PERCEIVED RISK FOR CARDIOVASCULAR DISEASE AND DIABETES TYPE 2 AMONG SAMOANS WITH METABOLIC SYNDROME

By

Leilani Ana Cruz Leon Guerrero Siaki

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Signed: Leilani Ana Cruz Leon Guerrero Siaki
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“Little drops of water, tiny grains of sand . . .”

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Fa’afetai tele lava / Si yuus maasi / Mahalo nui loa / Thank you very much

_Ua o gatasi le futia ma le umele:_ We must be of one mind in the undertaking, while the fisherman swings the rod, the others must assist him by paddling hard
DEDICATION

With all the love and heartfelt gratitude these simple words can convey, I dedicate this dissertation to my husband, children, and grandchildren, without their unwavering support, love, encouragement, and patience not to mention all the meals and everyday household chores and errands they took over, this would not have been accomplished.

Muliagatele Taufa’asau Sammy Le’aana Siaki
Fonoimoana Ana Cruz Siaki Melendez
Taufa’asau Sammy Siaki, II
Shaun Iulio Siaki
Seth Taelase Siaki
Sebastian-Stephen Le’aana Siaki
Ciera Ann Leilani Siaki
Taufa’asau Sammy Siaki, III
Taelase Iulio Siaki
Talia Lani Selemena Maria Melendez
Afegaitinoti Lehua Keakealanikealiwahineopuna Siaki

A special dedication to my parents Joe Cruz Leon Guerrero ‘Eto’ and Nani R. Kahananui and my in-laws, Va’aga S. Siaki and Sieni Malelegagausia Siaki, who instilled in me the importance of education and hard work and nourished my passion for nursing.

“I collected my figures with a purpose in mind, with the idea that they could be used to argue for change”-Florence Nightingale
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ABSTRACT

**Purpose/Aims:** To explore the relationship between perceived risk of cardiovascular disease (CVD) and diabetes and the health-world view of Samoans with two or more components of metabolic syndrome.

1. Describe participant’s perceptions of risk for CVD and diabetes.
2. Compare participants’ actual risk of CVD and diabetes based on presence of components of metabolic syndrome to their perceived risk of CVD and diabetes.
3. Describe the relationships among participants’ health-world views and perceived risk for CVD and diabetes.

**Rationale/Background:** Diabetes and CVD are leading causes of health disparities in the United States, particularly among Pacific Islanders, whose rates for CVD and diabetes are among the highest in the Nation. Metabolic syndrome significantly increases risks for CVD and diabetes and can be prevented using behavioral approaches. An important concept in behavioral models, perceived risk is influenced by both sociocultural and health-world views; yet is understudied in Pacific Islanders with regard to CVD and diabetes.

**Methods and Sample:** Questionnaires and focus groups were used in this mixed methods study involving 43 adult Samoans at moderately high risk of CVD or diabetes. Culture brokers were used to access potential participants using a non-probabilistic sampling scheme. Qualitative and quantitative data were analyzed using descriptive statistics and content analysis respectively, and points of convergence, complementarity, and/or divergence were identified.
**Results/Significance:** Over 80% of participants perceived themselves as high risk for CVD and diabetes. Converging and complementary data revealed predominately accurate perceptions of risk for CVD and diabetes. Underestimations of risk were influenced by current behavior. Overestimations of risk were influenced by behavior, physical health, and family and personal history. Nine codes supported the category health-world view. Five ways of knowing: personal, aesthetic, sociopolitical, empiric, and unknowing, and several values and beliefs i.e. respect, family, religion, harmony/balance, and personal responsibility, together with two cultural codes influenced perceived risk for CVD and diabetes. These important influences on perceived risk for CVD and diabetes in Samoan participants can be used to develop interventions targeting CVD and diabetes, thereby meeting Healthy People 2010, the National Institute of Nursing Research (2006) guidelines, and the National Patient Safety goals (2008) goals.
CHAPTER I: INTRODUCTION

This research aims to enhance our knowledge of Samoan’s perceptions of their risk for cardiovascular disease (CVD) and diabetes and the health-world views held by Samoans in regard to these conditions. This chapter will describe the prevalence of CVD and diabetes in Pacific Islanders, the precursor to both CVD and diabetes metabolic syndrome and perceptions of risk for CVD and diabetes. The influence of Westernization and Samoan cultural views on the development of metabolic syndrome, theoretical underpinnings, conceptual model, significance to nursing, and operational definitions used in the study are also presented together with the study purpose and aims.

Statement of the Problem

Cardiovascular Disease and Diabetes

As the leading causes of morbidity and mortality in the United States, CVD and diabetes (American Heart Association [AHA], 2007) share common risk factors. When three or more of these risk factors are clustered together within the same individual, the condition known as metabolic syndrome is said to exist (International Diabetes Federation, [IDF], 2005). Individuals with metabolic syndrome are five times more likely to develop diabetes and three times more likely to experience a myocardial infarction than those without metabolic syndrome (Grundy, Cleeman, Daniels, Donato, Eckel, Franklin et al., 2005; IDF). Major physiologic conditions that have been identified as part of the metabolic syndrome include central obesity, insulin resistance, hypertension (HTN), elevated triglycerides, low high density lipoprotein and impaired glucose tolerance. Despite the susceptibility of these conditions to health behavior changes, the
incidence of CVD and diabetes continues to rise at discouraging rates, particularly among minority populations such as Hispanics, Native Americans, Asians, and Pacific Islanders (AHA; Center for Disease Control [CDC], 2004).

Reducing health care disparities including the disproportionate rates of CVD and diabetes among minority peoples such as Pacific Islanders is addressed in one of two national health goals described in Healthy People 2010 (Department of Health and Human Services [DHHS], 2004). Addressing health disparities in Pacific Islanders is complicated by the historical treatment of Asians and Pacific Islanders as one homogenous ethnic group (Browne & Broderick, 1994; Louie, 2001). This deleterious practice has resulted in a dearth of research in Pacific Islanders compared with Whites, Blacks, or Hispanic population; promoted the myth of Asians and Pacific Islanders as “model minorities” with very few health care needs; and masked their actual health problems (Browne & Broderick; Louie; Ro, 2002). For example, Healthy People 2010(DHHS, 2004), describes Asians and Pacific Islanders as “one of the healthiest populations”, yet this is in direct contrast to AHA (2007/2008) statistics showing Pacific Islanders with one of the highest rates of heart disease and stroke (see Table 1).
Table 1

Cardiovascular, Diabetes, and Obesity Prevalence Rates in Percentages

<table>
<thead>
<tr>
<th></th>
<th>Pacific Islanders</th>
<th>Asians</th>
<th>American Indian/Native Americans</th>
<th>Black</th>
<th>Hispanic / Latino</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stroke</td>
<td>8.1</td>
<td>2.6</td>
<td>5.1</td>
<td>3.7</td>
<td>3.7</td>
<td>2.2</td>
</tr>
<tr>
<td>HTN</td>
<td>28.5</td>
<td>19.5</td>
<td>25.4</td>
<td>31.7</td>
<td>20.6</td>
<td>22.2</td>
</tr>
<tr>
<td>CVD</td>
<td>13.8</td>
<td>6.9</td>
<td>11.6</td>
<td>10.2</td>
<td>8.8</td>
<td>11.4</td>
</tr>
<tr>
<td>Diabetes</td>
<td>*</td>
<td>7.5</td>
<td>16.5</td>
<td>11.8</td>
<td>10.4</td>
<td>6.6</td>
</tr>
<tr>
<td>*PIH 2x that of Whites; NH 7.9 AmSa 50</td>
<td></td>
<td></td>
<td>AZ 29.3</td>
<td></td>
<td>MA 11.9</td>
<td></td>
</tr>
<tr>
<td>*PIH 2x that of Whites; NH 7.9 AmSa 50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>PN 12.6</td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>NH 75</td>
<td>8.1</td>
<td>32.9</td>
<td>35.3</td>
<td>24.7</td>
<td>23.6</td>
</tr>
<tr>
<td>Obstity</td>
<td>AmSa &gt;75</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obstity</td>
<td>HI Sa 70</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>


Collective incidence rates for diabetes among Asian and Pacific Islanders are about the same as those of Whites (Asian Pacific Islander Health Forum [AAPIHF], 2003a). In Hawaii and California however, where Asian and Pacific Islander information is desegregated, rates of diabetes in Pacific Islanders are estimated to be 2 to 5 times higher than those of Whites (AAPIHF, 2003a). By 2025, the IDF projects that half of the world’s diabetics will be of Asian or Pacific Islander ethnicity, the majority of those individuals will have type 2 diabetes (Joslin Diabetic Center, 2008; IDF, 2005). The
unique health care needs of Pacific Islanders must be desegregated from Asians, explored and addressed adequately if Healthy People 2010 goals are to be fully realized.

*Lifestyle Behaviors and Perceptions of Risk*

Objectives to achieve Healthy People 2010 goals specifically target modifiable risk factors such as physical inactivity, weight control, and tobacco use that contribute to the development of conditions leading to metabolic syndrome and ultimately CVD and diabetes. About one fourth of adult Pacific Islanders do not exercise and more than one third use tobacco (AHA, 2007). Some researchers estimate that obesity rates in Pacific Islanders, such as Samoans, are as high as 80% (Curtis, 2004; Grundy et al., 2005). These modifiable risk factors are also the targets of biobehavioral research that seeks to understand the intricate relationship among genetics, environment, and behavior. Behavior and environment are especially important because together they account for about 70% of premature death and disabilities in the United States (DHHS, 2004).

Many behavior change theories and models share common assumptions regarding behavior. According to Brewer, Chapman, Gibbons, Gerrard, McCaul, and Weinstein, (2007), Conner and Norman, (2005), and Rimal (2003) these assumptions include:

1. Behaviors are major causes of morbidity and mortality in developed countries.
2. Individuals shape their own health and well-being through behavior choices and these choices are modifiable to varying degrees.
3. Cognitive factors are key proximal determinants of behavior and generally are acquired through socialization. Cognitive factors include attitudes regarding the quality and benefits of health services, perceptions of disease risks,
knowledge of health/disease states, and qualities of individuals’ social networks.

4. Social behavior is more a function of subjective views of reality than objective views of the environmental context.

5. Utility or desirability of behavior(s) is the result of probability and value of specific outcomes or consequences.

6. Individuals seek to maximize utility/desirability, preferring those behaviors with the highest utility.

7. Recognition of the actual or future risks to health resulting from specific behavioral choices motivates behavior modification

Essentially, behavior choices are a function of the socioculturally derived attitudes and values attached to both the behavior and the outcomes of behaviors and are driven in part by the perception of risks associated with choosing or not choosing certain behaviors. This phenomenon is reflected in the inclusion of perceived risk as a concept in most behavior change models and theories (Brewer, Weinstein, Cuite, & Herrington, 2004; Sjoberg, 2006; Weinstein & Nicolich, 1993).

Initially the concept of risk was seen as a neutral idea regarding probabilities in gambling in the 17th century and later in the science and manufacturing fields (Jacobs, 2000; Slovic, 1987). Risk perception research started in earnest in the 1960s, focusing largely on dangers associated with nuclear power and making inroads into the health sciences by the 1970s (Sjoberg, 2000). These efforts have influenced several key models that focus on different aspects and processes forming perceptions of risks (see Table 2).
Regardless of the specific model, perceptions of risk regarding events/hazards are the end results of decisions that weigh the likelihood of harm and the severity and probability of the outcome with or without action. These decisions are affected by attitudes, beliefs, and individual predispositions as well as attributes of the event/hazard itself. The elements of perceived risk: likelihood of being harmed, one’s innate predisposition to the threat, the severity of the outcome of the threat, and outcome if no action taken (Brewer et al., 2007) are reflected in two questions most behavior change models attempt to answer: Do perceptions of individual risk accurately reflect the extent that persons use precautions or healthy behaviors and do perceptions of risk lead people to adopt self-protective measures to decrease health risks (Weinstein & Nicolich, 1993).

Most behavior change models concentrate on the likelihood of harm and outcome if no action is taken (Brewer et al., 2007). For example, in the health belief model three elements of perceived risk: the likelihood of harm, severity, and outcome are conceptualized as perceived susceptibility, perceived severity of health risks, and perceived benefits. These constructs are immediate antecedents to action, and are considered primary stimuli for behavior changes. (Baranowski, Cullen, Nicklas, Thompson, & Baranowski, 2003; Conner & Norman, 2005). Perceptions of risk indirectly shape behavior in the theory of planned behavior and address likelihood of harm and outcomes of action (Ajzen, 1991; Conner & Norman).
Table 2

*Examples of Models of Perceived Risk*

<table>
<thead>
<tr>
<th>Focus</th>
<th>Model</th>
<th>Brief summary</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective attitudes about objective features of a hazard</td>
<td>Psychometric</td>
<td>Objective: New or old risk, voluntary/non-voluntary, dread factor, number of people affected and outcome of the risk.</td>
<td>Seatbelt usage is an old voluntary activity usually affecting one person, with a low probability of consequences.</td>
</tr>
<tr>
<td>Subjective attributes of individuals or groups</td>
<td>Culture theory</td>
<td>Individual world view predispositions such as egalitarian or fatalist determine the types of risks people pay attention to.</td>
<td>Egalitarians are not comfortable with technology and may focus more on environmental harm from technology.</td>
</tr>
<tr>
<td></td>
<td>Affect-heuristic</td>
<td>Individual images about a risk influences attitudes and conscious / unconscious judgments regarding the risk.</td>
<td>People with positive images of smoking may perceive the health risks minimal when compared with those images.</td>
</tr>
<tr>
<td>Both subjective and objective attributes and outcomes of the event/hazard</td>
<td>Process model of risk perception</td>
<td>Degree of attention given a risk is influenced by knowledge and attitudes about the risk.</td>
<td>Someone who experienced bruising from a seatbelt may not to wear seatbelts.</td>
</tr>
<tr>
<td></td>
<td>Social amplification of risk theory</td>
<td>Risks trigger signals which are amplified like ripples in water; Ripple size depends on associated attributes and attitudes</td>
<td>Seatbelt injuries cause small ripples compared with nuclear accidents which cause larger ripples.</td>
</tr>
</tbody>
</table>

Specifically, in the Theory of Planned Behavior, beliefs and values about behaviors influence attitudes. These beliefs link the perceived benefits/costs of the behavior with outcomes leading to the formation of negative or positive attitudes about the behaviors. These attitudes are immediate antecedents of intentions to perform the behaviors. For example, some people may not want to eliminate ethnic foods such as pork skin or salted corn beef from their diet, because the cost, the associated cultural values and the taste of eating bland food, is too high. The Transtheoretical model (Prochaska, Prochaska, & Levesque, 2001) also implies but does not specifically address perceived risk and outcomes. A decision process involving self-evaluation of pros and cons of specific behaviors to determine whether or not to adopt a specific behavior occurs at different stages in the model. This process includes consequences or risks of behavior with or without change (Prochaska, Prochaska, Cohen, Gomes, LaForge, & Eastwood, 2004). Likelihood of harm, predisposition, and outcomes are incorporated in the health action process approach (HAPA). Risk perception is a central concept with direct and indirect effects on intention and considers contextual factors. Specifically beliefs that one is at risk, that the risk will be lowered by a change in behavior, and that the behavior can be maintained influence a persons’ intention to adopt specific behaviors (Schwarzer, 2004).

Whether or not the concept of perceived risk is directly or indirectly included in theoretical models, it is an important concept in health behavior research. Perceptions of risk result from a cognitive appraisal involving personal beliefs and values associated with the health threat, behaviors influencing the health threat, and the consequences of behavior choices. Any upstream attempts to use models of behavior change to reduce the
rising incidence of lifestyle associated risk factors in minority populations must use their emic perceptions of risk in a culturally congruent manner, an approach supported by the National Institute for Nursing Research (NINR) (2006).

Despite the recognition that modifiable behavior choices significantly impact morbidity and mortality and concepts important to behavior change models should be explored from an emic perspective, there remains significant gaps in research of Pacific Islanders with metabolic syndrome in general, and Samoans in particular. This gap is further reflected in the continued incidence of CVD and diabetes in Pacific Islanders. Currently not clear is whether new behavior change models or a better understanding of concepts used in current models from specific sociocultural perspectives are needed. Therefore exploring emic perceptions of risk for CVD and diabetes in Pacific Islanders, such as Samoans, with metabolic syndrome is imperative. Use of this information can then be made to determine whether or not behavior change models can be adapted or new models could be developed to reflect culturally specific perceptions of risk. Such models may lead to effective biobehavioral approaches that will facilitate meeting the Healthy People 2010 goals in Samoans and perhaps other Pacific Island populations as well.

Statement of Purpose/Aims

Despite the sociocultural foundations of perceived risk and the widespread use of the concept in behavior change models, very little information is available about perceived risks of CVD and diabetes in Samoan Pacific Islanders (Siaki & Loescher, 2008, in review). The purpose of this study is to explore perceived risk of CVD and
diabetes and the health-world view of Samoans with two or more components of metabolic syndrome using a mixed methods approach.

The specific aims of this study are to:

1. Describe participants’ perceptions of risk for CVD and diabetes.

2. Compare participants’ actual risk of CVD and diabetes based on presence of components of metabolic syndrome with their perceived risk for CVD and diabetes.

3. Describe the relationship among participants’ health-world views and perceived risk of CVD and diabetes.

Background

**Historical Perspective of Metabolic Syndrome**

A link between obesity, atherosclerosis, and HTN was first described by Morgagni in 1765 (Enzi, Busetto, Inelmen, Coin, & Sergi, 2003) and revisited with the addition of hyperglycemia in the 1920s during the same era that a non-insulin dependent type of diabetes, type 2, was discovered (Alberti, 2005; Himsworth, 1936). By the 1960s, this clustering of conditions, hyperglycemia, obesity, and HTN had expanded to include hyperlipidemia, and was thought to promote diabetes (Alberti; Vague, 1956; Zambon & Crepaldi, 2003). In 1988, Reaven proposed that HTN as well as diabetes and CVD were results of and not part of, this clustering of risk factors he termed Syndrome X. Reaven delineated the specific conditions comprising Syndrome X as insulin resistance, low levels of HDL, elevated triglycerides, IGT, and hyperinsulinemia. His efforts were confirmed by other researchers such as Haffner, Valdez, Hazuda, Mitchell, Morales, and Stern (1992), Beck-Nielsen (1999), and Wilson, Kannel, Silbershatz, and D’Agostino
Syndrome X had several aliases including insulin resistance syndrome, the deadly quartet, and the plurimetabolic syndrome. Ten years later, the World Health Organization (WHO) (1998) officially recognized this clustering of risk factors and changed the name to the metabolic syndrome to reflect the underlying metabolic abnormalities. According to the WHO, HTN was a part of not an outcome of metabolic syndrome. The WHO criteria for metabolic syndrome require the presence of insulin resistance and any two of the following conditions: obesity, elevated triglycerides, low HDL, and microalbuminuria. In 1999 the European Group for the study of IR (EGIR) published a definition of metabolic syndrome that also focused on insulin resistance. By 2005 the National Cholesterol Education Program Adult treatment Panel III (NCEP-ATP III), the American Association of Clinical Endocrinologists (AACE), and the International Diabetes Federation (IDF) had all published their own definitions of what constituted metabolic syndrome.

Briefly, these five definitions of metabolic syndrome agree that people with multiple metabolic conditions such as HTN, obesity, insulin resistance, low HDL, high triglycerides, or impaired glucose tolerance/hyperglycemia, are at increased risk of CVD and or diabetes. Differences between the definitions address which and how many conditions need to be present. For example the WHO, NCEP-ATP III, IDF, and the EGIR (but not the AACE) stipulate that a minimum of three metabolic conditions must be present within the same individual for metabolic syndrome to be diagnosed. The WHO, the EGIR, and the AACE (but not the NCEP-ATP III or IDF) state that insulin resistance must be present. The EGIR and the AACE exclude individuals with diabetes, while only
the IDF definition requires the presence of obesity. Only the WHO definition specifically mentions microalbuminuria (Grundy et al., 2005; Megis, 2006; Reaven, 2006).

These different metabolic syndrome definitions have various levels of clinical utility and describe different phenotypic manifestations. For example, determining the presence of insulin resistance is more suited to research settings because measurement requires the use of the euglycemic insulin clamp method. The IDF definition of metabolic syndrome was designed to be more user friendly, requiring the presence of obesity in combination with two other metabolic abnormalities. Individuals with a normal body mass index (BMI) would meet both NCEP-ATP III (2005) and WHO (1998) definitions of metabolic syndrome if insulin resistance, HTN, and a lipid abnormality were present. A summary of the definitions is provided in Table 3. A complete discussion of the merits of each definition and the syndrome itself is not the focus of this study. Interested readers are referred to several excellent articles on the topic, Gale (2005), Kahn, Ferranini, Buse, & Stern (2005), Megis (2006), and Reaven (2006). However, regardless of the definition, persons with metabolic syndrome have a greater likelihood of developing CVD or diabetes and greater mortality from these conditions than persons without metabolic syndrome (Grundy et al., 2005; IDF, 2005; PAC, 2001; Smith, Clark, Cooper, Daniels, Kumanyika, Ofili, et al., 2005).
Table 3.

**Definitions of Metabolic Syndrome**

<table>
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<tr>
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<tbody>
<tr>
<td>Definition</td>
<td>Any 3 of 5 factors</td>
<td>IR (including diabetes) and ≥2 other factors</td>
<td>Obesity and ≥2 other factors</td>
<td>IR or fasting hyperinsulinemia in top 25% and 2 other factors</td>
</tr>
<tr>
<td>Metabolic conditions</td>
<td>Obesity</td>
<td>HTN</td>
<td>HTN</td>
<td>HTN</td>
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<td></td>
<td>hTG</td>
<td>hTG</td>
<td>hTG</td>
<td>Low HDL or hTG</td>
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<td></td>
<td>Low HDL</td>
<td>Low HDL</td>
<td>Low HDL</td>
<td>Elevated FG</td>
</tr>
<tr>
<td></td>
<td>HTN</td>
<td>Obesity</td>
<td>Obesity</td>
<td>Low HDL</td>
</tr>
<tr>
<td></td>
<td>Elevated ?FG</td>
<td>Microalbuminuria</td>
<td>Elevated FG</td>
<td>HTN</td>
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<tr>
<td>Comments</td>
<td>IR assumed if criteria met. Primary outcome is CVD. Includes diabetes. Obesity is main target for interventions. Lipid centric focus. Most widely used definition.</td>
<td>More suited for research than clinical settings. IR includes IGT &amp; diabetes. Primary outcome is CVD. More of a diabetes syndrome.</td>
<td>Designed for clinical or research use. Obesity is central feature, more of an obesity syndrome.</td>
<td>Excludes diabetes, but proposes an underlying pathophysiologic model. Requires IR, less lipid centric.</td>
</tr>
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</table>

*Note.* Grundy, et al., 2004; Grundy, et al., 2005; IDF, 2005; Meigs, 2006; WHO, 2005. Abbreviations: American Association of Clinical Endocrinologists (AACE); cardiovascular disease (CVD); European Group for the study of IR (EGIR); fasting glucose (FG); hypertension (HTN); hypertriglyceridemia (hTG); high density lipoprotein (HDL); International Diabetes Foundation (IDF); impaired glucose tolerance (IGT); insulin resistance (IR); metabolic syndrome (metS); National cholesterol education panel adult treatment panel III (NCEP ATP III); oral glucose tolerance test (OGTT); World Health Organization (WHO).
Lifestyle Factors and Metabolic Syndrome

Although genetics exerts a minor influence over the development of the metabolic conditions that comprise metabolic syndrome, lifestyle behaviors wield the greatest impact (Clement & Ferre, 2002; Duarte, Colagiuri, Palu, Wang, & Wilcken, 2003; Kumar, Abbas, & Fausto, 2004; McGarvey, Forrest, Weeks, Sun, Smelser, Tufa, et al., 2002). For example, obesity is essentially an imbalance in energy homeostasis. Obesity is estimated to affect 300 million world-wide, and another 700 million people are considered to be overweight (WHO, 2005). Obesity has been linked to decreased energy expenditure associated with the use of labor saving devices, increased availability and consumption of calorie dense and processed foods, and a more sedentary lifestyle (Caterson, Hubbard, Bray, Grunstein, Hansen, Hong, et al., 2004; Clement & Ferre; Duarte et al.; McGarvey et al.; WHO, 2005). Low socioeconomic status, decreased physical activity, and increased BMI have been associated with insulin resistance (Goodman, Daniels, Dolan, 2007; Kumar et al.; Zimmet, Hodge, Nicolson, Staten, de Courten, & Moore, 1996). Hypertension—once considered an outcome of metabolic syndrome—also has increased as a result of more sedentary lifestyles, tobacco use, and diets high in salt and saturated fats (Kumar et al.; Sherwood, 2004). Similarly, elevated fasting glucose levels, low HDL, and elevated triglycerides, can also be linked to lifestyle (AHA, 2007; CDC, 2004; IDF, 2005).

