T F
14. Heart disease is the leading killer of men **and** women in the United States. T F

Prepared by the National Heart, Lung, and Blood Institute
NATIONAL INSTITUTES OF HEALTH

HEALTHY HEART I.Q.

1. TRUE High blood pressure, smoking, and high blood cholesterol are the three most important risk factors for heart disease. On the average, each one doubles your chance of developing heart disease. So, a person who has all three of the risk factors is 8 times more likely to develop heart disease than someone who has none. Obesity increases the likelihood of developing high blood cholesterol and high blood pressure, which increase your risk of heart disease. Physical inactivity increases your risk of heart attack. Regular exercise and good nutrition are essential to reducing high blood pressure, high blood cholesterol, and overweight. People who exercise are also more likely to cut down or stop smoking.
2. TRUE A person with high blood pressure or high blood cholesterol may feel fine and look great; there are often no signs that anything is wrong until a stroke or heart attack occurs. To find out if you have high blood pressure or high blood cholesterol, you should be tested by a doctor, nurse, or other health professional.
3. TRUE A blood pressure of 140/90 mm Hg or greater is generally classified as high blood pressure. However, blood pressures that fall below 140/90 mm Hg can sometimes be a problem. If the diastolic pressure, the second or lower number, is between 85-89, a person is at an increased risk for heart disease or stroke and should have his/her blood pressure checked at least once a year by a health professional. The higher your blood pressure, the greater your risk of developing heart disease or stroke. Controlling high blood pressure reduces your risk.
4. FALSE High blood pressure is more common in blacks than whites. It affects 29 out of every 100 black adults compared to 26 out of every 100 white adults. Also, with aging, high blood pressure is generally more severe among blacks then among whites, and therefore causes more strokes, heart disease, and kidney failure.
5. TRUE Recent studies show that lifestyle changes can help keep blood pressure levels normal even into advanced age and are important in treating and preventing high blood pressure. Limit high-salt foods which include many snack foods, such as potato chips, salted pretzels, and salted crackers; processed foods, such as canned soups; and condiments, such as ketchup and soy sauce. Also, it is **extremely important** to take blood pressure medication, if prescribed by your doctor, to make sure your blood pressure stays under control.
6. FALSE A total blood cholesterol of under 200 mg/dL is **desirable** and usually puts you at a lower risk for heart disease. A blood cholesterol level of 240 mg/dL or above is **high** and increases your risk of heart disease. If your cholesterol level is high, your doctor will want to check your levels of LDL-cholesterol ("bad" cholesterol) and HDL- cholesterol ("good" cholesterol). A HIGH level of LDL-cholesterol increases your risk for heart disease, as does a LOW level of HDL-cholesterol. A cholesterol level of 200-239 mg/dL is considered **borderline-high** and usually increases your risk for heart disease. If your cholesterol is borderline-high, you should speak to your doctor to see if additional cholesterol tests are needed. All adults 20 years of age or older should have their blood cholesterol level checked at least once every 5 years.
7. FALSE Reducing the amount of cholesterol in your diet is important; however, eating foods **low in saturated** fat is the most effective dietary way to lower blood cholesterol levels, along with eating less total fat and cholesterol. Choose low-saturated fat foods, such as grains, fruits, and vegetables; low-fat or skim milk and milk products; lean cuts of meat; fish; and chicken. Trim fat from meat before cooking; bake or broil meat rather than fry; use less fat and oil; and take the skin off chicken and turkey. Reducing overweight will also help lower your level of LDL-cholesterol as well as increase your level of HDL- cholesterol.
8. TRUE People who have had one heart attack are at much higher risk for a second attack. Reducing blood cholesterol levels can greatly slow down (and, in some people, even reverse) the buildup of cholesterol and fat in the walls of the arteries and significantly reduce the chances of a second heart attack.

9. TRUE Children from "high risk" families, in which a parent has high blood cholesterol (240 mg/dL or above) or in which a parent or grandparent has had heart disease at an early age (at 55 years of age or younger), should have their cholesterol levels tested. If a child from such a family has a cholesterol level that is high, it should be lowered under medical supervision, primarily with diet, to reduce the risk of developing heart disease as an adult. For most children, who are not from high-risk families, the best way to reduce the risk of adult heart disease is to follow a low-saturated fat, low cholesterol eating pattern. All children over the age of 2 years and all adults should adopt a heart-healthy eating pattern as a principal way of reducing coronary heart disease.

10. TRUE Heavy smokers are 2 to 4 times more likely to have a heart attack than nonsmokers, and the heart attack death rate among all smokers is 70 percent greater than that of nonsmokers. Older male smokers are also nearly twice as likely to die from stroke than older men who do not smoke, and these odds are nearly as high for older female smokers. Further, the risk of dying from lung cancer is 22 times higher for male smokers than male nonsmokers and 12 times higher for female smokers than female nonsmokers. Finally, 80 percent of all deaths from emphysema and bronchitis are directly due to smoking.

11. TRUE One year after quitting, ex-smokers cut their extra risk for heart attack by about half or more, and eventually the risk will return to normal in healthy ex-smokers. Even if you have already had a heart attack, you can reduce your chances of a second attack if you quit smoking. Ex-smokers can also reduce their risk of stroke and cancer, improve blood flow and lung function, and help stop diseases like emphysema and bronchitis from getting worse.

12. FALSE Older smokers are more likely to succeed at quitting smoking than younger smokers. Quitting helps relieve smoking-related symptoms like shortness of breath, coughing, and chest pain. Many quit to avoid further health problems and take control of their lives.

13. TRUE Weight control is a question of balance. You get calories from the foods you eat. You burn off calories by exercising. Cutting down on calories, especially calories from fat, is key to losing weight. Combining this with a regular physical activity, like walking, cycling, jogging, or swimming, not only can help in losing weight but also in maintaining weight loss. A steady weight loss of 1/2 to 1 pound a week is safe for most adults, and the weight is more likely to stay off over the long run. Losing weight, if you are overweight, may also reduce your blood pressure, lower your LDL-cholesterol, and raise your HDL-cholesterol. Being physically active and eating fewer calories will also help you control your weight if you quit smoking.

14. TRUE Coronary heart disease is the #1 killer in the United States. Approximately 489,000 Americans died of coronary heart disease in 1990, and approximately half of the deaths were women.

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