Asian and Pacific Islanders.

Asians and Pacific Island people originate from countries and communities in and around the Pacific basin such as India, Korea, Japan, China, New Zealand, Guam, Samoa,
and Hawaii. Asians and Pacific Islanders comprise about three percent of the U.S. population (U.S. Census Bureau, 2008), and are among the fastest growing minority groups in the U.S. Asians and Pacific Islanders are projected to triple in number by 2020 (Ghosh, 2003; U.S. Census Bureau). By 2050, the population of Asians and Pacific Islanders in the U.S. is expected to increase five-fold, whereas similar projections for Black Americans and Hispanic Americans are two-fold and four-fold, respectively (Ghosh, 2003; U. S. Census Bureau).

Although treated as a homogenous ethnic group in an effort to bring awareness to their concerns, Asians and Pacific Islanders, originate from multiple countries, each with their own unique histories, health care needs, sociocultural beliefs, values, and cultural practices. The health care needs of Asians and Pacific Islanders are as diverse as their countries of origin. For example, Japanese Americans have a lower death rate for cervical cancer than the general U.S. population, whereas the death rate for Chamorros with the same cancer is nine times higher than the U.S. average (AAPIHF, 2003b). Busch, Easa, Grandinetti, Mor and Harrigan (2003) found that although Japanese Americans and Native Hawaiians had similar rates of HTN, death rates attributed to CVD were lower for Japanese Americans living in Hawaii while death rates for Native Hawaiians were twice that of the state average. The mammogram rate for Asian-Indians is 40%, while just 25% of Samoans and Chamorros have had mammograms (APIAHF, 2003a, 2003b, 2003c; Chen, Diamant, Kagawa-Singer, & Pourat, 2004).

Disease prevalence, morbidity and mortality rates are just part of the problem for Asians and Pacific Islanders. Economic and geographic challenges to health also present
challenges. For example, misperceptions of Pacific Islands such as Hawaii and Samoa as idyllic, stress free, healthy places, have resulted in little attention to Pacific Islanders’ health care needs by both researchers and policy makers (Jiang, 2000; Palafox & Kaanoi, 2000). According to Louie (2001), Ro (2002), and a U.S. Census Bureau 2003 report, Pacific Islanders are less likely to graduate from high school or college, pursue a graduate degree, and own their own home than the general population. More Pacific Islanders work in service and sales occupations than in managerial and professional occupations, and have larger families and higher poverty rates than the average American. The poverty rate for Samoans is 20.2% compared with the general population rate of 12.4%. Up to 20% of Pacific Islanders are uninsured, with almost half of pregnant Samoan women not receiving early prenatal care. Some researchers feel that poverty and lack of insurance may be the most significant contributors of vulnerability to health issues (Shi, 2001; Flasketrud & Lee, 2001).

Effective communication between clients and health care providers has been identified as contributing to health care disparities (Agency for Healthcare Research and Quality, 2001; Flasketrud & Winslow, 1998), and is problematic for Asians and Pacific Islanders. About 44% of Pacific Islanders immigrated to the U.S. during the 1990s and do not speak English at home. Samoans have one of the highest rates (63.9%) of persons over age 5 who do not speak English at home (President’s Advisory Commission on API, 2003; U.S. Census Bureau, 2003). During a recent study in Los Angeles, Chen et al. (2004) found that half of the Pacific Islander respondents preferred to complete the questionnaires in their native language. This preference to communicate in a native
language is hampered by the paucity of Pacific Islander healthcare providers.

Communications issues also affect health behaviors (Palafox, Buenconsejo-Lum, Riklon, & Waitzfelder, 2002; Palafox & Yamada, 1997; Tamasese, Peteru, Waldegrave, & Bush 2004).

*Samoans*

Samoans are a sub-group of Pacific Islanders whose risk for CVD and diabetes is particularly high (Diane Ishida PhD, RN, University of Hawaii, personal communication, April, 2007; Joseph Kaholokula, PhD, University of Hawaii, personal communication, May, 2007). The Samoan Islands are located below the equator in the Pacific Ocean approximately half way between Hawaii and New Zealand. Initial Western contact with the Samoan Islands began early in the 16th century with the Spanish and other European explorers. In 1899 Germany and the U.S. divided the Islands of Samoa with American Samoa becoming a U.S. trust territory (Day, 1955; U. S. Census Bureau, 2002). Early Europeans described Pacific Islanders as stately, handsome, large in stature, strong, and muscular—essentially a well population (Waianae Book of Hawaiian Health, 1993). Samoan lifestyles involved more physical activity such as farming and fishing until after World War II. As a U.S. territory, however, lifestyles became more urban with a greater reliance on cash earnings than farming (Davison, Workman, Daida, Novotny, & Ching, 2004; Ezeamama, Viali, Tuitele, McGarvey, 2006). Indigenous peoples were able to afford the more expensive, high salt, high fat, processed foods. During the 1950s a major migratory movement to the United States began that continues today (Ahlburg & Song, 2006; Ezeamama et al.).
Cardiovascular and diabetes risk factors and metabolic syndrome in Samoans.

Unfortunately change in Samoan lifestyles has brought with it Western problems such as obesity, CVD, and diabetes. While there have been some efforts to address these health concerns, much of the research conducted with Pacific Islanders has been approached from a Western perspective. These Western-derived interventions have been less than successful, promoting more distrust than progress (Bush, Collings, Tamasese, & Waldegrave, 2004; Oneha, 2001; Palafox et al., 2002; Ro, 2002); thereby facilitating the increase in risk factors and poor health outcomes.

Information about risk factors and disease prevalence rates among Pacific Islanders in general, and Samoans in particular, is limited compared to Whites, Blacks, or Hispanics. Only three publications addressed metabolic syndrome prevalence rates in Pacific Islanders (Grandinetti, Chang, Theriault, & Mor, 2005; Lee, Huxley, Woodward, Zimmet, Shaw, Cho, et al., 2008; Simmons & Thompson, 2004). The study by Grandinetti et al. included 1,447 participants, 510 of whom were Pacific Islanders (designated as Hawaiian). Overall the three reports indicated that obesity and low high density lipoprotein were highest in Pacific Islanders. Using the NCEP-ATP III definition, Grandinetti et al. found that Pacific Islanders had higher rates for metabolic syndrome (42.0%) than Filipino (39.6%), Japanese (37.0%), and other mixed non-Hawaiians (30.1%).

Prevalence rates were higher in the study by Simmons and Thompson that targeted New Zealanders. This study used the NCEP-ATP III definition for metabolic syndrome, as well as self-reported data; actual blood samples to determine blood glucose
and cholesterol levels; and actual measures of height, weight, and waist circumference. Their sample consisted of 1562 individuals, two thirds of whom were Pacific Islanders. Pacific Islanders had the highest prevalence rates of screening detected diabetes and metabolic syndrome (greater than 50%) and more than 80% had at least two components of metabolic syndrome. The study by Lee et al. (2008) was the only study to specifically examine prevalence rates of metabolic syndrome in a Samoan population using the NCEP-ATP III, EGIR, IDF, and the WHO definitions. Regardless of the definition, metabolic syndrome prevalence was highest in the Samoan population, with Samoan women having the highest rates.

Additional information regarding risk factors shows that just over one-quarter of Samoans smoke cigarettes and the diets of westernized Samoans are high in cholesterol and sodium (AAPIHF, 2003c). In the U.S. 32.2% of adults are obese (AHA, 2007). In Samoans, obesity rates approach 80% (AAPIHF, 2003c; Curtis, 2004; Grundy et al., 2005).

In addition to high rates of CVD and CVD risk factors, Pacific Islanders have high rates of diabetes. By 2025 half of the world’s diabetes will originate in the Asia-Pacific region (AAPIHF, 2003a). Unfortunately, Samoans have already met this target: the CDC (2008) reported that 50% of adults in the U.S. territory of American Samoa had diabetes.

Although insulin resistance is a key component in several definitions of metabolic syndrome, there is some evidence that reduced insulin secretion may be an early, rather than late, manifestation of the pre-diabetic state in Pacific Islanders and a period of
insulin resistance may not occur at all. (Defay, Jaussent, Lacroux, & Fontbonne, 2007; Simmons, Thompson, & Volklander, 2001). For those Pacific Islanders who are insulin resistant, waist circumference and triglyceride levels show promise as a less invasive method than the euglycemic clamp method (Bell, McAuley, Mann, Murphy, & Williams, 2004). These issues, together with the high rates of obesity in Pacific Islanders, the use of waist circumference as the measure of obesity, and the ease of use in clinical settings, provide rationale for using the IDF (2005) definition for metabolic syndrome in this study.

Developing interventions that target modifiable behaviors using emic perspectives of concepts such as perceived risk may begin to diminish Samoans’ distrust of Western approaches. Such culturally relevant approaches are also keys to achieving Healthy People 2010 and NINR goals for minority populations such as Pacific Islanders, Samoans in particular.

Theoretical Background

Perceptions of Risk, Health Behaviors, and Health-world Views

Understanding emic perspectives in behavioral research utilizes multiple sources of information to lay a strong foundation for successful outcomes, an approach grounded in the theoretical perspective of neomodernism. This perspective evolved out of disenchantment with both modern and postmodern perspectives (Grauer, 1982) and a desire for more creative yet critical appraisals of knowledge development and applicability (Grauer; Reed, 1995; Whall & Hicks, 2002). Nightingale promoted empiric knowledge acquisition through careful observation—neomodernism promotes the use of
all methods and tools of acquiring knowledge including the use of multiple ways of knowing (Reed, 2006).

Ways of Knowing

Ways of knowing refer to the ontological processes of gaining knowledge; specifically, ways of perceiving and understanding one’s self and the world (Carper, 1978; Chinn & Kramer, 2004). These various ways of knowing include personal, aesthetic, empiric, sociopolitical, ethical, and unknowing. According to Chinn and Kramer (2004), personal knowing is an authentic understanding of the self, the moment, the context including the view of personal well being and health; and perceiving others as distinct entities separate from self. In conjunction with ethical knowing, respect for others as separate from the self fosters therapeutic interactions based on clients’ values and beliefs. Personal stories, self-reflection, autobiographies, photos, in depth descriptions are all tools used with this type of knowing. Aesthetic knowing embraces an intuitive, symbolic understanding, a real appreciation for the meaning of situations—what is underneath, in-between, beyond the surface, and a connection to the unique experiences of individual clients. Sociopolitical knowing (White, 1995) speaks to the contextual setting of clients. Individuals are indelibly marked by the sociocultural environment they identify with, which in turn affects their interpretation of health. Unknowing (Munhall, 1993) is recognizing the distinction between the self and the unique perspective or reality of others. Neomodernism also recognizes the possibility of partial truths rather than one universal truth enabling both practitioners and clients to participate in knowledge production (Reed, 1996). This implies a dynamic process, embracing critical inquiry,
preventing stagnation, while acknowledging the historical and contextual nature of knowledge. Integrating clients’ and practitioners’ knowledge using multiple perspectives aligns with both Healthy People 2010 (2004) and NINR (2006) strategic plans to decrease health disparities.

Reducing Health Disparities: Perceptions of Risk and Health Behaviors

Of the various origins of health disparities such as genetics, socioeconomic status, access, lack of research, and cultural issues (Black, 2002; Busch et al., 2003), behavior is the greatest contributor. Despite the importance of risk perceptions in behavior change models, research in this area has produced inconsistent results (Brewer et al., 2004; Sjoberg, 2006; Weinstein & Nicolich). A number of reasons for this have been proposed, including two that are particularly important to this study: (1) a lack of cultural exploration of risk perception and (2) the use of mainstream populations to develop the majority of health behavior models and theories (Brewer et al., 2004; Jacobs, 2000; National Center on Minority Health and Health Disparities, 2007; Sjoberg, 2006; Weinstein & Nicolich; Weinstein, 2003). These reasons were also acknowledged by the CDC (2004) and the NINR (2006) by the designation of risk factor modification through behavior change in minority populations as priority areas for research.

Attitudes and beliefs of individuals regarding health risks influence perceptions of risk and may at times supersede attributes and outcomes of the health hazards themselves. What is seen as undesirable by one individual or group may be seen as contributing to individual or community well-being in another. In some cultures, large body size is desirable, a source of income such as with professional sumo wrestlers, while in others,
the quest for thinness has led to psychological issues, eating disorders, and even death from over use of appetite suppressants and weight loss substances. It is important, therefore, to understand the particular world view of clients and use their perceptions of health and health hazards to promote healthy behavior.

Reducing Heath Disparities: Importance of Health-world views

Health-world views are cognitive orientations that evolve out of peoples’ attempts to explain phenomena experienced in the environment (Turton, 1997). Such explanations lead to the development of belief systems generally shared by those within the same culture (Andrews & Boyle, 2003). These health-world views contain assumptions, beliefs values, ideas, images, and ways of knowing that drive interpretations about phenomena such as health, well-being, illness, disease, and death. Such interpretations are the foundations of health behaviors. According to Turton assumptions concerning health-worldviews are:

1. Each person’s cultural world view provides the blueprint for making sense of the world.

2. Each person has a complex set of culturally influenced ways of knowing, beliefs, assumptions, concepts, and images that compose his or her health-world view, providing a framework for perceptions of health.

3. Health-world views are a subset of the ways of knowing, beliefs, assumptions, perceptions, concepts, and images that both shape and is embedded within a cultural world view.
Health is more than an absence of disease; health also encompasses feeling energetic, being able to engage in enjoyable activities, and being socially connected (Labonte, 1996). Too often, research investigating health disparities focuses on barriers to healthy behaviors, what is wrong, and individual sickness/illness behaviors from a Western perspective rather than identifying the strengths/salutogenic features of a particular culture that can be used to promote health and wellness (Dianne Ishida, Personal communication, March 2007; Turton, 1997). Identifying salutogenic features through explorations of the health-world view of people facilitates an upstream approach through health promotion (Antonovsky, 1987, 1996; Butterfield, 1990). Salutogenic approaches to health disparities focus on resources and strengths affecting clients’ location along a health continuum (Aday, 2001; Antonovsky, 1996; Bauer, Davies, Pelikan, 2006; Cromwell, Boyle, Eribes, & Michaels, ND).

Soifua Maloloina o Tagata Samoa: The Samoan Health-world View

Health-world views may be stronger barriers to access to care than lack of insurance in promoting health disparities (Andrews & Boyle, 2003; Louie, 2001; Oneha, 2001; Purnell, 2000; Turton, 1997). The overall cultural world view of the Samoan people is generally well described in the literature with little variation among the descriptions. The Samoan world view has a collectivist orientation referred to by Samoans as fa’a Samoa or the Samoan way. Despite the unrelenting encroachment of Western civilization that accelerated after WWII (Davison et al., 2004; Ezeamama et al., 2006), a majority of Samoans have maintained a strong sense of fa’a Samoa despite living in various geographic locations around the world (Diana Ishida, personal
communication, March 2007; Keawe Kaholokula, personal communication, July, 2007; McDade).

Samoans place high value on and great respect for maintaining the integrity of the family and community. For example, the concept of *feagaiga*, refers to the cultural, not financial, obligation a brother has towards a sister in maintaining/fulfilling cultural duties, thereby achieving a balance or harmony. Respect *fa’aaloalo*, is the cornerstone of *fa’a Samoa*. It is central to achieving and maintaining mental, physical and spiritual balance and harmony. Disruptions in this balance may result in divisions within the family, undermining the well being of not only the family, but the community and possible the village as a whole. Likewise being treated disrespectfully—intentionally or not—fosters mistrust. The fluidity of the concept of family from individual members through an extended network transcends temporal and geographical boundaries.

The equally important concept of *fa’alavelave* refers to any situation in which the family needs help. This can be anything from a graduation, wedding, or funeral. During times of *fa’alavelave*, it is important for family members to demonstrate love and concern by helping, which helps maintain/restore harmony and well being within the community. Overseeing this process are the *fono/chief council and matai/chief system* which manages such issues within the community, family, and extended family networks. Church ministers and family elders may also be involved based on a fundamental cultural respect for elders and a deep sense of spirituality.

Such high esteem and respect translates into sociopolitical power that is balanced by the heavy cloak of responsibility for the safety and well being of the community
placed on these leaders (McDade; Schuster, 2001; Stewart-Withers and O'Brien, 2006). They are charged with maintaining *fa'a Samoa*, managing the political and social decisions to preserve the culture, serve as role models for future generations, passing on their wisdom, and protecting the community from negative outside influences. The general community puts their faith in these leaders, that they will fulfill their obligations as cultural stewards.

Historically, these leaders were also seen as guardians of knowledge. In previous years, Samoan leaders did not view knowledge a right of the general population but something that was passed on through oral traditions and treated with reverence. The leaders categorized knowledge “every day” or “specialized.” Only persons deemed worthy or responsible enough to safeguard knowledge, develop, maintain, and use it for the betterment of the community were allowed by leaders to acquire knowledge such as navigation, canoe building, and healing (Palafox et al., 2002). As will be discussed later, this cultural belief has important implications concerning research methods with this population.

Traditional Samoan health-world views promoted wellness and spiritual harmony (Office of Minority Health, 2005; Louie, 2001; Palafox et al., 2002; Tamasese et al., 2004), yet traditional views of health did not include concepts of preventative health promotion (Levy-Storms & Luben, 2006; Mishra, Luce-Aoelua, &Hubbell, 2001). In this health-world view, certain illnesses called *ma’i Samoa*, are specific to Samoans and perceived as more responsive to treatment by indigenous healers through the use of prayer, massage, and herbal remedies. Some forms of cancer, venereal diseases, and HTN
are treated in this traditional manner (Hattori, 2006; Ishida, Toomata-Mayer, & Braginsky, 2001; Louie; Mishra, Hess, & Luce, 2003). Ill health may also be perceived as forms of punishment from ancestors for indiscretions while other illnesses are interpreted as divine punishment also best treated with prayer and traditional medicines (Ishida et al.; Louie; Mishra et al., 2003). Certain risk factors such as obesity continue to be associated with feelings of health, well-being, feeling fit, and perceived as a measure of prestige within the community (Loto-Sua, 1998; Louie, 2001; McDowell & Bond, 2006; Metcalf, Scagg, Willoughby, Finau, & Tipene-Leach, 2000; Wang, Abbott, Goodbody, & Hui, 2002).

Health-world views affect health education as well. Information regarding prevention of bad health outcomes such as premature deaths from CVD or diabetes may not have the same impact on Samoans as with mainstream American clients. Samoans and Hawaiians see death as a process through which the family can demonstrate love and concern for each other and an opportunity for the deceased to reciprocate by watching over the living (Loto-Sua, 1998; McLaughlin & Braun, 1998). Another example of the importance of understanding health-world views and education is the study by Ma’o (as cited in Jiang, 2000). Ma’o found that using brochures entitled “Respect for Children” to educate Samoans about child abuse was poorly received. Respect, fa’aaloalo, is expected by older individuals and those in positions of authority from the younger generation. Samoan parents were more receptive to the brochures when the title was changed to “Love your children”.


Health-world views, beliefs, values, and unique ways of knowing, from which perceptions of risk about health threats and health behaviors emerge, offer great insights into the best ways to approach health behavior change. This is especially true with minority people whose traditional views of health and health behaviors may contribute to development of diseases associated with Western lifestyles such as metabolic syndrome, CVD and diabetes. Capitalizing on salutogenic features of emic health-world views and perceptions of risk to develop culturally appropriate healthy behaviors is a major step toward reducing health care disparities.

Conceptual model

For the purposes of this study, Millstein’s (2003) process model of risk perception was expanded to include health-world views (see figures 1 and 2) based on the work of Andrews and Boyle (2003), Brewer et al. (2007), Palafox, Buenconsejo-Lum, Riklon, and Waitzfelder (2002), Reed (2006), and Turton (1997). For this study, constructs within Millstein’s expanded model provided a starting point for exploring perceptions of risk in Samoans. Actual testing of the expanded model in the Samoan population is reserved for future studies.

The process model of risk perception was originally developed with the adolescent population in mind (Millstein, 2003) and consists of three phases: (1) attention, (2) primary appraisal, and (3) secondary appraisal. According to this model some cue focuses an individual’s attention on the health risk. Both cognitive knowledge of potential risks and memories of similar situations mediate the degree of attention given the health risk. For example, knowledge of HIV transmission routes and memories of
family or friends affected by HIV would draw one’s attention to the hazards of unprotected sex. Affective states such as mood and contextual aspects associated with the risk also influence the degree of attention individuals give to the risk. Engaging in an enjoyable activity will facilitate positive moods, which direct individuals’ attention to the benefits of the situation rather than the risks. For example, health-world views that have favorable images of larger body sizes paired with positive images of large portion sizes of food and a lack of experience with chronic diseases such as CVD and diabetes may delay the acknowledgement of the risks associated with obesity.

Once a person’s attention is directed towards the risk, the primary appraisal phase occurs. Essentially, the questions “is there a risk?” and “would something bad happen as a result of that risk?” are answered. Processing all the available data about the risk, including links between the causal factors, requires cognitive skills, integrating personal theories with the data, and beliefs about the seriousness of and the extent to which the risk is controllable. An example might be beliefs that some illnesses are caused by a divine power and therefore not controllable or modifiable.

During the secondary appraisal phase the question “Am I personally at risk?” is addressed. This phase occurs if during the primary appraisal phase one determines that there is a potential risk to oneself. Personal feelings of vulnerability emerge at this point. Differing degrees of distress regarding vulnerability may result, leading to a variety of emotional coping strategies. For example, someone may decide his or her risk of HIV is low as they limit their partners. Persons who are overweight with an active lifestyle may not see their risk for CVD as high because they compare themselves to people who are
morbidly obese. Millstein (2003) also discussed behavior as a possible mediator in the secondary phase although it is not included in the illustration of her model. According to the model, processing all available data about a health risk draws on cognitive knowledge, memories, personal theories, beliefs, and images related to the health risk. Therefore the addition of health-world views seemed appropriate. The adapted model considers ways of knowing and associated beliefs, values, and images about health, disease, and illness that influence interpretations of health phenomena. These interpretations also include subjective and objective features of the health risks, affective influences, as well as contextual factors and behaviors making this a useful model to guide this study.
FIGURE 1: Process Model of Risk Perception Attention and Appraisal

COGNITION
- Knowledge
- Memory
- Information processing

ATTENTION PROCESS

AFFECT
- Mood states
- Affective dispositions
- Affect regulation

APPRAISAL PROCESS
- Primary appraisal
  "Is there potential risk?"
- Secondary appraisal
  "Am I at risk?"

HEALTH-WORLD VIEW

Note: Adapted from Millstein (2003) with permission.

FIGURE 2 Process Model of Risk Perception Attention and Appraisal

COGNITION
- Knowledge
- Memory
- Information processing

ATTENTION PROCESS

AFFECT
- Mood states
- Affective dispositions
- Affect regulation

APPRAISAL PROCESS
- Primary appraisal
  "Is there potential risk?"
- Secondary appraisal
  "Am I at risk?"

Operational Definitions
For the purposes of this study, key terms were defined as:

1. **Metabolic Syndrome**: The IDF (2005) definition, obesity and any two of the following: HTN, low HDL, high triglycerides, elevated blood glucose, will be used for this study.

2. **Samoan**: Pacific Islanders who self-identify as Samoans. This sub-group of Pacific Islanders share a common history, culture, and ancestry that can be traced back to either Samoa or American Samoa.

3. **Diabetes**: A fasting plasma glucose of greater than or equal to 126mg/dl, or 2-hour plasma glucose greater or equal to 200mg/dl (WHO & IDF, 2006). Samoan language does not distinguish between the various types of diabetes, using the term “ma’i suka” or sugar sickness (Muliagatele Lea’ana, personal communication, July, 2007; Luania Sula, personal communication, August, 2008, ). Data on the different types of diabetes are not readily available for Pacific Islanders; therefore, the generic term diabetes will be used.

4. **CVD**: The AHA (2007) descriptions will be used, specifically, a current or past history of a stroke, transient ischemic attack, myocardial infarction, coronary artery disease, carotid artery disease, aortic aneurysm, renal atherosclerotic disease, or peripheral vascular disease. Conditions will be discussed individually as pertinent and when specific data are available.

5. **Actual risk**: The actual level of risk will follow NCEP-ATP III criteria for low (<10%), moderately high (10-20%), and high (>20%) probability of developing CVD or diabetes within a 10-year period.
6. Perceived risk: Beliefs regarding personal vulnerability to specific health risks and to the consequences of vulnerability (i.e., the development of a specific disease and/or its sequelae).

7. Health: A subjective state of being in which the individual is in a physical, spiritual, and psychological state of well-being, and able to engage in daily activities and family and social functions in a socially acceptable manner (Labonte, 1996; Nightingale, 1859/1992; Turton, 1997).

8. Health-world view: A cognitive orientation/blueprint for understanding, and making sense of health matters including beliefs, values, ideas, images, assumptions, ways of knowing, concepts, and perceptions of health, wellness, and illness underlying health behaviors (Turton, 1997).

Significance to Nursing.

More than 100 years ago, Florence Nightingale (1992) endorsed behavioral approaches by advocating patients’ participation in their own care and advised nurses to put clients in the best position possible for nature to act. These views are supported today through the Department of Health and Human Resources Healthy People 2010 initiative (2004), the Institute of Medicine (2002), and the National Institute of Nursing Research (NINR) (2006) guidelines that stress health promotion through healthy behaviors. Facilitating healthy behaviors is also addressed in the NPSG (2008) and the NINR specifically mentions the critical role of culturally sensitive approaches in reducing health care disparities. Nursing’s holistic approach to caring for clients embraces multiple ways of knowing and incorporates emic perspectives as nurses seek to strategies to position
clients in ways that both the clients and nature may act to improve health. Thus identifying the specific health-world views and perceptions of health risks of Pacific Islanders, Samoans in particular, with metabolic syndrome, is critical for nurses in their efforts to reduce health care disparities.

Summary

Cardiovascular disease and diabetes are the leading causes of morbidity and mortality in the U.S., and in minority populations such as Samoans. Research has identified risk factors common to both diseases that converge in the metabolic syndrome. Metabolic syndrome is said to be present when three or more of these risk factors are clustered within the same individual, significantly increasing their risks of adverse health outcomes. These risks can be lowered through healthier lifestyle behaviors. Many models developed to address risk factor modification via behavior change include perception of risk, a socioculturally derived concept. Samoans bear an undue burden of risk factors associated with lifestyle such as obesity, HTN, and IGL. Understanding Samoans’ emic views of these risk factors and their cultural values and beliefs underlying perceptions of risk for CVD and diabetes, will guide modification and/or development of culturally acceptable behavior models. Interventions developed using such models align with Healthy People 2010, NINR, and NPSG goals and the holistic focus of nursing. These are goals that would have been endorsed by Nightingale herself.
CHAPTER TWO – LITERATURE REVIEW

This chapter presents a review of extant literature on risk perception and CVD, risk perception and diabetes, risk perception and metabolic syndrome, risk perception and Pacific Islanders/Samoans, and risk perception and health-world views of Pacific Islanders/Samoans. The main variables for this study are perceived risk of CVD and diabetes, and the health-world views of Samoans with components of metabolic syndrome.

Each of the priority areas or health indicators identified by the Healthy People 2010 initiatives (Department of Health and Human Services (DHHS), 2004) as critical to achieving the Healthy People 2010 goals, are amenable to a biobehavioral approach (see Appendix A). These priority areas underscore the importance of research directed at exploring key concepts in behavioral models especially in populations with health disparities. The review was conducted in two parts, each having three stages. The databases used for the review were CINAHL, Medline Ovid, PubMed, EBSCO, Ingenta, Psycho, and EBM full text journal databases.

Part One

In part one, articles were limited to original research studies published in English with the risk perception search terms in the title to focus on studies whose main purpose or goal was to explore perceptions of risk. In stage one, the search terms were Polynesian(s), “Pacific Islander(s)”, Hawaii(an), Samoa(n), Guam(anian), Chamorro, Tonga(n), New Zealand, Nauru(an), Marshall Islander, Marshallese. These ethnic designations were combined with the terms risk perception, perceived risk, and perceived
susceptibility netting 26 articles. Key terms in stage two were cardiovascular disease, diabetes, metabolic syndrome, and health-world views. When combined with the ethnic designations, 564 articles were returned, 7 of which concerned metabolic syndrome. Stage three combined the ethnic designations with the risk perception terms and cardiovascular disease, diabetes, metabolic syndrome, and health-world views separately. These searches yielded zero articles.

Of the 26 articles identified in stage one, three were literature reviews not original research, therefore were not included in this review. Two of these review articles summarized the information but did not provide the total number and type of articles reviewed or reported a partial list of articles. Hart (2005) listed each article reviewed but did not indicate how perceived risk was measured. The reference lists for these review articles were examined for further studies that met the search criteria. This yielded an additional three articles for a total of 26 original research studies. Several other articles identified in stage one were also not included in this review as the definitions of risk perception were incongruent with the definition used in this study. For example, Mosca, Jones, King, Ouyang, Redberg, Hill, et al. (2000) defined perception of CVD risk as knowledge of major causes of heart disease and one’s greatest perceived threat to health. Turner, Talmud, Visvikis, Ehnelm, and Tiret (1995) reported perceived risk as parental history of the disease.

Risk Perceptions in Cardiovascular Disease

Compared to HIV or cancer, risk perception is under-studied in cardiovascular research. This review identified fifteen studies that targeted perceptions of risk for CVD.
These studies consisted mainly of White participants (Asimakipoulou, Skinner, Spimpolo, Marsh, and Fox, 2008; Avis, Smith, & McKinlay, 1989; Carroll, Naylor, Marsden, & Dornan, 2003; Frijling, Lobo, Keus, Jenks, Akkermans, Hulscher, et al., 2004; Gabhainn, Kelleher, Naughton, Carter, Flanagan, & McGrath, 1999; Green, Grant, Hill, Brizzolara, & Belmont, 2003; Harwell, Blades, Oser, Dietrich, Okon, Rodriguez, et al., 2005; King, Thomlinson, Sanguins, and LeBlanc, 2006; Kreuter & Strecher, 1995; Mckenny, Lapane, Assaf, & Carleton, 1995; Meischke, Sellers, Robbins, Goff, Daya, Meshack et al., 2000: Montgomery, Erblich, DiLorenzo, & Bovbjerg, 2003; Samsa, Cohen, Goldstein, Bonito, Duncan, Enarson, et al., 1997; Sheppard & HELP study group, 1998), and did not explore culture/health-world views to any degree. No mention was made of any specific behavior change model or risk perception theory providing the basis for the studies although many authors mentioned perceived risk as a central construct in many behavioral change models.

Optimistic bias has been defined as underestimations of actual risk (Weinstein, 1989). Conversely, pessimistic bias is an overestimation of actual risk. Overall, participants were more likely to demonstrate optimistic bias for CVD (Avis et al.; Gabhainn et al., Harwell et al.; King, Thomlinson, Sanguins, and LeBlanc; Kreuter & Strecher; Meischke et al.; Sheppard et al.) than pessimistic bias (Asimakipoulou et al.; Frijling et al.).

Four studies reported data on ethnicity and perceptions of risk (Christian, Mochari, & Mosca, 2005; Kreuter & Strecher; Meischke et al.; Montgomery et al.). Operationalization of the concept frequently included three of the four components of
perceived risk, who is at risk for what, and when/what time frame, but seldom included the fourth, behavior (Brewer et al., 2004). Six studies used comparative assessments of perceived risk (Avis et al.; Christian et al.; Green et al.; Kreuter, & Strecher; Mckenny et al.; Meischke et al.). For example “Compared with other men and women your own age”. Qualitative studies (Carroll et al., 2003; Gabhainn et al., 1999; King, Thomlinson, Sanguins, & LeBlanc, 2006) offered greater insight as to participants’ perceptions of risk and related them to behavior. Participants in those studies felt their current lifestyle was more important than longevity, a point not revealed in the quantitative studies. This review highlighted the need to explore perceptions of risk within the health-world view of Samoans with metabolic syndrome. Table 4 presents an overview of the articles in this review focused on perceived risk for CVD including the purpose of the study, the targeted sample and ethnic makeup of participants, measures of actual and perceived risk, and main results related of perceptions of risk.
Table 4

Overview of Articles on Risk Perception and Cardiovascular Disease

<table>
<thead>
<tr>
<th>Reference</th>
<th>Purpose</th>
<th>Sample/ethnicity</th>
<th>Measure of actual risk (AR)/ Perceived risk (PR)</th>
<th>Perceived risk (PR) results</th>
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| Asimakipoulou et al. (2008). | Examine accuracy of diabetes patients’ risk estimates of heart disease & CVA as a consequence of diabetes. None mentioned. | N=95 (White n= 86, Asian n=5, Afro-Caribbean n=4), < age 80 years; no history of CVD. | AR: UKPDS Risk Engine: blood pressure, HgA1c, diabetes duration, smoking history, cholesterol, & HDL  
PR: My risk of developing coronary heart disease / CVA over the next year as a result of having diabetes is probably (visual analog 5-point scale with 1 = 0; 5 = 100%) | • More likely to overestimate risks: PR of CVD & CVA 3.5 & 5.5 times greater than actual risk respectively. |
| Avis et al. (1989)       | Examine relationship between PR & objectively measured risk for heart attacks & effect of tailored risk feedback on risk perception. | n=732 adults ages 25 to 65 years; no history of CVD.  
PR: Compared with persons of your own age/sex, how would you rate your risk of having a heart attack or stroke within the next 10 years? (5-point scale with 1=much lower than average to 5 = much | • 42% underestimated risk, 40% accurately rated risk, 18% overestimated risk.  
• Worse health & family history associated with pessimistic bias; younger less educated more associated with optimistic bias.  
• Majority receiving specific feedback did not |
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<th>Reference</th>
<th>Purpose</th>
<th>Sample/ethnicity</th>
<th>Measure of actual risk (AR)/Perceived risk (PR) results</th>
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<tbody>
<tr>
<td>Carroll et al.</td>
<td>Explore how people with diabetes perceive cardiovascular risk and how those perceptions might affect their motivation to make lifestyle changes.</td>
<td>n=20, 100% diabetic Whites, half of whom also had CVD.</td>
<td>Perceived risk (PR) results: higher than average. Change PR; those most likely to change had high AR, however 12% with high AR had decreased PR after receiving feedback.</td>
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<td>(2003).</td>
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<td>AR: Personal history of diabetes.</td>
<td>PR: What do you think your chances are of having a heart attack or CVA in the future? (Low, moderate, high)</td>
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<td>Christian et al.</td>
<td>Assess perceived versus calculated risk of CVD in ethnically diverse</td>
<td>n=110, 44% Hispanic, 29.6% White, 19.2% African American,</td>
<td>AR: blood pressure, lipid levels, BMI, WC, family history, diabetes, smoking history, glucose levels, and</td>
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<td>(2005).</td>
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**PR**: In the next 10 years, what do you think your chances are of having a heart attack or dying of heart disease compared to a woman of similar age as you? (less than 10%, 10-20%, > 20%).  
- More low risk women overestimated risk; mod/high risk women were more likely to underestimate risk.  
- “Minority” participants more likely to underestimate risk for CVD  
- 25% did not answer PR question.  
- Older age, smoking, family history, & self-rated poor health associated with higher PR. Heart attack & CVA PR were similar.  
- Overall, participants overestimated PR, women more often than men. About 50% overestimated risk by more than 20%.  
- Current treatment for diabetes, HTN, & hypercholesterolemia may have contributed to... |
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<tr>
<td>Gabhainn et al. (1999).</td>
<td>Assess attitudes and knowledge of CVD and related risk factors in Ireland. Concept: Perceived susceptibility under construct of control.</td>
<td>n=74, Irish adults.</td>
<td>AR: Not stated, but majority of participants were reported to have a high AR for CVD. PR: Not reported</td>
<td>lower PR. CVD perceived as less serious than cancer as death was painless and quicker than cancer. Older men less likely to perceive willingness or ability to change current health behavior to improve AR due to feeling healthy and perceived lack of benefits with change.</td>
</tr>
<tr>
<td>Green et al. (2003).</td>
<td>Assess PR for CVD in college undergraduate men and women.</td>
<td>N=470, 77.3% White, 7.9% Hispanic, 4.6% Black, less than 1% each of Alaskan, American Indian, Asian, Middle Eastern, and other. Pacific Islanders n=0.</td>
<td>AR: AHA risk factors for CVD such as activity and family history. PR: Compared with those of your own age and sex, how would you rate your risk of ever having a heart attack? (5 point scale ranging from 1= much lower to 5= much higher).</td>
<td>68% rated risk as low or much lower than peers; 25% rated themselves as average. Results did not differ significantly according to ethnicity. Exercising three or more times a week was associated with lower PR.</td>
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<td>Harwell et al. (2005)</td>
<td>Assess community perceptions of risk for CVA.</td>
<td>n=800, 45 years and older in rural Montana. Mean age 61 years old, 96%</td>
<td>AR: age, smoking, history of diabetes, HTN, HLP, CVD, CVA, TIA, or atrial fibrillation.</td>
<td>80% had ≥ 1 &amp; 22% ≥ 3 risk factors for CVA. Of those with ≥ 2 risk factors, 46% underestimated risk</td>
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<td>King et al. (2006).</td>
<td>Examine the influence of gender &amp; ethnocultural affiliation on the process that people of Euro-Celtic heritage undergo when faced with making lifestyle changes associated with their CAD risk. Focus on secondary prevention.</td>
<td>White, and 2% American Indian.</td>
<td>PR: Do you believe you are at increased risk of having a CVA?</td>
<td>&amp; 39% accurately rated risk.</td>
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<td>n=42, of Canadian residents with CVD. Ethno-cultural affiliation operationalized as rural or urban living.</td>
<td>AR: personal history of CVD. PR: Not reported</td>
<td>• Younger participants more likely to perceive themselves at risk than those &gt; age 65 years.</td>
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<td>• Main theme: Meeting the challenge.</td>
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<td>• Majority unaware or ignored their risk for CVD prior to their event.</td>
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<td>• Rural participants had lower PR than urban participants.</td>
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<td>• Some rural participants ignored symptoms, preferring a quicker death than that of cancer or Alzheimer’s. PR did not result in significant sustained behavior changes.</td>
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<td>Kreuter, &amp; Strecher, (1995).</td>
<td>Identify and correct inaccurate perceptions of risk for heart attack,</td>
<td>n=1131 adults 18-75 years of age in family practice in North Carolina with</td>
<td>AR: Health Risk Assessment from Carter Center of Emory University. Age, weight, body frame size,</td>
<td>• Most rated their risk as average or lower than average for heart attack or CVA.</td>
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<td>stroke, cancer, &amp; motor vehicle crashes.</td>
<td>86% White.</td>
<td>history of diabetes, blood pressure, cholesterol levels, tobacco use, alcohol use, &amp; risk factors appropriate for the other health hazards under study such as seat belt use &amp; last Pap smear.</td>
<td>45% underestimated risk, 20% overestimated risk, &amp; 35% accurately rated risk.</td>
<td>PR: Compared with others your same age and sex, how would you rate your risk of having a heart attack, CVA, fatal motor vehicle crash or cancer within the next 10 years? (5 pt. scale ranging from 1=much lower than average to 5=much higher than average).</td>
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<td>• Educated respondents were less likely to show optimistic bias overall. Women, African American, and younger respondents more likely to underestimate risk of CVD.</td>
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<td>• Women &amp; younger respondents more likely to underestimate risk of CVA.</td>
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<td>• Males and older respondents more likely to overestimate risk.</td>
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<td>• Those with accurate risk for CVA more likely to quit smoking at six months.</td>
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<td>• Those that underestimated risk more likely to increase PR when informed of their AR.</td>
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<td>Mckenny et al. (1995).</td>
<td>Examined association between self-rated risk of CVA or heart attack &amp; actual morbidity/mortality by gender</td>
<td>n=191 cases admitted to the hospital and n=573 matched controls of those attending a community demonstration project.</td>
<td>AR: CVD diagnosis based on ICD 9 codes</td>
<td>• Likelihood of a CVD event in women with high PR 4-fold higher than women with low PR.</td>
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<td>PR: Compared to persons your own age and sex, how would you rate your risk of having a heart attack or CVA within the next five years? (high, average, or low).</td>
<td>• Men perceiving themselves at average risk were twice as likely as men with low PR to have a CVD event.</td>
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<tr>
<td>Meischke et al. (2000).</td>
<td>Purpose: investigate factors associated with PR having an AMI. &amp; how that PR was related to perceptions of general health, risk-factor status, &amp; awareness of AMI in social environment, knowledge about general AMI risk and demographic variables.</td>
<td>N=1094, over age 18, 75% White, 11.2% Hispanic, 8.2% African American, 2.4% Asian Pacific, 0.6% Native American.</td>
<td>AR: family/ personal history of CVD, diabetes, HTN, high cholesterol, tobacco use,</td>
<td>• 75% rated risk as same as or less likely than others their age.</td>
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<td>PR: Compared to other women/men your age, how likely do you think it is that you could have a heart attack in the next 5 years? (5 pt scale ranging from 1=much less likely to 5= much more likely).</td>
<td>• As age increased &amp; general health decreased, PR for AMI increased.</td>
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<td>General health: In general would you say your health is excellent, very good, good, fair, poor?</td>
<td>• Family history &amp; personal history of HTN increased PR especially in younger participants</td>
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<td>• Women who did not report CVD as the most common health risk had lower PR than women answering correctly.</td>
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<td>• African Americans had higher PR than Whites</td>
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<tr>
<td>Montgomery et al. (2003).</td>
<td>Examined influence of family &amp; friend history, &amp; gender on PR of cancer, diabetes &amp; heart disease. Referenced risk perception, judgment, &amp; decision-making theory including heuristic decision-making.</td>
<td>n=522, over age 18, from a large medical center. 38% male, 4% Asian Pacific Islander, 15% African American, 12% Hispanic, 8% Asian Indian, 56% White, 6% other.</td>
<td>AR: Self report general health survey. PR: How likely are you to develop (1 of five listed diseases) in your lifetime. (0 – 100%). but were similar to Hispanics. Due to small numbers, Native American, Asian Pacific Island, or other, data was not reported. • Ethnicity did not significantly influence PR • Positive family history resulted in greater PR for both CVD and diabetes; friend history influenced PR in women only.</td>
</tr>
<tr>
<td>Samsa et al. (1997).</td>
<td>Describe PR of stroke among people at high risk for CVA from multiple centers.</td>
<td>n=1253, 90% White.</td>
<td>AR: History of CVA/TIA, atrial fibrillation, HTN, or coronary or carotid artery disease PR: do you believe you are at risk for CVA. Responses • 41% believed they were at risk. • Participants &lt; age 65 years accurately rated risk more often (50%) than older participants (30%)</td>
</tr>
</tbody>
</table>
### Reference

**Purpose**

Assess public awareness & attitudes to coronary heart disease & frequency of certain health-related behaviors in five European countries.

**Sample/ethnicity**

n=10,018, from five European countries age 16 to 69 with/without personal history of CVD.

**Measure of actual risk (AR)/Perceived risk (PR) results**

- **AR:** family or personal history of diabetes or CVD, smoking, sedentary lifestyle, non-healthy diet, three or more units of alcohol daily, and unwillingness to change behavior
- **PR:**
  - How worried are you that you might have a heart attack? (1=not worried at all to 10=extremely worried).

#### Perceived risk (PR) results

- yes/no/don’t know.

#### History of CVA or TIA, age < 65 yrs, depression, & poor health status associated with accurate risk for CVA
- 25% of those who remembered being told they were at high risk underestimated their risk.
- 98% of those aware of their risk reported healthy behaviors.
- Mean levels of worry were low for general & high risk groups despite a reasonable level of knowledge regarding risk factors.
- 1 in 20 high risk participants and 1 in 5 of general population were willing to make lifestyle changes to lower risk although heart disease was 1 of 2 main reported health concerns.
Risk Perceptions in Diabetes

Risk perception for diabetes is also understudied. Six articles (Adriaanse, Snoek, Dekker, Spijkerman, Nijpels, van der Ploeg et al., 2003; Forsyth & Goetsch, 1997; Graham et al., 2006; Kemple, Zlot, & Leman, 2005; Kim, McEwen, Piette, Goewey, Ferrara, & Walker, 2007; Walker, Kalten, Mertz, & Flynn, 2003) and one poster abstract (Cotrell, Chittleborough, Taylor, & Northwest Adelaide Study Team, 2005) were obtained during the literature search for risk perception and diabetes.

Results of this review were similar to studies of perceptions of risk for CVD. A majority of participants were White and generally underestimated risks for diabetes. Health-world views related to perceptions of risk were not addressed. There were no Pacific Islander participants reported. Two studies reported an effect of ethnicity, specifically Hispanic/Latino (Kemple et al., 2005) and Asians (Walker et al., 2003) on perceived risk. Measurements of perceptions of risk followed a standard format but did not often include a behavioral component. There were no qualitative studies or mention of specific behavioral change models or risk perception theories guiding the studies. Table 5 presents an overview of the articles focused on perceived risk for diabetes including the purpose of the study, the targeted sample and ethnic makeup of participants, measures of actual and perceived risk, and main results related of perceptions of risk.
Table 5

Overview of Articles on Risk Perception and Diabetes

<table>
<thead>
<tr>
<th>Reference</th>
<th>Purpose</th>
<th>Sample/ethnicity</th>
<th>Measure of actual risk (AR)/Perceived risk (PR) results</th>
</tr>
</thead>
</table>
| Adriaanse et al.     | To determine risk perception of diabetes in participants in a step-wise screening program in a Dutch population. PR measured as two dimensions, perceived risk of having diabetes and perceived seriousness of diabetes. | N=7736, more than 99% White, age 50 to 75, 217 were diagnosed with diabetes during the study. | **AR**: Age, BMI, sex, family history of diabetes, use of anti-HTN drugs, frequent thirst, claudication, DOE, bicycling  
**PR**: At this moment how would you estimate your risk” (Eleven-point scale from 0 to 100% and “I do not know”; 6-point qualitative scale from negligible to very high). 
I consider diabetes as (4-point scale: not a serious disease to very serious)  
- 43.5% unable to give estimate of their risk of diabetes, 31.2% estimated 0% risk, 25.3% estimated greater than 10%, and less than 3% rated themselves very high  
- Age, obesity, and taking HTN drugs did not increase PR  
- Compared with 4435 participants, 217 screening-detected diabetes participants were more likely to use “don’t know” or “no opinion”, less likely to use “no risk”, and accurately rated their risk slightly more often. Those with high PR and screening-detected participants were less likely to rate diabetes as very serious. |
| Phillips, Cottrell,  | Examined PR of diabetes across N=2836, age 15 and older. No              | **AR**: age and obesity  
**PR**: Do you consider yourself                                                                                          | • Significant portion of participants with two or more                                                                  |
<table>
<thead>
<tr>
<th>Reference</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Chittleborough, Taylor, &amp; the North West Adelaide study team (2005).</td>
<td>different ages and BMI in South Australia. Poster presentation</td>
<td>other demographics reported.</td>
<td>Perceived risk (PR) results</td>
</tr>
<tr>
<td>Forsyth, &amp; Goetsch, (1997).</td>
<td>Purpose: Are individuals with a family history of diabetes aware of their risk? Are they engaging in preventive health behaviors to reduce that risk? To see if high-risk people were aware of the preventive measures available to them. Concept:</td>
<td>N=89; age 24 to 46, 30 with parental history of diabetes, 29 with parental history of HTN, 30 without significant family history; 1.1% Asians, 3.4% Black, 95% White.</td>
<td>AR: Self report alcohol and tobacco use, family history, age, sex, education, height, and weight. Items from the Health Promotion and Disease Prevention supplement of the National Health Interview Survey measured health protective behaviors. PR: How likely participants thought they were to develop diabetes in the next 10 years; How likely the average person would develop diabetes in 10 years; How likely participants thought they were to develop HTN in the next 10 years (7-point Likert scale from no risk factors did not consider themselves at risk. • The diabetes risk group had higher BMIs, had higher PR for diabetes than the HTN and control groups, and engaged in some weight control measures but not diet and exercise • The Hypertension group did not perceive themselves to be more at risk for HTN than the other two groups • Levels of PR, did not correlate with increased healthy behaviors</td>
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<tr>
<td>Reference</td>
<td>Purpose</td>
<td>Sample/ethnicity</td>
<td>Measure of actual risk (AR)/Perceived risk (PR) results</td>
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<tr>
<td>Graham et al.</td>
<td>Perceived susceptibility. Risk reference was family history not personal behavior or other risk factors.</td>
<td>N=490; 225 with diabetes; 265 with HTN; 76% Black.</td>
<td>BM: age, sex, place of birth, language spoken at home, race/ethnicity, employment, and insurance status. Medical history PR: I believe I am at risk for diabetes/HTN. I believe I will never get diabetes (yes/no).</td>
</tr>
<tr>
<td>(2006).</td>
<td>Analyze actual and PR of diabetes and HTN in African Americans using modified versions of the ADA and AHA screening surveys.</td>
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<td>• 68% did not believe they were at risk or thought they would never get diabetes</td>
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<td>• Those with higher PR for diabetes were more likely to have higher AR scores</td>
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<td>• About 1/3 of those who underestimated their risk were actually high risk and 40% of those who felt they would never get diabetes were at high risk while 21% had low actual risk scores</td>
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<td></td>
<td>• 79% of participants who believed they were at high risk for HTN were accurate</td>
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<td>• Of those who thought they were not at risk, 65% were at</td>
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<td>Reference</td>
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<tr>
<td>Kemple et al. (2005).</td>
<td>Determine if Oregon adults at highest risk for diabetes believed there were at risk for diabetes in the future, had talked with a health care professional, and/or been tested for diabetes</td>
<td>n=1810, 84% White, adults age 18 and over.</td>
<td>AR: age over 45, overweight, obesity, sedentary, family history, Hispanic or Latino ethnicity, education, income, and access to medical care. PR: do you believe you are at risk for diabetes in the future.</td>
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<td>Reference</td>
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<td>Sample/ethnicity</td>
<td>Measure of actual risk (AR)/Perceived risk (PR) results</td>
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<tr>
<td>Kim et al. (2007).</td>
<td>Examine risk perception for diabetes in women with a history of GDM. Hypothesis: Women with a history of GDM and poor lifestyle behaviors would have high PR for diabetes and report plans to lower risk with behavior changes; Women with healthy lifestyles would have low PR even after adjusting for other risk factors.</td>
<td>n=217, 13% Asian, 71% White, 7% African American, 10% other.</td>
<td>AR: Personal history of GDM. PR: What is your chance of diabetes over the next 10 years? (almost no chance, slight, moderate, or high chance). Have you made any recent changes in your behavior that you believe will lower your chance of developing diabetes? If you don’t change your lifestyle behaviors, what is your chance of getting diabetes over the next 10 years?</td>
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</table>

Perceived risk (PR) consistently associated with PR for diabetes.
- Just 16% believed they were at high risk. This increased to 39% if no changes in behavior were planned
- 41% indicated they were at moderate risk, 35% at slight risk, and 7% at almost no risk
- Women with higher PR had more risk factors and were more likely to have plans to change their behavior in the future
- PR was not associated with recent behavior changes
<table>
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<tr>
<th>Reference</th>
<th>Purpose</th>
<th>Sample/ethnicity</th>
<th>Measure of actual risk (AR)</th>
<th>Perceived risk (PR) results</th>
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</thead>
</table>
| Walker et al. (2003).      | To assess personal risk perception for developing diabetes in practicing physicians. Optimistic bias was also measured. | n=535. 66% White, 24% Asian, 4.3% African American, 2.6% Hispanic, 86% male. Asian physicians were less likely to see Asian ethnicity as a risk factor for diabetes | AR: self-reported height, weight, age, exercise, family history, GDM, or delivering a baby over nine pounds. Participants stratified into two groups, high or low objective risk for diabetes. PR: Questions not reported (1 to 4, almost no risk to high risk). | • Almost 50% of high risk physicians demonstrated optimistic bias  
• Half of the high risk group agreed with the statement “Compared with other people my age and gender I am less likely than they are to get diabetes.”.  
• Just 35% of all physicians knew Asians were at increased risk for diabetes; More whites (73%) than Asians (44%) did not see Asian ethnicity as a risk factor for diabetes. |
**Risk Perception in Metabolic Syndrome**

No studies were identified that explored perceptions of risk for CVD and diabetes in people with metabolic syndrome.

**Risk Perception in Pacific Islanders and/or Samoans.**

Targeted risk perception research in this population is limited. Communications with a librarian at the University of Oregon, which advertises that they have one of the three largest collections of literature on Pacific Islanders in the United States, as well as several authors of published articles concerning Pacific Islanders did not produce better results than the original literature search yielding four studies (Davisson, Finucane, Pinhey, & Workman, personal communications, March/April 2006; Mary Sobralski, personal communication, October, 2006; J. Kaholokula, personal communication, October, 2007).

Studies of perceived risk in Asians and Pacific Islanders targeted diseases other than CVD and diabetes, yet participants were also more likely to underestimate their actual risks of disease. Half of these studies showed an influence of ethnicity on perceptions of risk. Measures of perceived risk were similar to other risk perception studies and used quantitative methods, several grounded in behavioral change theory. Table 6 presents an overview of the articles that focused on perceived risk in Asians and Pacific Islanders for different conditions including the purpose of the study, the targeted sample and ethnic makeup of participants, measures of actual and perceived risk, and main results related of perceptions of risk.
### Table 6

**Overview of Articles on Risk Perception and Asian Pacific Islanders**

<table>
<thead>
<tr>
<th>Reference</th>
<th>Purpose</th>
<th>Sample/ethnicity</th>
<th>Measure of actual risk</th>
<th>Perceived risk (PR) results</th>
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</thead>
<tbody>
<tr>
<td>Do et al. (2005)</td>
<td>Examine HIV testing patterns, correlates of prior testing and awareness on HIV infection in Asian and Pacific Islander men who have sex with men.</td>
<td>n=439 English speaking men, age 18 to 29 years old. 353 were Filipino, Chinese, Vietnamese, Thai, Japanese Korean. 86 (19.6%) were “other”</td>
<td>AR: Serum blood test for HIV, self reported sex practices, prior HIV testing. PR: likelihood of being HIV-positive at the time of the interview and during their lifetime (5-point scale, choices not available).</td>
<td>• PR was low. 11.5% of HIV positive subjects perceived being infected; 23.8% perceived ever becoming infected. 38% of subjects with recent unprotected sex had low PR • Subjects with high PR and low PR were equally likely to have been tested • Low PR (51.2%) was the most common reason for not being tested. Eight of 13 testing positive for HIV, did not know their status and 5 had low PR. • 43% of high risk participants accurately estimated their risk for breast cancer • More women (72%) with an average risk of breast cancer</td>
</tr>
<tr>
<td>Haas et al. (2005)</td>
<td>Examine characteristics associated with perception of breast cancer risk among women at average and high risk in San Francisco</td>
<td>n= 1619 White n= 670 Black n=308, Latina n=303, Asian/Pacific Islanders n=334 (20%)</td>
<td>AR: Gail model for breast cancer survey PR: In your opinion would you say your chances of getting breast cancer in your lifetime (much lower</td>
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<tr>
<td>Reference</td>
<td>Purpose</td>
<td>Sample/ethnicity</td>
<td>Measure of actual risk (AR)</td>
<td>Perceived risk (PR) results</td>
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<tr>
<td>Wroe, Turner, &amp; Salkovskis, (2004).</td>
<td>Investigate factors influencing parental decisions to immunize or not immunize their children and when the decision was made.</td>
<td>n=195, European n=151, Pacific Islanders n=31, Asian n=19, missing data n=8.</td>
<td>AR: not reported</td>
<td>Perceived risk (PR) results: cancer overestimated their risk. Age was inversely associated with PR. API with average risk were less likely to overestimate AR than Whites. No information was provided regarding API at high risk. High risk Blacks were less likely than Whites to accurately rate their risk.</td>
</tr>
<tr>
<td>Wroe, Turner, &amp; Owens, (2005).</td>
<td>To evaluate a decision making aid for parents considering childhood immunizations. Hypothesis: The use of the decision aid decreased subjects perceptions of risk from immunizing. Ethnicity did not impact the actual</td>
<td>n=100 European n=76, Pacific Islanders n=15 (15%), Asian n=9</td>
<td>AR: Immunization rate (63%) of children age 2 years lower than WHO target of 100%. PR: “How likely do you think it is that your child would develop each disease if the child is not immunized? Is immunized? (0 = no chance to 100 = definitely). Immunizers had higher ratings of perceived personal and community benefits than did nonimmunizers. Ethnicity was not a factor. Use of the decision aid decreased subjects perceptions of risk from immunizing. Ethnicity did not impact the actual.</td>
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<td>Reference</td>
<td>Purpose</td>
<td>Sample/ethnicity</td>
<td>Measure of actual risk</td>
<td>Perceived risk (PR) results</td>
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<td>intervention would be associated with an increased likelihood of immunizing, increased perception of benefits of immunizing, and decreased PR of immunization.</td>
<td>.</td>
<td>think it is that your child would develop any of the diseases at some point in life not immunized?” (0 = definitely not to 100 = definitely). “If your child is not immunized and develops diphtheria, polio, etc” (0 = not at all harmful to 100 = the most harmful thing I can imagine).</td>
<td>decision to immunize.</td>
</tr>
</tbody>
</table>
Health-world Views and Perceptions of Risk

No studies were identified that explored health-world views and perceptions of risk for CVD and diabetes in people with metabolic syndrome.

Part Two

It is not the purpose of this study to determine which metabolic syndrome definition is most predictive of CVD or diabetes or whether or not metabolic syndrome conveys a greater risk of CVD and diabetes than the individual components themselves. However, a brief literature search was conducted using the databases noted above to obtain a sense of the prevalence of metabolic syndrome and if a unifying pathophysiologic mechanism has been uncovered. This was also conducted in three steps. In step one, the term metabolic syndrome as a title word resulted in 6875 articles. In step two, physiology and pathophysiology were used as keywords, resulting in 208809 articles. Epidemiology and prevalence as key words resulted in 66337 articles. Step three combined the results of step one and step two and added humans and adults over 19 years as additional limitations. This resulted in 77 and 66 articles respectively. Virtually all parts of the world were represented. For example, metabolic syndrome prevalence studies included, but were not limited to populations from Spain, Finland, England, United States, Chile, China, Japan, Greece, Iran, India, Lithuania, France, New Zealand, Australia, and the Philippines.

Prevalence. Articles that looked at roles, effects, management, phenotypes or other topics not directly addressing prevalence/epidemiology were eliminated. For example, Reynolds and Jiang (2005) is a review article. The study by Freeman (2006)
looked at diagnosis and management of metabolic syndrome. Articles evaluating prevalence using the major definitions written after the IDF definition was published were retained. This left a total of 16 articles. The IDF, NCEP-ATP III, and WHO definitions were the most frequently used definitions. Except among Japanese participants (Iwasaki, Togashi, Ohshige, Yoneda, Fujita, Nakajima, et al., 2007; Lee et al., 2008; Sone, Tanaka, Ishibashi, Yamasaki, Oikawa, Ito, et al., 2006), the IDF definition resulted in a higher prevalence of metabolic syndrome (Athyros, Ganotakis, Elisaf, Liberopoulos, Goudevenos, Karagiannis, 2005; Corona, Mannucci, Petrone, Schulman, Balercia, Fisher, et al., 2007; Decoda Study group, 2007; Deepa, Farooq, Datta, Deepa, Mohan, 2007; Ford, 2005; Koehler, Ott, Benke, Hanefeld, & DIG Study Group, 2007; Kora, 2007; Monami, Marchionni, Masotti, & Mannucci, 2006, Mujica, Leiva, Icaza, Diaz, Arredondo, & Moore-Carrasco, 2008; Saely, Koch, Schmid, Marte, Aczel, Langer, et al., 2006; Skilton, Moulin, Serusclat, Nony, & Bonnet, 2007, Sone et al., 2006; Zabetian, Hadaegh, & Azizi, 2007). The NCEP-ATP III definition was more likely to be predictive of higher CVD risk (Athyros et al.; Corona et al.; Monami et al.; Saely et al.), however this advantage was removed when dyslipidemia was controlled for (Corona et al.; Saely et al.; Skilton et al.). One study included a Samoan population (Lee et al.). Only one study looked at predictive ability of metabolic syndrome and diabetes (Lorenzo, Williams, Hunt, & Haffner, 2007). These articles are listed in Table 7.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Definition</th>
<th>Population</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athyros et al.</td>
<td>NCEP-ATP III IDF</td>
<td>n=9669 Greek adults</td>
<td>• Prevalence was higher using IDF (43.4) than with NCEP-ATP III(24.5)</td>
</tr>
<tr>
<td>(2006)</td>
<td>Compared prevalence of metS with each definition</td>
<td></td>
<td>• Prevalence of CVD lower using IDF (18.3) versus NCEP-ATP III(23.3) metS</td>
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<td></td>
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<td>• Estimated 10-year vascular event risk was lower using IDF (6.1) than NCEP-ATP III(11.3) according to Framingham criteria</td>
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<td></td>
<td></td>
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<td>• Framingham criteria does not consider abdominal obesity, elevated blood glucose or high triglycerides</td>
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<tr>
<td>Corona et al.</td>
<td>NCEP-ATP III IDF</td>
<td>n=1086 White males with a mean age of 51.9 (SD 12.8) years</td>
<td>• Prevalence rate was 32% (NCEP-ATP III) and 44.7% (IDF)</td>
</tr>
<tr>
<td>(2007)</td>
<td>Compare ability of definitions to identify those at risk for hypogonadism and vascular erectile dysfunction among men with sexual dysfunction</td>
<td></td>
<td>• NCEP-ATP III was a better predictor of hypogonadism and impaired penile blood flow than the IDF</td>
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<td>• Regardless of definition, hypogonadism was 3 times higher in males with metS than males without metS.</td>
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<td>• Waist circumference, hyperglycemia, and hypertriglyceridemia were best predictors of hypogonadism</td>
</tr>
<tr>
<td>Decoda Study group</td>
<td>NCEP-ATP III IDF</td>
<td>n=14222 non-diabetics and 1516 diabetics age 25 –</td>
<td>• Using IDF, non-diabetic men/women: Chinese 12%/15%; Japanese 13.8%/2.5%; Mauritian Indians 12.8/17%; Native Indians 13.2/20.3%</td>
</tr>
<tr>
<td>(2007)</td>
<td>Estimate prevalence of</td>
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</table>
| Deepa et al. (2007). | metS using each definition                                                | 74 years of age from four countries                                        | - Except for Japanese women, prevalence was higher with IDF than NCEP-ATP III definition, but lean hypertensive, dyslipidemia subjects were not diagnosed with metS using the IDF criteria  
- Current obesity measures were inappropriate in this study for Japanese men and women  
- Agreement between definitions was poor in men ($k=0.36$) and moderate ($k=0.58$) in women |
| deSimone, et al. (2007) | WHO NCEP-ATP III IDF  
Estimate prevalence of metS and ability of each definition to identify CVD | n=2350 subjects in urban India age 40 years ±13                           | - Prevalence was highest in IDF (25.8), then WHO (23.2), followed by NCEP-ATP III (18.3), with 224 subjects having all three criteria  
- $k =$IDF with NCEP-ATP III 0.58, IDF with WHO 0.44, NCEP-ATP III with WHO 0.48  
- CVD was risk was highest among those meeting WHO criteria regardless of gender |
|                 | WHO NCEP-ATP III IDF  
Analyzed which definition was more predictive of CVD events in participants with/without diabetes over ten years (Strong heart study). | N=3945 American Indians from Arizona, Oklahoma, and North and South Dakota. | - Regardless of definition, metS significantly increased likelihood of CVD event particularly in non-diabetic participants.  
- In diabetics, the risk was highest using the WHO criteria, then the NCEP-ATP III. The IDF was not statistically significant  
- Highest prevalence identified by the IDF. Both the IDF and NCEP-ATP III identified more women than men  
- $k=$ for WHO and NCEP-ATP III was 0.56 women, 0.59 men. For IDF and NCEP-ATP III, 0.58 men, |
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<tr>
<th>Reference</th>
<th>Definition</th>
<th>Population</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford, (2005)</td>
<td>NCEP-ATP III IDF</td>
<td>n=3601 using NHANES data</td>
<td>0.77 women. Among WHO and IDF, 0.49 men 0.50 women.</td>
</tr>
<tr>
<td></td>
<td>Estimate prevalence of metS using</td>
<td>for adults over 20 years</td>
<td>• Prevalence was about 38.5% using IDF and 34.5% using NCEP-ATP III</td>
</tr>
<tr>
<td></td>
<td>each definition</td>
<td>old</td>
<td>• $k=89.8%$ in males and 96% for females</td>
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<td></td>
<td>• Using both definitions accurately identified 92.9% of subjects as positive or negative for metS</td>
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<tr>
<td>Iwasaki, (2007)</td>
<td>WHO NCEP-ATP III IDF</td>
<td>n=130 Japanese with diabetes</td>
<td>• Prevalence was IDF (58.5%), NCEP-ATP III(63.8), and WHO (72.3)</td>
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<td>Evaluate the relationship between</td>
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<td>• Proteinuria was associated with WHO and NCEP-ATP III</td>
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<td>metS diagnosis and prevalence of</td>
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<td>• IDF was not associated with any micro/macrovascular problems</td>
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<tr>
<td></td>
<td>micro/macrovacular complications</td>
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<td>• Presence of metS or increased waist circumference was indicative of micro/macrovascular issues</td>
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<td>• BMI did not differ significantly among Japanese diabetics/ non-diabetics</td>
</tr>
<tr>
<td>Koehler et al.</td>
<td>WHO NCEP-ATP III IDF</td>
<td>n=4020 Germans with diabetes</td>
<td>• Prevalence was IDF (82.6%), NCEP-ATP III(79.3), and WHO (26.1)</td>
</tr>
<tr>
<td>(2007)</td>
<td>Analyze the prevalence of metS</td>
<td></td>
<td>• $K=0.69$ for IDF and NCEP-ATP III, 0.12 IDF and WHO, 0.17 NCEP-ATP III and WHO</td>
</tr>
<tr>
<td></td>
<td>using the three definitions</td>
<td></td>
<td>• diabetes should be considered as metS equivalent</td>
</tr>
<tr>
<td>Kora (2007)</td>
<td>WHO NCEP-ATP III IDF</td>
<td>n=1373 Germans 55-74 years</td>
<td>• Prevalence was IDF (46% females, 58% males), NCEP-ATP III(24% females, 28% males), and WHO (38% females, 50% males)</td>
</tr>
<tr>
<td>Reference</td>
<td>Definition</td>
<td>Population</td>
<td>Findings</td>
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</tr>
<tr>
<td>Lee et al. (2008)</td>
<td>Estimate prevalence of metS in Southern Germany</td>
<td>n=22403                           Australia/White (42%), Japanese (9%), Korean (43%), Samoan (6%).</td>
<td>• IDF definition was less likely to be associated with C-reactive protein, leading to authors to question the worth of IDF in predicting CVD.</td>
</tr>
<tr>
<td></td>
<td>WHO NCEP-ATP III IDF EGIR</td>
<td></td>
<td>• Prevalence was lowest among Japanese and highest among Samoans especial Samoan females regardless of definition.</td>
</tr>
<tr>
<td></td>
<td>Compare prevalence across ethnic groups using these four definitions</td>
<td></td>
<td>• Prevalence of metS was 2 to 5 times higher among diabetic versus non-diabetic participants.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Obesity guidelines may be set too low for Samoans and too high for Japanese.</td>
</tr>
<tr>
<td>Lorenzo, 2007</td>
<td>WHO NCEP-ATP III IDF</td>
<td>n= 2646 Hispanics and Whites age 25-64 years old</td>
<td>• All three definitions predicted CVD risk</td>
</tr>
<tr>
<td></td>
<td>Examined CVD and diabetes risk prediction using three definitions</td>
<td></td>
<td>• Sensitivity for CVD risk was highest with IDF except for NCEP-ATP III defined males, but IDF also had higher false positive rates</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• MetS did not predict new events in subjects with existing CVD</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Sensitivity for diabetes risk was also higher for the IDF, again with higher rates of false positives than for the NCEP-ATP III or WHO</td>
</tr>
<tr>
<td>Monami et al. (2006)</td>
<td>NCEP-ATP III IDF</td>
<td>n=882 White diabetic</td>
<td>Prevalence was 73.7% with IDF and 68.4% with NCEP-ATP III</td>
</tr>
<tr>
<td></td>
<td>Assess prognostic value of the definitions</td>
<td></td>
<td>Mortality trend was higher using the NCEP-ATP III criteria</td>
</tr>
<tr>
<td>Mujica et al. (2008)</td>
<td>NCEP-ATP III IDF</td>
<td>n=1007 age 18 – 74 years in Talca,</td>
<td>Prevalence was 36.4 using IDF and 29.5 using NCEP-ATP III</td>
</tr>
<tr>
<td>Reference</td>
<td>Definition</td>
<td>Population</td>
<td>Findings</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
|                           | Prevalence and characteristics of metS | Chile                                                                      | • *k*=77%  
• Hypertension, followed by high triglycerides, and obesity were most common metS criteria present  
• Ethnic waist circumference measures should be revised |
<table>
<thead>
<tr>
<th>Reference</th>
<th>Definition</th>
<th>Population</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sone et al. (2006)</td>
<td>WHO NCEP-ATP III IDF Compared predictive power for CVD among definitions</td>
<td>n=1424 Japanese with diabetes</td>
<td>• Prevalence using IDF was lower, especially for females than either the WHO or NCEP-ATP III definitions.</td>
</tr>
<tr>
<td>Zabetian et al. (2007)</td>
<td>WHO NCEP-ATP III IDF Estimate prevalence based on definition</td>
<td>n= 10368 Iranian adults age 20 years and older</td>
<td>• Prevalence of metS was 32.1% for IDF, 33.2% for NCEP-ATP III, and 18.4% for WHO</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• $k=66.3$ between NCEP-ATP III and IDF, 39.5 between WHO and IDF</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• More females than males had metS according to the IDF and NCEP-ATP III. No gender differences with the WHO definition</td>
</tr>
</tbody>
</table>

*Note.* Metabolic syndrome (metS)
Physiology/Pathophysiology. Articles not directly addressing physiology/pathophysiology of the syndrome itself were eliminated. This included such topics as HIV, cancer, exercise, depression, and adaptation effects in people with metabolic syndrome. For example, both the study by Ahmed (2007) that looked at chloroquine as a potential treatment for metabolic syndrome associated erectile dysfunction and the study by Diamanti-Kandarakis, Christakou, and Kandarakis (2007) examining polycystic ovarian syndrome as a risk factor for metabolic syndrome were eliminated. This resulted in seven articles (Adiels, Olofsson, Riitta, and Boren, 2008; Bray & Bellanger, 2006; Chapman & Sposito, 2008; Eckel, 2007; Ito, 2004; Kolovou, Anagnostopoulou, and Kokkinos, 2005; Reaven, 2002). While a unifying pathophysiologic explanation for metabolic syndrome has not been discovered, these articles discussed what is currently known about the pathophysiology of individual metabolic syndrome components. There was little variation among the descriptions and it is beyond the scope of this study to present a complete discussion of this topic, therefore, a synopsis of the information is presented below.

Obesity. Obesity is an imbalance in energy homeostasis influenced by factors such as anxiety, shivering, food intake, time of day/month, physical activity, hormone levels and more (Clegg & Woods, 2005; Sherwood, 2004; Shimizu & Mori, 2005). As an endocrine organ, adipose tissue releases a variety of substances that interact with the appetite centers in the brain. One of the most important is leptin, an anorexigenic, appetite-suppressing hormone (Bray & Bellanger, 2006; Clegg & Woods; Sherwood). While rare, among single gene alterations that facilitate obesity, a majority involve the
leptin-POMC pathway (Kumar et al., 2004; Perusse, Rankinen, Zuberi, Chagnon, Weisnagel, Argyropoulos, et al., 2005). Working together with insulin, corticotrophin, tumor necrosis factor-α (TNF-α), adiponectin and other hormones, leptin is thought to act on neuroreceptors in the brain, producing an anorexigenic response to maintain homeostasis (Clegg & Woods; Dotsch, Rascher, Meibner, 2005; Sherwood).

*Insulin resistance and dyslipidemia.* While much remains unknown about the mechanisms involved in insulin resistance, the end result is decreased glucose uptake by muscles and adipocytes as well as decreased suppression of hepatic gluconeogenesis (Kumar et al., 2004; Sherwood, 2004). Obesity and insulin resistance are not always present in combination with each other (Reaven, 2002), however insulin resistance together with obesity leads to increased free fatty acids (FFA), increased blood glucose levels, and increased triglyceride production (Ito, 2004; Kumar et al.). This results in decreased apolipoprotein B degradation and increased plasma levels of very-low-density lipoprotein (VLDL) which in turn increases the triglyceride–HDL exchange. Triglyceride-rich HDL is hydrolyzed to small HDL particles which are then excreted by the kidneys resulting in low HDL plasma levels (Bray & Bellanger, 2006; Ito; Reaven, 2002). Remnants of VLDL are metabolized to LDL which is oxidized and taken up by tissue macrophages. These macrophages transform into foam cells, get lodged in the muscle layers of the vascular beds, and end up as lipid rich atheromatous plaques (Bray & Bellanger; Ito; Kumar et al., 2004). Although causes of hypertension can only be identified in about 10 percent of cases, calcified atherosclerotic plaque is thought to be
one of the mechanisms that contribute to the development of hypertension (Sherwood, 2004).

_Hypertension_. Approximately 90% of cases of HTN have no known cause (Kumar et al., 2004). Although exact mechanisms remain unknown, in the metabolic syndrome, HTN, dyslipidemia, and insulin resistance are thought to synergistically increase CVD and diabetes risk through immunologic, inflammatory, mechanical shear pressure, endothelial remodeling and dysfunction, and oxidative stress (Chapman & Sposito, 2008; Sherwood, 2004; Touyz, 2005). Specifically, an inverse relationship between insulin resistance and free fatty acids (FFA) has been noted. Excess FFA are stored as triglycerides in skeletal muscle and liver tissue. Intracellular triglycerides and products of FFA metabolism work in tandem to inhibit insulin signaling, most likely through adipocytokine dysregulation leading to insulin resistance (Kumar et al.). Adipose tissue produces a variety of hormones known collectively as adipocytokines. Dysregulation of adipocytokines exacerbate inflammatory responses promoting vascular permeability, leukocyte adhesion and vascular remodeling (Chapman & Spositis; Touyz). Vascular remodeling facilitates vascular wall thickening and scaring, leading to increased peripheral vascular resistance, or vascular stiffening and endothelial dysfunction. Both endothelial dysfunction and increased adiposity have been associated with rennin-angiotensin stimulation and subsequent increase in angiotensin-II, aldosterone, and antidiuretic hormone levels as well as increased sympathetic nervous system stimulation (Sherwood; Touyz). Chronic sympathetic nervous system stimulation produces further remodeling, baroreceptor dysfunction, and reduced bioavailability of nitric oxide whose
potent vasodilating effects are blunted in insulin resistant states, further promoting HTN (Chapman).

Summary

This review of studies of perceptions of risk for CVD, diabetes, and metabolic syndrome was consistent with observations of the National Center on Minority Health and Health Disparities (2007) and Brewer et al. (2004), which are the following: (1) the majority of studies focus on mainstream populations with very limited research in minority populations, particularly among Pacific Islanders in general and Samoans specifically; (2) there are no studies looking at perceived risk and metabolic syndrome and no studies of perceived risk for CVD and diabetes/ diabetes in Pacific Islanders or Samoans with metabolic syndrome. In those studies reporting ethnicity and perceptions of risk, 8 of 10 studies found a relationship between perceived risk and ethnicity, but culture and health-world views were either not explored or only briefly mentioned. Overall, participants were more likely to underestimate their risk for CVD and diabetes. Measurements of perceived risk was fairly standard, but seldom included a behavioral component. The few qualitative studies that included behavior offered greater insight as to participants’ perceptions of risk. This review highlighted the presence of metabolic syndrome across geographic, cultural, and ethnic boundaries world wide and the ongoing need for research into the pathophysiology and outcomes of metabolic syndrome as well as the need to explore health-world views of Samoans with metabolic syndrome and their perceptions of risk for CVD and diabetes, the primary focus of this study. Using Samoan perspectives of risk for CVD and diabetes in current behavioral change models may lead
to culturally acceptable interventions directed at reducing health care disparities in this population.
CHAPTER THREE – METHODOLOGY

This chapter describes the methodology for this descriptive study. Specifically this chapter includes the study design, sample, setting, and procedures for recruitment, human subjects protection, measurement of variables, and data analysis.

Design

This study used a mixed method design to describe perceived risk of CVD and diabetes and health-world views of Samoans with two or more components of metabolic syndrome. Currently, there are over 30 mixed methods research designs (Onwuegbuzie & Collins, 2007). Mixed methods research uses both qualitative and a quantitative data in one study or a succession of studies examining the same phenomena (Onwuegbuzie & Leech, 2006; Sandelowski, 2000; Tashakkori & Teddlie, 2003). Based on the paucity of prior research and the need for a better understanding of perceived risk in Samoans, the design chosen for this study was a dominant-less dominant design (Figure 3). When using this design, the first step is to identify a qualitative or quantitative dominant, or core component. In this study, the dominant component was qualitative. The next step is to identify a less-dominant or supplementary component. In this study, that component was quantitative. The nomenclature for this design is QUAL + quan (Munhall, 2007; Tashakkori & Teddlie). The qualitative component used the method of qualitative description to guide focus groups to ascertain the emic view of Samoans. The quantitative component described actual risk and consisted of a descriptive analysis of perceived risk questions. The final analysis was an integration of both qualitative and quantitative data.
Sample

Samoans with two or more components of metabolic syndrome (IDF, 2005) living on the Island of Oahu were recruited. With 899,593 residents, Oahu is the most populous island in Hawaii, a state with a total population of 1,285,498. Of those citizens, 28,184 are Samoan or part Samoan. Samoan population distribution is shown in Figure 4 (State of Hawaii Department of Health, 2001).
The study inclusion criteria and exclusion criteria were as follows:

**Inclusion criteria.**

1. Self-described Samoans living on the Island of Oahu;
2. Age 18 or older;
3. Male or female;
4. Ability to speak, read, write, and comprehend either English or Samoan;
5. Presence of two or more components of metabolic syndrome as defined by the IDF (2005): Obesity, measured by waist circumference and HTN, low HDL, high triglycerides, elevated fasting glucose, or impaired glucose tolerance.

**FIGURE 4.** Samoan Population on Oahu by Census Tract

Island of Oahu
Samoan Population by Census Tracts: 2000
(Race Alone or in Combination)

- Samoan Population
  - 0 - 100
  - 101 - 350
  - 351 - 600
  - 601 - 1460

Note: Percent figures displayed in map are the number of Samoans as a percent of the total census tract population.
Exclusion criteria.

1. Personal history of diabetes;

2. Personal history of CVD such as heart attack, stroke, renal disease, diabetes, or other condition indicative of an existing CVD diagnosis as defined by the American Heart Association (chapter 1, operational definitions).

3. Age younger than 18 years.

Sample size. Sampling decisions significantly influence the credibility and validity of inferences made from study results. Concerns regarding sampling decisions in mixed methods research are only recently gaining attention and are not listed as one of the six major concerns in the Tashakkori and Teddlie 2003 Handbook of Mixed Methods (Onwuegbuzie & Collins, 2007; Teddlie & Yu, 2007). To improve credibility and validity of results of this study, this investigator used a relatively new framework specifically developed to address this methodological gap in mixed methods literature, (Onwuegbuzie & Collins). This framework uses a seven-step decision process and a two-dimensional sampling model (Appendix B). It is beyond the scope of this study to present the details. Interested readers are referred to the original article (Onwuegbuzie & Collins). The steps begin with identifying the research goals, objectives, and purposes. For example goals include making inferences or gaining insights into a particular phenomenon, Objectives refer to exploring, predicting, describing, or influencing. These seven steps as they apply to this study were:

1. Research goal(s): Understand a complex phenomenon and add knowledge.

2. Research objectives: Explore and describe.
3. Research purpose: Convergence and complementarity.

4. Research questions: Explore and describe using both qualitative and quantitative data

5. Research design: Concurrent.

6. Sampling design: Identical participants for each strand.

7. Sampling scheme: Homogenous, criterion-based, non-probabilistic.

Steps 1 and 2 were discussed in chapter 1 (statement of purpose and aims). Regarding Step 3 the purpose of using mixed methods in this study is to look for convergence and complementarity. Complementarity refers to the use of different data sources to obtain alternate or overlapping views of phenomena. In this study complementarity was accomplished using a quantitative approach in the form of two closed-ended questions and qualitatively through focus group discussions. Convergence refers to arriving at shared conclusions from data collected by the different methods such as definitions of constructs and confirmation or strengthening of results thereby increasing the validity of outcomes (Johnson, Onwuegbuzie, & Turner, 2007; Tashakkori & Teddlie, 2003).

Determining complementarity and convergence involves some or all of the following sub-steps (Onwuegbuzie & Teddlie, 2003; Voils, Sandelowski, Barroso, & Hasselblad, 2008):

1. Data reduction.

2. Data display.

3. Data transformation.

4. Data correlation.
5. Data consolidation.

6. Data comparison.

7. Data integration.

Step 4, Research questions, derive from the study purpose. Step 5 refers to time or the temporal order of data collection. Concurrent data collection as opposed to sequential, was appropriate for this study based on the purpose for using mixed methods, convergence and complementarity. Step 6, sample design, denotes the association between the qualitative and quantitative samples. Four options are available: identical, parallel, nested, or multilevel. This study used identical samples indicating the same participants completed both qualitative and quantitative phases. Step 7, the sampling scheme refers to representativeness. Specifically this refers to probabilistic or nonprobabilistic sampling. A homogenous, criterion-based, non-probabilistic sampling scheme was used to obtain information-rich participants.

Based on the decisions made in the steps noted above, Onwuegbuzie and Collins (2007) provided recommendations for minimum sample sizes. According to Onwuegbuzie and Collins, recommendations for the minimum sample size were based on existing guidelines and conventional values for a moderate effect size (0.50), power (1-\(\beta\)) 0.80, and alpha (\(\alpha\)) of 0.05. The value for 1-\(\beta\), 0.80 indicates a 20% chance of a Type II error, and \(\alpha\), 0.05 indicating a 05% probability the results were due to chance. Using this process, three to four focus groups with six to 12 participants each, resulting in a total sample size range of 18 to 48 was initially targeted. These numbers were checked using Cohens’s (1992) calculations of \(\gamma\) for small (0.20), medium (0.50), or large (0.80) effect
sizes, estimated sample sizes were 645, 91, and 42 respectively. One additional check for sample size was completed. Sample sizes for qualitative methods are based on achieving data saturation. Data saturation is discussed further under data analysis and is generally achieved within three to four focus groups (Krueger & Casey, 2000; Morgan, 1993). This supports the results achieved using the sampling framework noted above. Combining the three sample size determinations and considering the resources of the investigator, the target sample size was 48.

Using a sample size of 48 assumes a large effect size. Effect size refers to the intensity, magnitude, or significance of the relationship between variables (Cohen, 1992; Tashakkori & Teddlie, 2003). This can be determined using pilot studies, prior research, or if little or no research is available, conventions based on the expected effect size: small (0.20), medium (0.50), or large (0.80) (Cohen; Polit & Beck, 2006). According to Polit and Beck, most nursing studies do not exceed an effect size of 0.50.

Decisions regarding sample size and therefore effect sizes potentially impact the validity of inferences made in studies testing hypotheses. More specifically, choosing the smaller sample size (42-48) makes it harder to identify differences between groups or differences in treatment effects unless such effects are large. With smaller effect sizes, differences may be overlooked, leading to Type II errors or concluding there is no difference between groups when one actually exists. Larger sample sizes increase power making it more likely to find very small differences even if such differences or treatment effects are insignificant. Classifying these differences as significant, or rejecting the null hypothesis is a Type I error. Lowering the significance/alpha level also increases power
and decreases the likelihood that such differences are due to chance, but also makes it
deeper to detect any differences. The procedures for determining the study sample size for
both qualitative and quantitative strands of 42 to 48 participants were confirmed in a
personal communication with Tony Onwuegbuzie (September, 2008)

Setting

Four Samoan churches on the Leeward side of the island of Oahu were contacted
as possible recruitment sites. Three chose to participate. Two of these have
Samoan/Pacific Islander-only congregations and conduct services in the Samoan
language. Sixty-five percent of participants were recruited from one church that served
as the primary recruitment site. According to the culture broker (more explanation of this
person below) and two church members, the primary recruitment site consists of more
than 400 congregants. A small percentage, 10% or less, are Tongan, the remaining
congregants are Samoan. Some services at the church such as the youth programs and
outreach programs are in both English and Samoan. The remaining two recruitment sites
have mixed ethnic congregations, however they offer Samoan language services. No
further information is available about the church that chose not to participate. The
investigator lives within seven miles of both recruitment and data collection sites.

Data collection occurred in two locations: (1) meeting rooms at the church serving
as the main recruitment site and (2) a conference room at a nearby restaurant. The
restaurant conference room was selected based on availability, location, and ability to
preserve privacy/confidentiality of participants. Specifically the room was available by
reservation only and accessible through only one door. Two focus groups were conducted at the church, five occurred in the restaurant conference room.

**Measurement of Variables**

An investigator-developed self-report, pen and paper 18-item questionnaire served as the quantitative data collection tool for this study. The questionnaire included demographic and risk factor characteristics, current medication list, and components of metabolic syndrome (waist circumference, HTN, dyslipidemia, elevated blood glucose). This form contained no identifying information (Appendix C).

**Demographic characteristics.** Demographic characteristics included gender, year and place of birth, language spoken at home, education level, and occupation. Education level was operationalized as less than high school, high school, some college/associates, bachelors, or graduate degree. Occupation was operationalized as home/student (unemployed, homemaker, student), blue collar (truck driver, warehouse, laborer, security, construction), white collar (clerical, cashier, education assistant, data technician, purchaser, self-employed), and professional (youth counselor, teacher). Birthplace was operationalized as Samoa/American Samoa, Hawaii, and United States.

**Actual risk.** As noted in chapter 1, operational definitions, actual risk for CVD and diabetes for this study was determined using risk levels outlined by the NCEP-ATP III (2004) criteria for adults without CVD or diabetes. Briefly, high risk individuals have a CVD or CVD-risk equivalent and have a greater than 20% risk of new or recurrent disease over a 10 year period. Individuals with two or more risk factors and/or metabolic syndrome are classified as moderately high with a 10 year risk of disease between 10-
20%. Individuals with one or less risk factors are considered at low risk. All participants in this study were in the moderately high risk group.

*Perceptions of risk.* Perceptions of risk for CVD and diabetes were measured using two methods: (1) two self-report quantitative questions and (2) focus groups. Data for the qualitative core component of this mixed methods design were obtained using focus groups. The interview guide is listed in Appendix D. Focus groups were originally designed to evaluate responses to radio broadcasts by researchers at Columbia University and have evolved into a useful qualitative method (Kidd & Parshall, 2000). Focus groups are well suited for gaining the emic perspective of phenomena as they promote lines of communication, offer a method of active listening, promote respect and trust (Krueger & Casey, 2000; Morgan, 1993).

Focus groups were culturally appropriate for these participants, because most important issues are discussed collectively in *fa’a Samoa* (Tamasese et al., 2004). Other culturally appropriate strategies included flexible start and ending times, providing food in line with the custom of *fa’alavelave* (healthy food choices were available), providing opportunities to begin and/or end the focus group discussions with prayer, and having the culture broker available during the discussions (Loto-Sua, 1996; Tamasese et al.). Additional measures to enhance the trustworthiness of this method are listed in Appendix E.

Table 8
*Determinants of Metabolic Syndrome Components and Data Collection Procedures*

<table>
<thead>
<tr>
<th>Component</th>
<th>Definition</th>
<th>Data Collection Procedures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Condition</td>
<td>Criteria/Measurements</td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>HTN</td>
<td>Based on JNC VII guidelines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Normal = &lt; 120/80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-HTN = 120-139/80-89</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HTN = 140+/&lt;90+</td>
<td></td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>Based on ATP III guidelines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LDL: Normal = &lt;100</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Borderline high =130-159</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High = &gt;160</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HDL: Low = &lt; 40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High = &gt; 60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Cholesterol: High = &gt;200</td>
<td></td>
</tr>
<tr>
<td>Glucose intolerance/Insulin resistance</td>
<td>Based on ATP III guidelines</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fasting glucose &gt;110</td>
<td></td>
</tr>
</tbody>
</table>

Collection of quantitative perceived risk data consisted of asking two questions (Appendix C) that were based on the literature and reviewed with subject matter experts. The stem “What do you think your risk is of developing ” as noted in chapter 2, has been used reliably in multiple studies in such diverse topics as cancer, HIV, immunizations, and CVD (Do, Chen, McFarland, Secura, Behel, MacKellar, et al., 2005; Frijling et al.,
2004; Montgomery et al., 2003; Wroe, Turner, & Owens, 2005) and with different populations such as whites, Hispanics, and blacks (Christian et al., 2005; Montgomery et al.). The specific response scale is discussed below. The questions were translated into Samoan using the translation process described by Jones, Lee, Phillips, Zhang, and Jaceldo, (2001) based on Brislin’s translation theory with the cultural modifications described previously (Siaki, 2008, in review). A description of this procedure is in Appendix F. This three-step-process included back translation by bicultural, bilingual Samoan translators and pilot testing. The consent form and data collection sheet were also translated into Samoan.

Preliminary testing of the instruments: To check content validity, the data collection sheet, the risk perception questions, and a draft of the consent form underwent preliminary testing. As part of previous coursework, the English and Samoan versions of the risk perception questions were pilot tested using two response scales. For this preliminary testing, participants (n=17) were adult bilingual Samoans ages 28 to 60 years old. All were obese and all met the IDF criteria for metabolic syndrome. They lived in different geographic areas than the sample for this report. Both the Samoan and English versions were tested. The questions were:

1. What do you think your risk is of developing heart disease in your lifetime if you make no changes in your current lifestyle (diet, activity level, tobacco use, stress level)?
2. What do you think your risk is of developing diabetes in your lifetime if you make no changes in your current lifestyle (diet, activity level, tobacco use, stress level)?

Two response scales were used, a 5-point verbal scale: none/very low, low, moderate, high, and very high and a numeric scale from 0 to 100%.

The only suggested revisions from the participants concerned the response scales. Specifically, the verbal response scale was difficult to understand as there are no conceptual equivalent terms in Samoan for very low versus low, “moderate”, and high versus very high. The numeric scale was more acceptable and easy to understand. The other recommendation was to keep the verbal cues “low” and “high” as anchors for the numeric scale as these concepts are readily translatable and easily understood by participants. A numeric scale is also appropriate for use with non-Western cultures (Kapadia-Kundu & Dyalchand, 2006) or when comparing perceived risk with actual risk factors (Weinstein & Diefenbach, 1997). The resulting scale used in this study is shown in Figure 5. The reading level of the English and Samoan data collection sheet including the risk perception questions is 7.4 and 14.7 respectively according to the Flesch-Kincaid grade level scale. A list of the variables by research aims and associated measures are listed in Table 9.

**FIGURE 5:** Verbal Numeric Response Scale for Perception of Risk

<table>
<thead>
<tr>
<th>0</th>
<th>10</th>
<th>20</th>
<th>30</th>
<th>40</th>
<th>50%</th>
<th>60</th>
<th>70</th>
<th>80</th>
<th>90</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low/Maualalo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High/Maualuga</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 9

Research Aims, Variables, and Measurement Plan

<table>
<thead>
<tr>
<th>Research Aim</th>
<th>Variable</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Describe participants’ perceptions of perceived risk of CVD and diabetes.</td>
<td>Perceived risk for CVD</td>
<td>What do you think your risk is of developing heart disease in your lifetime if you make no changes in your current lifestyle (diet, activity level, tobacco use, stress level)?</td>
</tr>
<tr>
<td></td>
<td>Perceived risk for diabetes</td>
<td>What do you think your risk is of developing diabetes in your lifetime if you make no changes in your current lifestyle (diet, activity level, tobacco use, stress level)?</td>
</tr>
<tr>
<td>2a: Compare participants’ actual risk of CVD based on presence of components of metabolic syndrome to their perceived risk for CVD.</td>
<td>Actual Risk</td>
<td>By meeting inclusion criteria and by definition, all participants were at moderate to high risk for CVD and diabetes.</td>
</tr>
<tr>
<td></td>
<td>Perceived risk for CVD</td>
<td>Perceived risk:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Same as in Aim 1 above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Codes and categories identified from focus group data.</td>
</tr>
<tr>
<td>2b: Compare participants’ actual risk of diabetes based on presence of components of metS to their perceived risk for diabetes</td>
<td>Actual Risk</td>
<td>All participants at moderate to high risk for CVD and diabetes.</td>
</tr>
<tr>
<td></td>
<td>Perceived risk for diabetes</td>
<td>Perceived risk:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. Same as in Aim 1 above</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Codes and categories identified from focus group data.</td>
</tr>
<tr>
<td>Aim 3: Describe the relationship among participants’ health-world views and perceived risk of CVD/diabetes.</td>
<td>Samoan health-world view</td>
<td>1. Demographic data</td>
</tr>
<tr>
<td></td>
<td>Perceived risk for CVD and diabetes</td>
<td>2. Codes and categories from focus group data</td>
</tr>
</tbody>
</table>

Note. Metabolic syndrome (metS).
In addition to using the stem question identified in the literature, consulting with subject matter experts, and pilot testing the questions, other measures to achieve rigor included the following: having one person (the investigator) collect all data including waist circumference measures (see Table 8), providing clear concise directions to participants, using the services of the culture broker (see below) as needed, providing written information in English and Samoan, and taking steps to decrease attrition such as reminder calls prior to data collection. Other methods to enhance rigor are discussed below and in Appendix E.

Health-world view. Samoan health-world views were explored using qualitative information collected during the focus group interviews. Questions were devised from the literature using other qualitative studies that explored health beliefs. The list of questions was also reviewed by a qualitative cancer clinician and researcher on the Island of Oahu who has Samoan clients. The question guide used to collect the focus group data is listed in Appendix D.
Procedures

Human Subjects Procedures

This study was approved by the Human Subjects Protection Program at the University of Arizona. Consent forms (Appendix G) followed the template of the Program, including statements retaining the right of participants to withdraw from the study at any time and the study purpose. The English consent and data collection forms were translated into the Samoan language. The reading level of the English and Samoan consent forms according to the Flesch-Kincaid grade level scale is 8.0 and 14.7 respectively.

Potential risks. Potential risks of the study included new awareness that conditions such as HTN, obesity, and the metabolic syndrome significantly increase risk of CVD and diabetes; this new awareness might have caused some anxiety regarding health risks. Upon request, participants were referred to their health care provider to discuss any specific concerns about these conditions and need for continuing care after data collection was complete. There are at least three clinics that are free or accept payment on a sliding scale located in Leeward Oahu if participants do not have their own health care provider.

Potential benefits. There was no direct benefit for individual participants. A vicarious benefit may have been that participants with inaccurate perceptions of risk became more aware of their actual risk through focus group discussion and chose to maintain or initiate health-seeking behaviors. Longer range benefits may have been using knowledge gained in this study to develop or extend existing behaviors that also
could extend to other Pacific Island populations with similar health-world views. Respectful use of cultural knowledge potentially fostered trust, which may have a positive impact on future work with this population aimed at decreasing health disparities. These possibilities together with steps outlined above weighted the potential benefits greater than the potential risks of this study.

*Entrée with a Culture Broker*

Chapter 1 provides a discussion of Samoan cultural world views, issues of distrust with Western researchers, and view of keepers of knowledge. Briefly, prior experience with Western researchers has not resulted in a relationship characterized by trust or one producing successful outcomes. Culture brokers are individuals that provide a vital link between researchers and participants not only for language and communication, but to assist with adherence to cultural customs, including avoiding behavior that may seem offensive to the potential participants (Eide & Allen, 2005; Loto-sua, 1996). Both culture brokers used in this study volunteered their services, stating that they felt the research was important to the health of the Samoan community. The primary culture broker was recommended by several Samoans in the local community and is a member of the Church that served as the primary recruitment site. She is a teacher of special needs children, follows *fa’a Samoa*, and frequently translates documents for her church and members of the congregation. She introduced the investigator to the Church leaders at the primary recruitment site and to the congregants once the Church leaders gave their approval. She also translated the study consent form, HIPAA form, and data collection items into Samoan. According to the culture broker, 75% of the intended sample population were
fluent in English; however, based on her recommendations, all consenting documents were translated as previously noted. The consensus was that having the forms available in Samoan would be viewed by the Samoan community as a gesture of goodwill and respect for fa’a Samoa. She generously volunteered all of her services. Because of scheduling conflicts and family emergencies, a second culture broker was required to achieve recruitment goals. This second culture broker was known to the investigator through family connections and facilitated recruitment at the two other sites. He attends church services at one of the sites, is active at a Samoan community center, and has also functioned as a language translator in California and Arizona. Letters of support from the culture brokers and the primary recruitment site are in Appendix H.

Accessing the Community

Each culture broker introduced the investigator to the ministers and a few informal community leaders at the churches in which they were members or knew the congregants through family or community connections. The primary culture broker introduced the investigator at the church used as the primary recruitment site only, while the second culture broker introduced the investigator to members of the other three churches. Both culture brokers provided invaluable cultural guidance throughout the study, negotiated times and dates for presentations to potential participants, translated as necessary during oral presentations, and networked with church and community leaders and potential participants to identify other potential participants. Church leaders expressed their support of this study (Appendix H). Use of churches as sites of recruitment is appropriate because religion plays a major part in Samoan life and census
tract information may not be up to date (Ishida et al., 2001; Levy-Storms, 2006; Mishra et al., 2001). Unlike Native American communities, Samoan communities do not have formal councils that must be approached for permission to engage in research. However, approaching community leaders prior to contacting community members at large is culturally congruent with fa’a Samoa. It is also congruent with their view of social hierarchy, specifically the Matai/chief system, which shows respect for the cultural customs and openness on the part of the researcher to learn from the community, and follows recommendations of the Guidelines for Research with Pacific Islanders (Flaskerud & Winslow, 1998; HRC, 2006; Kinloch, 1983; Loto-Sua; McDade, 2002; Simmons & Mesui, 1999). As noted by other researchers (Eide & Allen, 2005; Flaskerud & Winslow) having the support of community leaders also increased the likelihood of recruiting sufficient numbers of participants for this study.

**Recruitment**

Participants were recruited using criterion-based purposeful sampling. This sampling method selects informants based on specific characteristics such as the variables of interest as opposed to random sampling (Sandelowski, 2000; Tashakkori & Teddlie, 2003). For descriptive studies such as this one, selecting participants that embody the qualities of interest or information-rich cases was a key factor to achieving the study aims. The main study variables were health-world views and perceptions of risk of Samoans at risk for CVD and diabetes.

After obtaining approval from the leaders of the Samoan community at the recruitment sites, the investigator and the leaders agreed on procedures to address the
congregants. The investigator presented information about the study after church functions and events. Prior to each presentation, the culture broker introduced the investigator in Samoan using an English script as a guide (Appendix G) and clarified the investigator’s role as a researcher and academician, not as a health care provider. The investigator reviewed inclusion/exclusion criteria, study requirements, the confidential, voluntary nature of the study, and the right to withdraw at any time. The culture broker then repeated this information in Samoan. The investigator handed out business cards to interested persons after the presentations. This process, followed at each church presentation, yielded no participants. After four presentations, discussions with both culture brokers resulted in minor alterations in the process. Interested recruits were asked if they would be willing to participate in the focus group the same day or within a few days after the presentation was given. All but one focus group was conducted on the same day as the request for participants. If meeting rooms at the Church were not available, the focus groups were conducted at a nearby restaurant that had a quiet meeting room available. Just one focus group was held on any particular day.

Once eligibility was established, the investigator obtained informed consent (Appendix G) and gave participants the data collection sheet to complete. The investigator collected these sheets and reviewed them for missing data, asking participants to complete missing responses at that time. Then, the investigator obtained waist circumference using the procedure described in Table 8. No personally identifiable information was documented on the data collection sheet. Once the data collection sheets were completed, the focus group started.
Focus Groups

Each session was conducted using the same format. Immediately prior to asking the questions (Appendix D), the investigator reviewed the purpose, confidential and voluntary nature of the study, and provided an opportunity to ask questions and opt out of the study. At the request of participants, each session ended with a prayer. To facilitate transcription of data, the investigator kept a log during each session that detailed the speaking order of participants by number. Participants were asked not to use names to preserve confidentiality on the audio recordings. Participants were not paid, however similar to the custom of fa’alavelave food was provided at each session.

Measures to enhance the trustworthiness of the study by facilitating the quality of focus group data followed recommendations noted in the literature (Cote-Arsenault and Morrison-Beedy, Kreuger & Casey, 2000; Morgan, 1993, Ruff, Alexander, & McKie, 2005). Specifically, these included the following methods:

- Maintaining the attention on data gathering not treatment
- Use of open-ended questions
- Active listening
- Showing respect, including a non-judgmental attitude toward participants
- Limiting the sessions to one hour
- Keeping questions simple, free from technical language
- Not using leading questions, maintaining consistency of terms, using conversational tones, and repeating/rewording questions as needed
The investigator took care of practical issues such as back up batteries for the recorders, and reserved the meeting rooms (Morgan, 1993, Ruff et al., 2005) (see also Appendix E). As soon as possible after each session the investigator:

1. Transferred the digital recordings to the main computer.
2. Placed the data collection sheets and consent forms in a locked file cabinet.
3. Hand delivered the speaking order list and audio recordings to the transcriptionist.
   Entered data from the collection sheets into Microsoft Excel 2003 then uploaded into SPSS version 17.
4. Verified accuracy of transcripts as soon as they were available from the transcriptionist using Microsoft Word 2003.
5. Imported the Word documents into Atlas ti The Knowledge Workbench version 5.2.
6. Analyzed focus group data.

Sufficient data to achieve saturation for the qualitative component of the study occurred with focus group four, at n=32; however, data collection continued in order to meet the sample size for the quantitative component. Data saturation is determined during data analysis and is more than the number of times or frequency with which properties of a concept are detected. It is the point at which no new data or discoveries are obtained regarding the range of information, the identification of properties of the concept, and relationships among themes and categories (Munhall, 2007). Data saturation can take from 10 to 40 interviews or 3 to 4 focus groups (Krueger & Casey, 2000; Morgan, 1993; Munhall, 2007). The final sample size was 43 participants.
Data Analysis

Data for this study were analyzed using a parallel mixed methods analysis as described by Tashakkori and Teddlie (2003) and Onwuegbuzie, Slate, Leech, and Collins (2007). Prior to the actual analysis decisions are made with regards to the number of data types, the data analysis type, whether analysis will be concurrent or sequential, and the priority given to each type of data. For this study, two data analysis and data types were used: quantitative questionnaires and focus groups with descriptive statistics and content analysis respectively. Analysis was concurrent with priority given to the qualitative strand. Table 10 outlines data analysis by study aim. These decisions lead to a seven-step process that can be used in part or whole as applicable (Onwuegbuzie et al., 2007; Tashakkori and Teddlie, 2003). This process with the corresponding techniques used in this study are:

1. Data reduction: Descriptive statistics and content analysis.
2. Data display: Tables.
3. Data transformation: Narrative descriptions of quantitative results.
4. Data correlation: Quantitative data was correlated with qualitative data during interpretation stage.
5. Data consolidation: Qualitative data was consolidated into codes and categories using content analysis.
6. Data comparison: Results for each strand were compared.
7. Integration: Results for each strand were integrated into a coherent whole.

Table 10
Research Aims, Variables, and Data Analysis Plan

<table>
<thead>
<tr>
<th>Research Aim</th>
<th>Variable</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aim 1: Describe participants’ perceptions of PR of CVD and diabetes.</strong></td>
<td>PR for CVD &amp; PR for diabetes</td>
<td>1. Quantitative data: descriptive statistics (summary table, frequencies, means, percentages, range, measures of central tendency), 2. Check for correspondence between PR for CVD and diabetes. 3. Focus group data: content analysis (see text) a. Identify codes and categories b. Define codes and categories c. Describe PR codes and categories.</td>
</tr>
<tr>
<td><strong>Aim 2: Compare participants’ actual risk of CVD / diabetes based on presence of components of metabolic syndrome to their PR for CVD / diabetes</strong></td>
<td>Actual Risk PR for CVD/diabetes</td>
<td>1. Descriptive statistics from Aim 1. 2. Compare perceived risk scores with actual risk for accuracy. For example, participants marking 0% for perceived CVD or diabetes risk were categorized as underestimating their actual risk 3. Developed empiric statements for quantitative data 4. Matched supporting/refuting data from aim 1 against qualitative codes and categories looking for points of convergence and complementarity.</td>
</tr>
<tr>
<td><strong>Aim 3: Describe the relationship among participants’ health-world views and PR of CVD/diabetes</strong></td>
<td>Samoan health-world view PR for CVD and diabetes</td>
<td>Content analysis.</td>
</tr>
</tbody>
</table>

Note. Abbreviations: cardiovascular disease (CVD), perceived risk (PR)
Qualitative Analysis

Qualitative data were managed using the software Atlas ti The Knowledge Workbench version 5.2. Atlas.ti offers several features that were important to the analysis including ease of importing individual focus group transcripts as Word documents in rich text format, employing user defined codes for automatic or manual coding of text, ability to search and track coded text by individual transcripts, whole unit, key words, codes, or categories, graphic display of associated codes and categories, automatic display of codes in the margin next to the corresponding text, quantitative tracking of frequencies of codes for both individual transcripts and the unit as a whole, create memos such as definitions for each code/category to assist with consistency of coding, and provide visual output of all analysis results for editing, exporting, or printing.

Focus group data were analyzed using the inductive content analysis approach as described by Elo and Kyngas (2008). The five steps included:

1. Select a unit of analysis: This is guided by the research questions. Can range from a person, clinic, an object, to a letter, word, sentence, phrase, theme, paragraph, page, book, or individual or group interviews.

2. Data immersion: The goal is obtain a sense of the data, becoming familiar with the data in order to determine who is doing the telling, where, when, and what is going on, and why,

3. Data organization: This occurs by describing all aspects or attributes of the data using open coding and creating categories that best fit the data. Data
organization also occurs by using of content-characteristic terms that describe
the phenomena under study.

4. Data abstraction: This process refers to condensing or collapsing similar codes
into broader categories. Categories have been equated with the “what”
referred to in item 2 above. General descriptions of the categories specify
what data do or do not belong in that category and can be further combined
into main categories or themes. Abstraction continues as long as is reasonable
and possible.

5. Reassess trustworthiness: This refers to providing clear descriptions of how
the analysis was conducted to enable readers to understand the process and
speaks to the validity of results.

Unit of analysis. In keeping with the data-driven nature of qualitative data
analysis (Sandelowski, 2000), the unit of analysis was determined after an initial reading
of the first group interview to determine what approach would best fit the data. The unit
of analysis for this study was the group interview because describing the group
perspective rather than individual views of the variables supported the study aims. Also,
as a result of group interactions, responses were similar within groups despite the
different participants. For example, participants would often reference one another and
agree or expand on the previous comment saying “Oh, what she or he said is true, I also .
. .” or “I would like to add to what she or he said . . .”. A secondary consideration of unit of analysis is whether or not to include latent
content such as sighs, laughter, and other non-verbal behavior. In keeping with the purely
descriptive, focus of this study directed at an overall group rather than individual perspective, the general consistency of non-verbal behavior within and between focus groups, and time resources of the investigator, latent content was not included.

*Data immersion* The investigator read through the transcripts multiple times to obtain an overall sense of the data, identify what was occurring, and discover possible codes following the same process each time:

1. Verified transcripts against audio recordings within 24 hours;
2. Verified transcripts were imported into Atlas ti.
3. Reading 1 identified all potential codes in the margin using content-characteristic words or phrases.
4. Reading 2 used the same process as reading one with a printed version as a check of the computer version for this digitally-challenged investigator.
5. Reading 3 confirmed, identified, combined, and/or revised potential codes. Definitions for the resulting list of codes were entered using the code manager function of Atlas ti.
6. Reading 4 occurred after Steps 1 through 5 were completed for the next focus group to look for possible missed codes.
7. Reading 5 of the transcript followed completion of data analysis for Groups 4 and 5 and paid attention to the appropriateness of the coding and to verify data saturation.
8. Reading 6 of the transcript followed completion of data analysis for all seven focus groups again to review codes and verify data saturation.
9. Transcripts were also reviewed throughout the analysis to review, clarify, verify, or revise codes and categories as needed.

Atlas ti tracks user identified sections of text as quotes and associated memos, codes, and categories. Frequency tables and graphs of codes, categories, and main categories can be generated and exported to programs such as SPSS and Microsoft Word. To avoid over counting frequencies of codes, quotes were assigned a code if the responses or examples were given by different participants or brought up later in the interview by the same participant using a different example/perspective or in response to a different question. Codes were not assigned to quotes if the same participant’s responses was a continuation of his/her previous remarks within the same thread of conversation.

To facilitate consistency of coding and auditability, the investigator added memos as needed to outline how the code fit with the text. For example, while discussing how her mental and physical state influenced her perceptions of risk one participant remarked “if the doctor say you got this, if I agree with the doctor, even if I don’t have it then I say yes to the sick” (Participant 7, Group 3) was coded as religion. This coding was based on conversations with potential participants before and after recruitment procedures who did not meet inclusion criteria as well as comments by the participant herself after the focus group was completed. Essentially, the decision to accept or not accept a diagnosis was based in part on the belief that God would take care of her. Accepting a diagnosis meant she was somehow lapse in her faith. Subsequent discussions with the culture brokers further confirmed the appropriateness of this coding.
Data organization. Except as noted above in data immersion, all steps were completed in Atlas ti. The investigator used the following steps for organizing data from the seven focus groups:

1. Listed potential codes with memos as needed in the margin while reading through the data.
2. Compared lists from Groups 1 and 2 and wrote definitions each code to assist with consistency of coding for subsequent focus groups adding memos if needed.
3. Repeated the process for each focus group adding definitions for each new code identified.
4. Compared code lists for each focus group after Group 5 to confirm data saturation had actually been achieved.

Each code emerging out of Groups 4 and 5 was also present in Groups 1-3, indicating data saturation had been achieved by Group 4. This finding was confirmed in Groups 6 and 7. A total of 28 codes were initially identified.

Data abstraction. The investigator used the following approach for abstracting the data:

1. Reviewed definitions of the codes and combined codes to create categories. For example, “portion sizes”, “negative effects of food”, and “healthy effects of food” were combined into the code “food”. “Knowledge of risk factors”, “Knowledge of signs of diabetes”, and “lack of knowledge” were combined into “knowledge”. Participants mentioned financial concerns as adding to their stress levels in multiple contexts, therefore finances and stress were
combined into the code “stress”. All codes reflecting an effect on perceptions of risk were combined into the category “Perceptions of risk influences”. Using this process, the 28 codes were condensed into 12. These 12 codes were organized into four categories.

2. Read the transcripts an additional time to confirm that all pertinent quotes had been identified.

3. Reviewed quotes from each focus group, using the abstracted code list. All quotes reflected the 12 codes.

4. Reviewed all quotes for each code, and categories with an experienced researcher at Tripler Army Medical Center, Nursing research office. This review resulted in combining the categories lifestyle mediators and harmony/balance were consolidated into one category named health-world view. Definitions for each code and category are listed in Table 11. Categories and codes by research aims are listed in Table 12.
## TABLE 11

**Definitions for Identified Codes and Categories**

<table>
<thead>
<tr>
<th>Category</th>
<th>Code</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Culture</td>
<td></td>
<td>Participant identified cultural attitudes, beliefs, behaviors, customs, ideology guiding/influencing decision making</td>
</tr>
<tr>
<td>Change</td>
<td></td>
<td>Changing lifestyles, cultural attitudes, beliefs, behaviors, customs, ideology guiding/influencing health-world views</td>
</tr>
<tr>
<td>Food</td>
<td></td>
<td>Types of foods, food as motivators, health producing, disease producing, primary reason</td>
</tr>
<tr>
<td>Health-world view</td>
<td></td>
<td>Beliefs about and facilitators of health and illness, ways of knowing about health and health-ease/health promoting factors, mediators and influences on lifestyle choices, affective states of happiness, harmony, and wellbeing</td>
</tr>
<tr>
<td>Harmony</td>
<td></td>
<td>Activities, situations that make participants happy, promote positive affective/spiritual state, balance, harmony, health, and relieve mental distress, participant identified health promotion efforts</td>
</tr>
<tr>
<td>Physical health</td>
<td></td>
<td>Physical sense of wellbeing or illness influencing behaviors</td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td>Activities/situations that lead to mental distress and can affect physical health</td>
</tr>
<tr>
<td>Knowledge</td>
<td></td>
<td>Cognitive awareness, lack of, or requests for more information about risk factors, signs of CVD, diabetes, healthy behaviors, lifestyle modifications</td>
</tr>
<tr>
<td>Personal motivation</td>
<td></td>
<td>Activities, situations that lead to individual action/inaction</td>
</tr>
<tr>
<td>Category</td>
<td>Code</td>
<td>Definition</td>
</tr>
<tr>
<td>------------------</td>
<td>-------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Personal</td>
<td>PR</td>
<td>Individual accountability for activities, situations</td>
</tr>
<tr>
<td>responsibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PR influences</td>
<td></td>
<td>Activities, situations influencing perceptions of risk</td>
</tr>
<tr>
<td>Behavior PR</td>
<td></td>
<td>Lifestyle/behaviors that influenced PR</td>
</tr>
<tr>
<td>Knowledge PR</td>
<td></td>
<td>Participant cognitive awareness or lack of awareness cited as reason for PR response</td>
</tr>
<tr>
<td>Family PR</td>
<td></td>
<td>Family history influenced PR</td>
</tr>
<tr>
<td>Physical health PR</td>
<td></td>
<td>Physical state given as reason for PR</td>
</tr>
</tbody>
</table>

*Note: perceived risk (PR)*

Table 12

*Qualitative Analysis of Research Aims: Question, Categories, and Codes,*

<table>
<thead>
<tr>
<th>Research Aim</th>
<th>Question(s)/Trigger(s)</th>
<th>Categories with Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aim 1: Describe</td>
<td>When you first arrived, you answered two questions about what your risk of CVD/diabetes was. Tell me more about why you answered the way you did for example -10%, 20%, 50%, 100%.</td>
<td>PR influences, Behavior PR, Family PR, Knowledge PR, Physical health PR</td>
</tr>
<tr>
<td>participants’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>perceptions of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>perceived risk of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVD and diabetes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aim 2a: Compare</td>
<td>Does your culture have anything to do with how you answered the question?</td>
<td></td>
</tr>
<tr>
<td>participants’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>actual risk of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVD and diabetes.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Research Aim

<table>
<thead>
<tr>
<th>Question(s)/Trigger(s)</th>
<th>Categories with Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>diabetes based on presence of components of metabolic syndrome to their perceived risk for CVD and diabetes.</td>
<td>Physical health PR</td>
</tr>
</tbody>
</table>

- Tell me more about how those fit with your beliefs about health
- Is there anything else you’d like to say about your beliefs about health, risk of CVD/diabetes?

Aim 3: Describe the relationships among participants’ health-world views and perceived risk of CVD and diabetes

- What are your beliefs about health, things that keep people healthy or things that cause illness/disease, CVD/stroke/diabetes in particular
- Does your culture have anything to do with your views/beliefs about health?
- Of the things that are most important to you, to your life, where would you place health in your list of priorities? (Any cultural influence?)

Closing: Is there anything else you’d like to say about your beliefs about health, risk of CVD/diabetes

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**Reassess trustworthiness.** Strategies to achieve trustworthiness occurred throughout the study. Specific steps recommended by Morse, Barrte, Mayan, Olson, and Spiers (2002) included selecting information-rich participants, achieving data saturation, concurrent data collection and analysis, and building themes and categories from the data itself. Additional strategies are outlined in Appendix E. Additionally, historical threats such as health presentations to the community or the start of a state-wide health week were monitored by the investigator. All waist circumference measurements were
obtained solely by the investigator. Two measures were taken and the lowest reading was recorded. Quantitative data were collected on the same day as the focus group.

Quantitative Analysis

All data entry was performed by this investigator and verified by an independent researcher. Quantitative data analysis consisted of descriptive statistics: Frequencies, distribution, measures of central tendency, mean, median, mode, percentages, mean, mode, median, and standard deviations for all variables. The Kolmogorov-Smirnov and Shapiro goodness-of-fit tests were run to check for normalcy of distribution. Distribution was not normal, therefore nonparametric testing was done. Specifically, Kendall’s tau b to assess the degree of correspondence between perceived risk for CVD and perceived risk for diabetes. Analysis was concurrent with data collection and continued after data collection was complete as indicated during data integration. These results were then used to develop descriptive narratives about the data such as “Eight percent of participants spoke Samoan only at home” and two percent of participants had a graduate degree.

Convergence and Complementarity.

In contrast to the sampling and data analysis frameworks discussed above, this investigator found no specific process to determine convergence and complementarity in the mixed methods literature. Emails to several authors failed to illuminate this process. General guidelines were available however beginning with the fundamental principle of mixed methods analysis: “use of quantitative and qualitative analytical techniques either concurrently or sequentially, at some stage beginning with the data collection process,
from which interpretations are made in either a parallel, an integrated, or an iterative manner” (Tashakkori and Teddlie, 2003, p. 353). Four decisions need to be made regarding this principle (Onwuegbuzie et al., 2007):

1. Number of data types to analyze: reports, surveys, interviews, observations, diaries, etc.
2. Type of data analysis such as statistical, narrative, or visual.
3. Concurrent or sequential analysis.
4. Priority of analysis: Qualitative, quantitative, or equal.

Several techniques related to this principle were also described with relative homogeneity in the literature. For example, transforming coded qualitative data into quantitative data referred to as quantitizing qualitative data, transforming quantitative data into qualitative data referred to as qualitizing quantitative data, data organizing using matrix tables, creating new variables from the transformed data, linking the data types, and case analysis (Happ, Dabbs, Tate, Hricik, & Erien, 2006; Jang, McDougall, Pollon, Herbert, & Russell, 2008; Onwuegbuzie & Dickinson, 2008; Sandelowski, 2000; Voils et al., 2008; Woolley, 2009). The studies by Voils et al. and Woolley came closest to describing a process where these techniques were used. Voils et al. used a meta analysis of antiretroviral adherence in HIV positive women, conducted their research specifically to find ways to integrate qualitative and quantitative findings in mixed methods studies. Woolley explored the interplay of structural and personal factors in the lives of young adults (see Table 13). Both studies concluded that flexibility and using an iterative approach were important and determining relationships among the findings were
judgments informed by both clinical and theoretical knowledge. An in-press manuscript by Onwuegbuzie, Slate, Leech, and Collins will present a “coherent and inclusive framework” for data analysis for novice and experienced researchers however this framework was not available to this investigator. The specific steps used in this study are outlined in Table 13. Examples linking judgments to a prior knowledge included classifying perceived risk scores of 20% or higher as accurate based on AHA (2007) and NCEP-ATP III (2004) risk assessment guidelines. Judgments about points of complementarity and convergence were informed by clinical experience of the investigator with individuals at risk for CVD and diabetes as well as conceptual models regarding perceptions of risk derived from the literature. Specifically, this investigator judged that quantitative and qualitative data converged on accuracy of perceived risk scores based on clinical and theoretical treatment models to lower actual risk.

Table 13

Data Integration Processes for Three Studies

<table>
<thead>
<tr>
<th>Voils et al. 2008</th>
<th>Woolley, 2009</th>
<th>This investigator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Data were extracted, grouped then findings summarized.</td>
<td>1. Data were analyzed for each strand using appropriate techniques such as descriptive statistics and content analysis.</td>
<td>1. Analyzed qualitative and quantitative strands using the procedures noted in the text.</td>
</tr>
<tr>
<td>2. Identified possible ways to bring the data together.</td>
<td>2. Data were organized using tables organized by the research questions.</td>
<td>2. Constructed tables to organize data using results from step one.</td>
</tr>
<tr>
<td>3. Data were assimilated looking at common denominators.</td>
<td>3. Areas of difference</td>
<td>3. Developed empiric statements for the quantitative data based on the results of steps one and two. For example: 83.7% of participants accurately perceived themselves to be at high risk for disease.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Reviewed all qualitative data identifying all codes related to perceptions of risk for either CVD</td>
</tr>
<tr>
<td>Voils et al. 2008</td>
<td>Woolley, 2009</td>
<td>This investigator</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>4. Quantitative findings synthesized into qualitative statements.</td>
<td>or lack of differences were identified.</td>
<td>or diabetes.</td>
</tr>
<tr>
<td>5. Relationships between findings were identified</td>
<td>4. Patterns were identified among the differences/lack of differences.</td>
<td>5. Reviewed results from steps four and five identifying points of convergence, divergence, and trends.</td>
</tr>
<tr>
<td>6. Judgments were derived from these findings.</td>
<td>5. Judgments regarding theoretical and practical implications were formulated.</td>
<td>6. Repeated steps one through five as needed to clarify or verify identified points of convergence, divergence, and trends.</td>
</tr>
<tr>
<td>7. Judgments regarding convergence, divergence, and complementarity were formulated.</td>
<td></td>
<td>7. Judgments regarding convergence, divergence, and complementarity were formulated.</td>
</tr>
</tbody>
</table>

Judgments informed by both clinical and theoretical knowledge in each study

Summary

Methods used in this study followed established human subjects procedures and standard measures of variables available in the literature. Recently developed sampling and data analysis frameworks specific to mixed methods studies were used. Quantitative analysis used descriptive statistics, t tests and tests for normality. Content analysis was conducted with qualitative data. Data integration procedures to determine points of convergence and complementarity was not supported by an existing framework but used a synthesis of used processes identified in the literature.
CHAPTER FOUR: RESULTS

Results that are reported in this chapter include demographic characteristics and risk factors, descriptive statistics for quantitative variables, and codes and categories identified from content analysis of the qualitative data.

The purpose of this study was to explore the relationship between perceived risk of CVD and diabetes and the health-world view of Samoans with two or more components of metabolic syndrome using a mixed methods approach. Specific aims were to: 1) describe participants’ perceptions of risk for CVD and diabetes; 2) compare participants’ actual risk of CVD and diabetes based on presence of components of metabolic syndrome, and their perceived risk for CVD and diabetes; 3) describe the relationship among participants’ health-world views and perceived risk of CVD and diabetes.

Description of the Sample

A total of 43 self-identified Samoan men and women living on the island of Oahu, state of Hawaii, were recruited from three local churches. Nine potential participants who asked about being in the study had a personal history of diabetes and were not eligible. No information was collected from the church whose pastor chose not to have his congregation participate or those individuals not inquiring about the study after the general presentation.

Demographic Characteristics: These characteristics are summarized in Tables 14 and 15. The participants’ mean age was 32 years (range 18-55/SD 10.44). The majority of participants were women (65.1%), married (51.2%), and born in American
Samoa/Samoa (72.1%). Participants had lived in the U.S. a mean of 12.8 years (range 30 days -35 years/SD 9.38). All participants had at least a high school diploma, approximately one-third worked in either a white (39.5%) or blue collar (32.6%) job.

*Metabolic Syndrome Risk Characteristics.* More than half the participants had a personal history of HTN (51.2%), over one-third had dyslipidemia (39.5%) and a history of elevated blood glucose (34.9%). The majority (83.7%) were not taking any prescribed medications for HTN, dyslipidemia, elevated blood glucose, or weight loss. The IDF (2005) defines waist circumference for metabolic syndrome as over 37 inches for men and over 31.5 for women. As required by inclusion criteria, all participants met or exceeded IDF waist circumference criteria for metabolic syndrome. Mean waist circumference for participants as a group was 50.27 inches (range 42-68/SD 6.24).
Table 14

Demographics for Metabolic Syndrome Components

<table>
<thead>
<tr>
<th>Component</th>
<th>Females</th>
<th>Males</th>
<th>Group</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waist circumference in inches</td>
<td>Mean</td>
<td>50.49</td>
<td>49.87</td>
<td>50.27</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>42-65</td>
<td>42-68</td>
<td>42-68</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>6.8</td>
<td>7.1</td>
<td>6.24</td>
<td></td>
</tr>
<tr>
<td>Inches over IDF obesity criteria</td>
<td>Mean</td>
<td>19</td>
<td>12.8</td>
<td>16.85</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Range</td>
<td>10.6-33.5</td>
<td>4.5-31.3</td>
<td>4.5-33.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>5.8</td>
<td>7.1</td>
<td>6.9</td>
<td></td>
</tr>
<tr>
<td>Number of components</td>
<td>2</td>
<td>23</td>
<td>11</td>
<td>34</td>
<td>79.1</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>2</td>
<td>7</td>
<td>16.3</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>4.7</td>
</tr>
<tr>
<td>Personal history</td>
<td>Elevated blood glucose</td>
<td>15</td>
<td>34.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dyslipidemia</td>
<td>17</td>
<td>39.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hypertension</td>
<td>22</td>
<td>51.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medications*</td>
<td>1</td>
<td>6</td>
<td>14.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>1</td>
<td>2.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>36</td>
<td>83.7</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Number of prescriptions taken for hypertension, dyslipidemia, or impaired glucose tolerance
Table 15

*Demographic Characteristics*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age in years:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>32.07</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>18-55</td>
<td></td>
</tr>
<tr>
<td>SD</td>
<td>10.44</td>
<td></td>
</tr>
<tr>
<td><strong>Gender:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>65.1</td>
</tr>
<tr>
<td>Male</td>
<td>15</td>
<td>34.9</td>
</tr>
<tr>
<td><strong>Education:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High school</td>
<td>43</td>
<td>100</td>
</tr>
<tr>
<td>Some college/Associates degree</td>
<td>13</td>
<td>30.2</td>
</tr>
<tr>
<td>Bachelors</td>
<td>5</td>
<td>11.6</td>
</tr>
<tr>
<td>Masters</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td><strong>Occupation:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White collar</td>
<td>17</td>
<td>39.5</td>
</tr>
<tr>
<td>Blue collar</td>
<td>14</td>
<td>32.6</td>
</tr>
<tr>
<td>Home/student</td>
<td>10</td>
<td>23.3</td>
</tr>
<tr>
<td>Professional</td>
<td>2</td>
<td>4.7</td>
</tr>
<tr>
<td><strong>Marital status:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>22</td>
<td>51.2</td>
</tr>
<tr>
<td>Single</td>
<td>18</td>
<td>41.9</td>
</tr>
<tr>
<td>Widow</td>
<td>3</td>
<td>7.0</td>
</tr>
<tr>
<td><strong>Home language:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bilingual</td>
<td>28</td>
<td>65.1</td>
</tr>
<tr>
<td>Samoan</td>
<td>7</td>
<td>16.3</td>
</tr>
<tr>
<td>English</td>
<td>8</td>
<td>18.6</td>
</tr>
<tr>
<td><strong>Form used</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samoan</td>
<td>6</td>
<td>14</td>
</tr>
<tr>
<td>English</td>
<td>37</td>
<td>86</td>
</tr>
<tr>
<td><strong>Birthplace:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Am Samoa/Samoa</td>
<td>31</td>
<td>72.1</td>
</tr>
<tr>
<td>Hawaii</td>
<td>8</td>
<td>18.6</td>
</tr>
<tr>
<td>Continental United States</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td><strong>Tobacco use:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>31</td>
<td>72.1</td>
</tr>
<tr>
<td>Quit</td>
<td>8</td>
<td>18.6</td>
</tr>
<tr>
<td>Current user</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular disease</td>
<td>12</td>
<td>27.9</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>13</td>
<td>30.2</td>
</tr>
<tr>
<td>Diabetes</td>
<td>23</td>
<td>53.5</td>
</tr>
<tr>
<td>Hypertension</td>
<td>26</td>
<td>60.5</td>
</tr>
<tr>
<td><strong>Over one year since last healthcare provider visit</strong></td>
<td>21</td>
<td>48.8</td>
</tr>
</tbody>
</table>

*Note:* No recent HCP visit = greater than one year since last visit
Research Aims

There is no standardized format for presentation of results for studies using mixed methods designs. Results may be presented using a conventional experimental, ethnographic, or case organized format (Sandelowski, 2003). For this study, results are organized by research aims. Quantitative findings are presented first, followed by qualitative data, then points of convergence and complementarity.

*Aim 1: Describe participants’ perceptions of risk of CVD and diabetes.*

Perceived risk for this study was defined as beliefs regarding personal vulnerability to specific health risks and to the consequences of vulnerability. These beliefs are specific to the health threat and include consequences of the specific threat such as loss of mobility that may result from a stroke as noted in chapter 1.

*Quantitative Findings.* NCEP-ATP III (2004) guidelines for assigning a level of risk based on number of risk factors present are: high (>20%), moderately high (10-20%), and low (<10%). Based on inclusion criteria of presence of metabolic syndrome components defined by the IDF (2005) all participants were in the moderately high risk group. Mean perceived risk scores for CVD and diabetes were 49.07% (range 0-100/SD 29.8) and 51.74% (range 0 – 100/SD 29.4) respectively. The majority of participants scored themselves at or above 20% for perceived risk of CVD (83.7%) and diabetes (86%) indicating they perceived themselves to be at higher risk for both CVD and diabetes (Table 16). Mean perceived risk scores by actual risk factors are listed in Tables 17 and 18. To determine if differences existed between participants perceived risk for CVD and diabetes, Kolmogorov-Smirnov goodness-of-fit test was run and indicated
distribution was not normal for CVD (.185, df=43, p=.009) or diabetes (.175, df=43, p=.007) at the specified p<0.05 significance level. Therefore a nonparametric test, Kendall’s tau -b was used to look for the degree of correspondence between perceived risk for CVD and perceived risk for diabetes. This was significant (0.797; p<0.05) indicating a high degree of concordance between these two variables.

Qualitative Findings. One category Perceived Risk Influences supported by the codes: Family history, behavior, not knowing, and physical health were abstracted from the qualitative data underlying perceptions of risk. Participants’ perceiving themselves to be at higher risk for CVD and diabetes cited family history and behavior as influencing their perceptions (see Tables 16, 17, and 18). Participants who were unsure of their risk stated they gave themselves a 50/50 chance of developing either disease, however several mentioned family history or behavior in the same discussion. Current behavior also influenced lower perceived risk. Feeling health or unhealthy was also associated with how participants perceived their risk. For example, one participant stated “I’m only 27 but I’m way overweight, I know that for a fact cause I can feel it I mean really feel it all over” (participant 2, group 4). When asked if they thought about their risk for CVD and diabetes separately, participants predominately indicated they thought about them together.
Table 16

Perceived Risk for CVD and Diabetes Frequencies and Exemplars

<table>
<thead>
<tr>
<th>PR CVD</th>
<th>PR Diabetes</th>
<th>Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Score</td>
<td>Number</td>
<td>Percent</td>
</tr>
<tr>
<td>0</td>
<td>6</td>
<td>14.0</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>20</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>30</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td>40</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td>50</td>
<td>14</td>
<td>32.6</td>
</tr>
<tr>
<td>55</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60</td>
<td>1</td>
<td>2.3</td>
</tr>
<tr>
<td>70</td>
<td>3</td>
<td>7.0</td>
</tr>
<tr>
<td>80</td>
<td>2</td>
<td>4.7</td>
</tr>
<tr>
<td>90</td>
<td>3</td>
<td>7.0</td>
</tr>
<tr>
<td>100</td>
<td>4</td>
<td>9.3</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Note: perceived risk (PR)

1. “that’s why I believe I put down 0 because I had to change the way I cook and eat, and the way I watch my weight so I don’t get that . . . I drink my medicine every day, and I watch my eating”

2. “I put 70% because I don’t eat vegetables, I love fried foods, I eat a lot of fatty foods”
Table 17

*Mean Perceived Risk Scores for Cardiovascular Disease by Risk Factor*

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Mean PR score</th>
<th>Range</th>
<th>SD</th>
<th>Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Family history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVD</td>
<td>Yes  n=12</td>
<td>47.5</td>
<td>0-100</td>
<td>37.44</td>
</tr>
<tr>
<td></td>
<td>No  n=31</td>
<td>49.7</td>
<td>0-100</td>
<td>27.02</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Yes  n=23</td>
<td>55.22</td>
<td>0-100</td>
<td>31.02</td>
</tr>
<tr>
<td></td>
<td>No  n=20</td>
<td>42.0</td>
<td>0-90</td>
<td>27.45</td>
</tr>
<tr>
<td>HTN</td>
<td>Yes  n=26</td>
<td>56.54</td>
<td>0-100</td>
<td>28.28</td>
</tr>
<tr>
<td></td>
<td>No  n=17</td>
<td>37.65</td>
<td>0-90</td>
<td>29.27</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>Yes  n=13</td>
<td>61.54</td>
<td>0-100</td>
<td>27.64</td>
</tr>
<tr>
<td></td>
<td>No  n=30</td>
<td>43.7</td>
<td>0-100</td>
<td>29.54</td>
</tr>
<tr>
<td><strong>Personal history</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HTN</td>
<td>Yes  n=22</td>
<td>54.09</td>
<td>0-100</td>
<td>26.31</td>
</tr>
<tr>
<td></td>
<td>No  n=21</td>
<td>43.8</td>
<td>0-100</td>
<td>32.94</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>Yes  n=17</td>
<td>44.71</td>
<td>0-100</td>
<td>33.38</td>
</tr>
<tr>
<td></td>
<td>No  n=26</td>
<td>51.92</td>
<td>0-100</td>
<td>27.57</td>
</tr>
<tr>
<td>Elevated glucose</td>
<td>Yes  n=15</td>
<td>52.0</td>
<td>0-100</td>
<td>30.28</td>
</tr>
<tr>
<td></td>
<td>No  n=28</td>
<td>47.5</td>
<td>0-100</td>
<td>30.02</td>
</tr>
</tbody>
</table>

*Note*: perceived risk (PR)
Table 18

*Mean Perceived Risk Scores for Diabetes by Risk Factor*

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Mean PR score</th>
<th>Range</th>
<th>SD</th>
<th>Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family history</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CVD</td>
<td>Yes n=12</td>
<td>48.33</td>
<td>0-100</td>
<td>38.34</td>
</tr>
<tr>
<td></td>
<td>No n=31</td>
<td>53.06</td>
<td>0-100</td>
<td>25.84</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Yes n=23</td>
<td>58.91</td>
<td>0-100</td>
<td>28.44</td>
</tr>
<tr>
<td></td>
<td>No n=20</td>
<td>43.5</td>
<td>0-90</td>
<td>29.07</td>
</tr>
<tr>
<td>HTN</td>
<td>Yes n=26</td>
<td>58.9</td>
<td>0-100</td>
<td>29.17</td>
</tr>
<tr>
<td></td>
<td>No n=17</td>
<td>40.88</td>
<td>0-90</td>
<td>27.17</td>
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<tr>
<td>Dyslipidemia</td>
<td>Yes n=13</td>
<td>61.54</td>
<td>0-100</td>
<td>29.4</td>
</tr>
<tr>
<td></td>
<td>No n=30</td>
<td>47.5</td>
<td>0-100</td>
<td>28.9</td>
</tr>
<tr>
<td>Personal history</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HTN</td>
<td>Yes n=22</td>
<td>56.6</td>
<td>0-100</td>
<td>26.97</td>
</tr>
<tr>
<td></td>
<td>No n=21</td>
<td>46.67</td>
<td>0-100</td>
<td>31.68</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>Yes n=17</td>
<td>48.24</td>
<td>0-100</td>
<td>30.46</td>
</tr>
<tr>
<td></td>
<td>No n=26</td>
<td>54.04</td>
<td>0-100</td>
<td>29.12</td>
</tr>
<tr>
<td>Elevated glucose</td>
<td>Yes n=15</td>
<td>56.33</td>
<td>0-100</td>
<td>32.43</td>
</tr>
<tr>
<td></td>
<td>No n=28</td>
<td>49.3</td>
<td>0-100</td>
<td>28.01</td>
</tr>
</tbody>
</table>

*Note: perceived risk (PR)*
Table 19

**Codes and Exemplars for Category Perceived Risk Influences**

<table>
<thead>
<tr>
<th>Codes</th>
<th>Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavior PR</td>
<td>• “and exercise yeah, but the funny thing is I eat too much junk morning breakfast lunch and evening” (P2, G1)</td>
</tr>
<tr>
<td>Family PR</td>
<td>• “I put 50 for both because my dad’s family even his brothers and sisters and his parents died from diabetes, so that’s why I was concerning” (P1, G3)</td>
</tr>
<tr>
<td>Knowledge PR</td>
<td>• “I had an injury on my toe, I got so scared, I had to go see the doctor right away” (P4, G2).</td>
</tr>
<tr>
<td>Physical feelings PR</td>
<td>• “I know a lot of people they don’t really understand like the risk when the doctor is talking they don’t pay attention, like maybe they don’t understand like myself until you feel it” (P1, G4)</td>
</tr>
<tr>
<td></td>
<td>• “For me if I’m eating right then my risk for getting sick is lower and if I’m exercising” (P4, G 6)</td>
</tr>
</tbody>
</table>

*Note:* participant (P), group (G)

**Convergence.** As indicated above, participants generally did not perceive their risk for CVD separately from their risk for diabetes. Quantitative indicators were discussed above. In response to the question “did you consider different things when you answered the questions regarding your risk of CVD and diabetes” participants in all groups generally indicated they viewed them together stating “the same”, “lumped them together” or just answered no.

Convergence was also noted with regard to perceived risk scores. The majority of participants quantitatively scored themselves above 20%. Qualitative data also indicated a majority of participants perceived themselves to be at higher risk. In response to the
question “when you answered the question about what you thought your risk for CVD or diabetes was . . . “ participants responded: “I marked it high . . “ (Participant 1, Group 1) “I just put 50/50% but honestly I should have put higher, I know it “ (Participant 2, Group 4); “I put 70% “ (Participant 6, Group 5).

*Complementarity.* Insight into why some of these high risk participants underestimated their perceived risk on the numeric scale emerged from the qualitative data. Essentially current or planned behavior and current physical state of well-being influenced their perceptions about their risk. This was reflected in statements such as: “on the low side mainly because mainly in my head I am thinking that I am going to make the changes” (Participant 5, Group 2); “Because I feel, I feel healthy, I don’t feel sick or anything, I don’t feel like I’m having a weight problem, that’s what I perceive” (Participant 5, Group 3), “I’m eating right then my risk for getting sick is lower and if I’m exercising” (Participant 2, Group 6). Behavior and family history was given as a reasons why participants perceived themselves to be at higher risk for CVD and diabetes: “I put a hundred percent because I think it’s all lifestyle” (Participant 2, Group 5) and “just because it could be hereditary from my parents” (Participant 2, Group 3).

**Aim 2:** Compare participants’ actual risk of CVD and diabetes based on presence of components of metabolic syndrome to their perceived risk for CVD and diabetes.

This aim focused on describing the accuracy of participants’ perceived risk compared with their actual risk. As discussed in chapter 3, measurement of variables actual risk was determined by the NCEP-ATP III (2004) risk assessment criteria.
**Quantitative Findings.** Perceived risk questions were conditioned on behavior: “if you make no changes in your current lifestyle . . . ”. These participants were already at moderately high risk. As quantitative data did not include questions about actual health behaviors, there was no clear cut method to determine overestimations of risk or pessimistic bias. Few participants accurately perceived their risk as moderately high for either CVD (2.3%) or diabetes (2.3%). More underestimated their risks for CVD (14%) and diabetes (11.6%) and over 80%, perceived themselves to have a greater than 20% chance of developing CVD or diabetes. A decided “50% blip” was noted. A third of participants (32.6%) perceived themselves as having a 50% chance of both CVD and diabetes. This phenomenon has been described in the literature as an indication that participants are uncertain of their risk rather than an actual probability of 50% of getting the disease (Bruine de Bruin, Fischhoff, Milstein, & Halpern-Felsher, 2000). Including all participants perceiving themselves as having a greater than 20% of either disease but excluding all those at the 50% score still resulted in a majority of participants perceiving themselves at high risk for both CVD (48.83%) and diabetes (53.5%).

**Qualitative Findings.** As mentioned under Aim 1, four codes supported one category regarding perceptions of risk. These codes emerged as bidirectional key influences on perceived risk. For example, knowledge both increased and decreased perceived risk scores as noted in these comments: “I put down 0 because I had to change the way I cook and eat, and the way I watch my weight so I don’t get that” (Participant 6, Group 3), “Hereditary from my parents so that does make it a factor a concern for me “ (Participant 2, Group 3), and “We have that knowledge that what makes us big will cause
after effects of diabetes, high blood pressure, or any of the other diseases that we are now dealing with” (Participant 5, Group 2). Physical health was reflected in comments such as “I can feel it, my body isn’t working as it should be” (Participant 2, Group 6)

Behavior and family history emerged early as a determinants of perceived risk “I try to do at least 30 min a day [of exercise]” (Participant 4, Group 1) “because both our parents have high blood pressure, our father had stroke and a sibling is diabetic, so I think that’s one of the reasons” (Participant 4, Group 1), “because my dad’s family even his brothers and sisters and his parents died from diabetes” (Participant 1, Group 3), “cause my mom and dad” (Participant 4, Group 3). Participants choosing to explain their 50% answered indicated they knew they were at high risk due to lifestyle and family history but were not sure of their exact risk and therefore decided on a 50/50 chance: “50% for diabetic because my mom, aunty, sister, brother”. (P4, G3) and “the same thing, a 50/50 shot” (P4, G7). There was some indication however that not all of those answering 50% were uncertain of their risk: “I just put 50/50% but honestly I should have put higher, I know it because man, I’m only 27 but I’m way over weight” (P4, G4). The prevailing descriptions to emerge out of the data reflected an overall accurate perceived risk for CVD and diabetes.

Convergence. There was some evidence that not all the 50% responses were due to uncertainty. Even those that were uncertain cited established risk factors as influencing their decision. Therefore, Both qualitative and quantitative data generally indicated that perceived risks for CVD and diabetes were accurate. (see Tables 15 and 16).
Complementarity. Quantitative data indicated a small percentage of participants underestimated their risk for both CVD and diabetes. Qualitative data revealed "the rest of the story". Behavior was the predominant influence determining perceived risk. Participants described their personal efforts to lower their actual risk for CVD and diabetes through diet, exercise, and smoking cessation.

Aim three: Describe the relationships among participants’ health-world views and perceived risk of CVD and diabetes.

Health-world view. No quantitative data were collected for this aim. Health-world views are beliefs, values, ideas, images and ways of knowing about health, wellbeing, and illness that inform interpretations of phenomena including perceptions of risk and are themselves informed by the global cultural world view (Turton, 1997). Nine codes emerged from the data that supported one category, health-world views (Table 17). For example, ways of knowing, such as aesthetic and personal knowing (see chapter 1), were reflected in the codes balance/harmony, personal motivation, food, culture, and knowledge.

The influence of ways of knowing on perceptions of risk was reflected in statements such as "I mark it high for the reason being number one, I smoke, smoke is one of the worse" (Participant 1, Group 1), indicating empiric knowing and "like I’m really feelin it you know yeah, you really start to think, you start thinking about your health and everything, I think about it all the time, man I wish when I was young and healthy and I was a good size I would have pay attention, listen to the health teacher, listen to mom and dad" (Participant 1, Group 4) indicating an understanding of his
situation, seeing beyond the surface as with aesthetic knowing. Table 17 presents exemplars of each of these ways of knowing.
Table 20

Codes, Categories, and Health-world Views Ways of Knowing with Exemplars

<table>
<thead>
<tr>
<th>Category Codes</th>
<th>Ways of knowing</th>
<th>Exemplar</th>
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<tbody>
<tr>
<td>Culture Change Food</td>
<td>Sociopolitical Personal</td>
<td>“I see a movement from the islands that both governments are starting to make it as their top priority. It’s the health “ (P1, G1) “ so it’s changing our culture and generation because . . . we’re more exposed to outside world” (P1, G2) “It makes or breaks your reputation, your family honor [quality and amount of food at fa’alavelave]” (P1,G6) “in our culture we’re more of eating if no more food in our stomach, no more strength No happiness” (P1, G3) “religion . . . and different activities make them happy so that will reduce their blood pressure” (P1, G1). “let me do my own Samoan style . . . be normal, be your self and just get out and enjoy“(P6, G1). “if you want to live long if you want to see certain things happen in your family you have to be here for it” (P5, G2) “as long as I’m healthy, I don’t wanna be a toothpick I’d be happy at a [size] 12, 13, 14 around there” (P2, G2) “health is a lifestyle. . . you’ve got to learn to discipline yourself” (P2, G5) “Even a local McDonalds if you want a salad which is 5 something and a cheeseburger that’s 99 cents you know the pocket with the hole in it will tell you cheeseburger cheeseburger”, (P1,G6) “I agree with that I think that a lot of our Samoan culture has in away dwindled away because of our environment I think that no matter if you’re Samoan, if you live in the mainland if you live in Samoa or if you live here in Hawaii it all depends basically on your environment your surrounded by so if you have access to ulu you should make the most of it so that you have a better diet” (P2, G5)</td>
</tr>
<tr>
<td>Health-world view</td>
<td>Personal Aesthetic Sociopolitical Unknowing</td>
<td></td>
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<tr>
<td>Harmony/Balance</td>
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<td>Physical health</td>
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<tr>
<td>Stress</td>
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<tr>
<td>Knowledge</td>
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<tr>
<td>Personal Motivation</td>
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<tr>
<td>Personal Responsibility</td>
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<tr>
<td>Category Codes</td>
<td>Ways of knowing</td>
<td>Exemplar</td>
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<tr>
<td>PR Influences</td>
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<tr>
<td>Behavior PR</td>
<td>Personal</td>
<td>“I put a hundred percent because I think it’s all lifestyle” (P2, G5)</td>
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<tr>
<td>Family PR</td>
<td>Empiric</td>
<td>“I put 50% for diabetic because my mom, aunty, sister, brother, . . . so I might have it but I’m not sure” (P4, G3)</td>
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<tr>
<td>Knowledge PR</td>
<td></td>
<td>“and I gained like 40 pounds within a year and a half and it wasn’t healthy” (P?, G6)</td>
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<tr>
<td>Physical health PR</td>
<td></td>
<td>“I know that if I’m not eating right, I can feel it, my body isn’t working as it should be” (P3, G6)</td>
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<td></td>
<td></td>
<td>“you have to look at the way you live your life what you do every day” (P4, G6)</td>
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*Note:* participant (P), group (G), PR
Beliefs, ideas, images, and values of the health-world views were threaded throughout the codes. For example, beliefs about the importance of achieving or maintaining spiritual, mental, and physical balance, causes of CVD and diabetes, images of a healthy body, the importance of family to health and health practices, were noted throughout the focus group discussions and with regard to perceptions of risk. For example: “you gotta lose weight it’s you know you gotta exercise and in the balancing of the meals” (Participant 1, Group 7) and “so when I answered that I put 80 percent of risk if I don’t control what I eat” (Participant 4, Group 5). Table 16 lists these attributes with exemplars.
Table 21

*Health-world View Values, Beliefs, and Images with Exemplars*

<table>
<thead>
<tr>
<th>Values/Beliefs/Images</th>
<th>Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Respect</strong></td>
<td>“In our culture which is respect, we adhere to our family way of life . . . it makes us healthy to think that way” (P1, G1)</td>
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<td></td>
<td>“But if the minister believed in his health, . . . they also should give 5-10 min of a homily to preach for their total health . . . because people trust the ministers, the priests, the ministers, they listen to them”, (P1, G1)</td>
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<td>“It makes or breaks your reputation, your family honor is like down the drain”, (P1, G6)</td>
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<td>“You don’t want the family name to be downgraded, because our family didn’t have enough food, that’s shame”, (p5, G2)</td>
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<td>“it would be rude in our own mind to throw the food away. So in other words if you eat and have enough and there’s still corn beef and palusami and you say no I got to eat this up until it’s done”, (P2, G1)</td>
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<td>“sometimes they don’t think we don’t listen, but when you leave or away from them it’s always in your head”, (P2, G4)</td>
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<td>“Cause you don’t want to let that person down”, (P2, G4)</td>
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<tr>
<td><strong>Religion</strong></td>
<td>“I think the foremost important part of our culture life is religion, a lot of the majority of the Samoans look at religion as more important than anything else, that’s what gives them a peace of mind” (P1, G1)</td>
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<td></td>
<td>“I know we can . . . we love God so much, that’s why we do it, and if only we can do that every day of our life, I mean like I say it’s gonna be all up to you and I’m thankful I’m here today. ”, (P3,G4)</td>
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<td>“Our mom doesn’t like drinking medicine from the hospital, so she has first she always um she always go to prayer, she always prays”, (P3, G1)</td>
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<tr>
<td>Values/Exemplar</td>
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<tr>
<td><strong>Beliefs/Images</strong></td>
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<tr>
<td>• “For me my God is first my health is second and my family is third, if I’m not healthy I can not take care of my family I have to be healthy”, (P2, G6)</td>
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<tr>
<td><strong>Family</strong></td>
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<tr>
<td>• “Posterity thinking about my children and my children’s children”, (P1, G2)</td>
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<td>• “Hopefully the way I live will affect them (her children) to live a healthy lifestyle” (P6, G2)</td>
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<td>• “because my grandma now is 85 and she’s still alive and she eats very healthy . . . and it’s what she fed us too”, (P7, G5)</td>
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<td>• “you know everyday I see um a lot of the older people at church it blesses me that they’re alive”, (P2, G5)</td>
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<td>• “they’re looking at in terms of what they see and the fears of watching their parents or people that are older”, (P1, G6)</td>
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<td>• “then we’re always thinking of our family first”, (P1, G7)</td>
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<td>• “But from the time they were all growing up from the great grands [grandparents] you know they always say why you eat that you’re suppose to eat this”, (P1, G7)</td>
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<td><strong>Responsibility</strong></td>
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<td>• “we grew up to farm and to work with your hands as islanders ...you either work or you’re gonna go hungry” (P1, G6)</td>
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<td>• “I mean going back to this health stuff, it’s a thing that you control. I mean we all believe in God, I believe that God never made anybody, He made us into His image and He don’t make nobody to destroy his self,” (P3, G4)</td>
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<td>• “we do a lot of chores at home we have a lot of responsibility while we grow up . . . . I mean we eat but we work I think that’s the main point we eat, but we sweat a lot” (P4, G5)</td>
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<tr>
<td>• “we can all say it’s the culture but in a way it’s all on the person, mostly on the person” (P4, G2)</td>
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<td>• “because health is so much more of an awareness now like how was said earlier we need to be just more conscience of the decisions that we made . . . food is not bad it’s all how we consume it, portion control, we have to learn that we can have what we want but it comes with a limit”, (P2, G5)</td>
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</table>
Values/
Beliefs/Images

- “I know that emotionally that if you’re sad that that can affect your health “, (P1, G2)
- “Basically it’s on your self, if you can control what you eat, you can control what you do”, (P6, G4)
- “health is a lifestyle you know so you’ve got to learn to discipline yourself which I’m learning now because within the past three years I’ve gotten to the state where I’ve had 2 brushes with death”, (P2, G5)
- “Because in our culture we’re more of eating if no more food in our stomach, no more strength No happiness” (P1, G3)
- “I just tend to think sometime that more Samoan people who had all the pure food without all the additives and stuff, he’s from back, back, back, all the way back [rural village not urbanized villages]”, (P1, G6)
- “if you’re anorexic we think you’re sick or involved with drugs. That’s what we think of skinny”, (P5, G1)
- “because health is so much more of an awareness now like how was said earlier we need to be just more conscience of the decisions that we made . . . food is not bad it’s all how we consume it, portion control, we have to learn that we can have what we want but it comes with a limit”, (P2, G5)
- “That’s why majority of Samoans get sick because they eat too much preservative”, (P3, G6)

Balance

- “I think that you know for my doctor he said, gotta do more like more work than more of eating “ (P3, G4)
- “I believe you know you need to exercise you know and keep exercise and do activity for you to get healthy” (P4, G4)
- “When [son] was young and he was like 10 months old, he had a diarrhea and vomiting both at the same time, so he was in the hospital for 2 weeks and they cannot do nothing about it . . . and then that was it and now he’s 20 years old now. The doctor says he was going to die and that’s why we took him home. So we used, instead of using the you know the Palagi medicine we just used the Samoan
<table>
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<tr>
<th>Values/Images</th>
<th>Exemplar</th>
</tr>
</thead>
<tbody>
<tr>
<td>medicine” (P6, G1)</td>
<td>“for example you drink Tylenol for your head right? You know you have your head is sore and stuff, something like that and it’s heal your head and the medication not good for other part of your body”, (P4, G4)</td>
</tr>
<tr>
<td>“I learned something from school my teacher, he said that the new generation, . . . . have that belief that Samoan medicine can cure some and Western medicine, there is like some illness they can cure”, (P4, G1)</td>
<td>“I think the best way is to like do it, exercise, balanced meals and to see the doctors”, (P1, G7)</td>
</tr>
<tr>
<td>Body image</td>
<td>“as Samoans we’re taught it’s ok to be big, big is pretty, it’s being voluptuous, having curves that’s good. That’s changing how we’re more exposed to outside world, . . . as long as I’m healthy, I don’t wanna be a toothpick and I’d be happy at a 12, 13, 14 around” (P1, G2)</td>
</tr>
<tr>
<td>“they’ll say that skinny people die, Fat people die”, (P3, G2)</td>
<td>“I believe as a Samoan, I know a lotta people who don’t even care about their weight and I really feel that I’m not the only one who believes that, I mean I see a lotta big Samoans, they don’t even care”, (P4, G4)</td>
</tr>
<tr>
<td>“Size doesn’t matter, whatever God gave me, that’s the one”, (P4, G5)</td>
<td>“because like some people are smaller than us have more health issues because of the size they are I don’t know I barely get sick I’m big I’m like overweight I have my body fat so but I never get sick”, (P3, G6)</td>
</tr>
</tbody>
</table>

Note: participant (P), group (G).
Culture and health-world views. Health-world views originate from the larger cultural views of a group (Andrews & Boyle, 2003; Turton, 1997). Data from the questions regarding how their culture or being Samoan influenced their beliefs about their health or perceptions of their risks for CVD and diabetes produced one category, Culture with two codes: Change and food. Participants overall referenced the differences in lifestyle between Samoa/American Samoa and Hawaii/United States when talking about fa’a Samoa and their perceptions of risk. Specifically they discussed how they grew up, their daily routines and how that had changed when they moved here. Occasionally specific customs or cultural protocols were mentioned, but overall quotes referenced a change in lifestyle and results of that change.

Participants also referenced changes that were occurring in Samoa/ American Samoa that influenced health. These quotes generally referenced changes in food sources and preparation. Food was also indicted by these participants as both positive and negatively influencing their health. When hearing about the purposes of the study, one individual who later participated in a focus group remarked “you know, you will find that it’s all about the food, it’s like food has almost become our culture”. This statement proved prophetic as food did emerge as a code. Table 19 presents quotes exemplifying these codes.
Table 22

*Category Culture with Codes and Exemplars*

<table>
<thead>
<tr>
<th>Code</th>
<th>Exemplar</th>
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<tbody>
<tr>
<td><strong>Change</strong></td>
<td>“they work the plantation everyday. You wake up in the morning, go to the plantation, so they exercise. The people living 5-10 mile radius from downtown in Western Samoa, they depend on the Western medicine to support them health-wise. So therefore the rate for those living downtown to have high blood pressure and being diabetic is much higher than the outside [plantation]. And it’s the same thing coming back to the Western. They come over here, they add more . . . they’re twice or 3 times more stress out because now they’re bringing our culture, we bring our culture and try to fit it in to the Western culture over here, we’re more stress out” (P1, G1)</td>
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<td>“Well to me I think it’s not like the culture cause Samoan people are mainly fishing, fishing is always their main, how they get their foods yeah and then we have our own grown trees back home like fruits, bananas, breadfruit, taros you know those are like all good food for the people but then the generation changed” (P1, G7)</td>
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<td>“Now that everybody has cell phone it’s so easy to just call pizza to deliver, you know I think technology now days is growing as well as how easy it is to get our food” (P6, G5).</td>
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<td></td>
<td>“But back home . . . if you don’t take care of your plants, if you don’t take care of your banana trees your taro trees, you don’t get any breadfruit you know like it’s harder you have to work harder for everything, but when you come here and it’s handed to you” (P3, G6)</td>
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<td>“It’s the food it’s all naturally grown, and the lifestyle back there is like so relaxed I’m like, I mean I know we didn’t have taxes it’s like, everybody kinda you know help one another, so you weren’t really working hard, stress, but when you come out here to the mainland you gotta work, you gotta earn everything so it’s like you work hard and then you come home and you like stress level’s already up” (P2, G 2)</td>
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<td>“Getting more sick because of the pig because right now they send the food, they used to feed the pig with the coconut, bread fruit, the taro, you know the leftover, but in now-a-days they don’t do that no more, they use to order the food, and when the pig is sick, they use that that shot, the antibiotic” (P7 G 3)</td>
</tr>
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</table>
Perceptions of risk for CVD and diabetes in this sample of Samoans living on the leeward coast of Oahu were fairly accurate. A majority of participants rated themselves as having a 20% or greater chance of developing CVD and/or diabetes. All participants
were at moderately high risk for CVD and/or diabetes as all were obese with at least one other component of metabolic syndrome. The majority of participants who rated themselves as having a lower than the sample mean risk for CVD and diabetes based their decisions on current or planned lifestyle.

Multiple ways of knowing were identified in the health-world views of these participants together with important beliefs, values and images. The influence of these attributes of health-world views on perceptions of risk were noted throughout the focus group discussions. Beliefs and values such as achieving and maintaining harmony or balance, responsibility, and family emerged as particularly important.
CHAPTER FIVE: DISCUSSION

This chapter includes a discussion of the demographic and disease-related findings, and the findings for each specific aim as they pertain to the conceptual framework and extant literature. Discussion of limitations and implications for nursing research, practice, and theory, and future research are also presented.

The purpose of this study was to explore perceptions of risk, an integral part of many theories and models of health behavior change, in Samoan people at risk of CVD and diabetes. To this investigator’s knowledge, this is the first study to do so and to use neomodernism to inform a mixed methods study. Perceptions of risk were described both qualitatively and quantitatively, compared with participants’ actual risk as defined by the presence of metabolic syndrome components, then explored within the health-world views of participants.

Demographic Characteristics and Risk Factors

Demographic Characteristics. Demographic information for this study was similar to available information regarding Pacific Islanders in the US (US Census Bureau, 2003) in that a majority were bilingual and married, with less than 10% linguistically isolated. This sample differed from available information in that all were high school graduates, more worked in white collar jobs, and more than 12% held bachelors degree or higher. Although over 60% were bilingual, only 14% used the Samoan language study materials despite the unanimous approval of participants that these forms were available. This finding differs from that reported by Chen et al. (2004) who investigated cancer screening rates in Asian and Pacific Islander women (n=383) in
the Los Angeles area using data from a population-based survey. When given an option (n=204) 50% of their participants preferred native language forms. Education and a desire not to appear different or be singled out may account for this difference or it may just be a reflection of the proportion of participants in this study who were more fluent in Samoan. In the study by Chen et al., 21% of participants had less than high school education. In this study, participants expressed their satisfaction Samoan language forms were available, yet many choose the English forms stating “I'll just use what they [indicating the rest of the group] are using”. A few participants received help from English speaking relatives to complete the English language forms. The availability of native language forms in research studies promotes trust between researchers and participants and increases the possibility linguistically isolated participants may choose to take part in health research studies, therefore this should be an option whenever feasible.

Risk Factors. All participants were at moderately high risk (10-20% per NCEP-ATP III criteria) for CVD and diabetes as required by inclusion criteria. Waist circumference as an independent predictor of CVD and diabetes risk and association with other risk factors is well established (AHA, 2007; Mosca, Edelman, Mochari, Christian, Pauletre, & Pollin, 2006). Overall, the mean waist measure for both men (49.87 inches) and women (50.49 inches) exceeded the IDF waist circumference cutoffs by a mean of more than 12 inches. This amount was greater than that reported by Novotny, Nabokov, Derauf, Grove, and Vijayadeva (2007) who studied 55 Samoan women, ages 18-28 years, living on Oahu to determine the applicability of using CDC and WHO cut-off points for BMI in Samoan women as indicators for risk. Mean waist
circumference in that study was 35.9 inches. However, inclusion criteria for the study by Novotny et al. limited participants by age (18-28 years) and weight (300 pounds or less), whereas this dissertation accepted all ages over 18 years and any weight as long as minimum waist circumference criteria (IDF, 2005) were met. Two of the four studies (Grandinetti et al., 2005; Lee et al., 2008; Simmons & Thompson, 2004; Sundborn, Metcalf, Gentles, Scragg, Schaaf, Dyall et al., 2008) reporting metabolic syndrome prevalence rates for Pacific Islanders reported mean waist circumference. Lee et al. used the NCEP-ATP III (2004) and IDF (2005) definitions to compare prevalence rates of metabolic syndrome in four studies from the DETECT-2 study database with Asian Pacific Islander participants (n=22,952). Six-percent were Samoan with a reported mean waist circumference of 38.7 inches. Sundborn et al. reported results from a population-based survey in New Zealand (n=2756) that included 484 Samoans. Mean waist circumference for Samoans was 41.5 inches. The purposeful sampling method requiring obesity in participants in this study may account for this difference. Differences in lifestyles may also play a part however it is not possible to assess this as only Sundborn et al. reported data regarding sedentary versus active lifestyles. Prevalence of HTN (51.2%) in these participants and their first-degree relatives (53.5%) was higher than the AHA (2007) statistics for Pacific Islanders (20.7%), but similar to those reported by Grandinetti et al. (2005) and Simmons and Thompson (2004). Hypertension rates in both studies were over 50% in their Pacific Islander participants in Hawaii and New Zealand respectively. Neither study recruited high or moderately high risk individuals only, as was done in this study. Differences between AHA statistics and these studies may be a
reflection of lack of current data about Pacific Islanders desegregated from Asians in general. This is supported by the discrepancy in the descriptions of Asian Pacific Islanders in Healthy People 2010 as healthy people and risk factor rates reported by the AHA. It may also reflect the higher concentration of Pacific Islanders in these studies (17% - 100%) than the general US population (3%). Rates of dyslipidemia and elevated blood glucose levels in this study were similar to the studies reported above.

These participants were somewhat younger (mean age 32.07 years) than those in studies preciously mentioned. In the study by Grandinetti et al. (2005) metabolic syndrome prevalence rates rose with age: 18-29 years (12.7%), 10-39 years (26.8%), 40-49 years (30.6%), 50-59 years (47.7%). Mean age of participants in the studies by Lee et al., Simmons and Thompson, and Sundborn et al. were 51.6, 49, and 49.6 years respectively, however inclusion criteria in these studies was limited to individuals 35 years or older. The higher rates of disease and risk factors in these younger participants may be a result of purposeful sampling or may indicate a larger problem in Samoans and other Pacific Islanders than is currently reflected in the literature. Studies with larger sample sizes are needed to gain a clearer picture of the prevalence of risk factors in Pacific Islanders.

Aim One

Aim one: Describe participants’ perceptions of risk for CVD and diabetes.

Perceptions of risk directly or indirectly influence health behaviors related to specific health threats (Connor & Norman, 2005) and have been included in many health behavior change models (Brewer et al., 2007). Understanding perceived risk can direct
attention to areas where interventions may have the most impact on decreasing health risks.

Perceived risk is conceptually linked to cognitive knowledge including memories, affective states, and contextual aspects of the specific risks (Millstein, 2003). Although knowledge, memory, and affect were not specifically measured in this study, the links between these concepts were clearly demonstrated. The majority of participants in this study perceived themselves to be at high risk for both CVD and diabetes. They cited knowledge of established risk factors for these diseases such as family history, obesity, dietary habits, and physical activity as influencing their perceived risk. While general knowledge was high, a lack of knowledge in one particular area was noted, specifically with regard to gestational diabetes. Participants reported being confused as to why they would be told they were diabetic at one time and not diabetic at another time. This finding contrasted with that of Kim et al. (2007) who examined perceived risk for diabetes in women with a history of gestational diabetes enrolled in a managed care plan (n=217) none of whom were Pacific Islander. Ninety percent of women knew their personal history of gestational diabetes was a risk factor for diabetes. However, Walker et al. (2003) also identified a lack of knowledge for a specific risk factor. In that study, 535 physicians attending a conference were surveyed. Just 35% of all physician participants were aware that Asians were at increased risk for diabetes. Significant numbers of Asian (44%) and White (73%) physician participants did not believe Asian-Americans were at increased risk for diabetes.
The influences of memories and affective states on perceived risk emerged through both personal and vicarious (observing others) experiences. Participants related how they had made lifestyle changes specifically to lower their CVD and diabetes risk so they did not end up like other family members or have another near death experience. They also discussed feeling happy at a particular body weight and eating certain foods. Contextual factors such as availability and low price of unhealthy fast-foods and the cost of healthier foods were mentioned. Multiple participants also related how they knew they were at risk as they could “really feel it”. Similar findings were reported in other studies. Frijliang et al. (2004), evaluated perceived risk for CVD in moderate to high risk individuals in the Netherlands (n=1557). Family history and self-rated good health were related to accuracy of perceived risk. Meischke et al. (2000) examined factors associated with perceived risk for CVD (n=1094) in a nationwide phone survey that included Asian Pacific Islanders (2.4%). Family history, personal history of HTN, and general health were associated with higher perceived risk. Montgomery et al. (2003) specifically examined family and friend history on perceptions of risk for multiple diseases two of which were CVD and diabetes (n=522) in the northwest U.S. Four percent of the sample was reported as Asian Pacific Islander. Although these other studies were conducted with primarily White participants, both family and friend history were associated with higher perceived risk.

This study was the first to explore perceived risk for CVD and diabetes in a Samoan population. Three studies included Asian Pacific Islanders (Kim et al., 2007; Meischke et al., 2000; Montgomery et al., 2003). No information was given regarding
what percent of participants were Pacific Islander versus Asian. Ethnicity was not found to have an effect on perceived risk for CVD or diabetes (Meischke et al.; Montgomery et al.). In other studies, minority participants have been reported to be both more likely to underestimate their risk of CVD (Christian et al., 2005; Kreuter & Strecher, 1995) or more likely to be concerned about their risk (Kemple et al., 2005). While knowledge, memory, affect and contextual factors clearly influence perceived risk for CVD and diabetes, more information is needed however as to how these factors may operate in different populations.

Aim Two

Aim two: Compare participants’ actual risk of CVD and diabetes based on presence of components of metabolic syndrome to their perceived risk for CVD and diabetes

A major premise underlying theories or models directed at decreasing modifiable risk factors through behavior change is that when people understand their personal risk, they will plan and follow through with the appropriate changes. It is important then, for health care professionals to be aware of both actual and perceived risks of their clients for diseases such as CVD and diabetes so that care can be tailored appropriately.

Actual level of risk for CVD and diabetes was determined using the NCEP-ATP III (2004) cut-off criteria for low (< 10%), moderate to high (10-20%), and high risk (>20%). Overall, participants addressed their risk for CVD and diabetes together, perceiving themselves to be at high risk both quantitatively and qualitatively for these diseases as determined by both statistical and content analysis. Small numbers of participants quantitatively underestimated their risk for CVD (16.3%) and diabetes
Qualitatively, underestimations of risk were qualified on behavior. Participants recounted how they had made behavior changes specifically to lower their risk for CVD and diabetes. They also reported feeling much better both physically and mentally after losing weight or changing their diet and therefore intentioned to maintain their current behavior.

Participants in this study perceiving themselves to be at high risk (>20%) for CVD (83.7%) and diabetes (86%) stated they based their perceptions on their current physical health, lack of healthy behaviors, and/or family history. Therefore there was no clear way to determine overestimations of risk or pessimistic bias because if these participants did not make lifestyle changes, they would most likely progress to the high risk category. Additionally, no qualitative codes emerged that indicated participants felt disease was inevitable regardless of whether or not they instituted behavior changes or by virtue of their family history. Rather, behavior was seen as a means to lower their actual risk and family history provided another reason to make lifestyle changes. Based on these complementary and converging aspects of the quantitative and qualitative data, participants in this study overwhelmingly perceived their risk for both CVD and diabetes accurately.

Results from this study are somewhat similar to results from other studies regarding perceived risk for CVD and diabetes. For example, behavior and feeling healthy have been cited by other studies reporting underestimations of risk for CVD or diabetes (Carroll et al., 2003; Gabhainn et al., 1999; Green et al., 2003; Kemple et al., 2005; Kim et al., 2007; King et al., 2006). However, in some cases, behavior, family or
personal history of risk factors, or basic knowledge of CVD was not associated with perceptions of risk (Avis et al., 1989; Christian et al., 2005; Forsyth & Goetsch, 1997). Lack of healthy behaviors, as well as perceived poor physical health, and personal and/or family history have also been reported to be associated with higher perceived risk for both CVD and diabetes (Frijling et al., 2004; Harwell et al., 2005; Kemple et al.; Kim et al., 2007; Meischke et al., 2000; Montgomery et al., 2003). Age was found to be associated with both lower perceived risk (Avis et al., 1989; Adriaanse et al., 2003; Phillips et al., 2005; Kemple et al.; Kreuter & Strecher, 1995) and higher perceived risk (Frijling et al.; Harwell et al.; Meischke et al.) for both CVD and diabetes.

Only two studies reported accuracy rates for perceived risk of 50% or greater for CVD or diabetes (Carroll et al., 2003; Christian et al., 2005). As noted in this study, personal and/or family history, health behaviors, and physical health were cited as influencing perceived risk in both studies.

General knowledge regarding CVD and diabetes risk factors and lifestyle changes recommended to treat those risk factors influenced accuracy of perceived risk for participants in this study. Several other studies also reported high levels of general knowledge regarding CVD and diabetes risk factors however results were mixed. General knowledge levels were associated with underestimations of risks (Green et al., 2003; King et al., 2006; Shepherd et al., 1998), higher perceived risk or overestimations of risk (Assimakipoulou et al., 2008; Samsa et al., 1997), and a lack of knowledge in specific area(s) (Carroll et al., 2003; Gabhainn et al., 1999; Kim et al., 2007; Walker et al., 2003).
Behavior, personal and family history, perceived physical and mental health, and levels of knowledge have been associated with accurate and inaccurate perceived risk for CVD and diabetes in multiple studies across multiple ethnic and socioeconomic groups. By identifying factors and their specific influences on perceived risk for CVD and diabetes, health care professionals can link them with assessments of actual risk and develop specific interventions for clients. Knowledge of these factors and how they work in different populations also assists researchers seeking to increase the utility of behavioral change models based in part on perceived risk.

Aim Three

Aim three: Describe the relationships among participants’ health-world views and perceived risk of CVD and diabetes.

Health-world views influence interpretations of health and illness phenomena and shape perceptions about health risks. These interpretations and perceptions can be both health and illness promoting. For example, beliefs that ancestors and other spiritual beings influence both health and illness promote the idea that prayer and meditation are more important than Western medicine in maintaining/regaining health (Andrews & Boyle, 2003), yet cultural influences and health-world views have not been studied to any degree in risk perception research.

Published descriptions of Samoan health-world views include beliefs that certain illnesses are specific to Samoans and referred to by Samoans as ma’ai Samoa, or are caused by divine entities and therefore curable only by traditional Samoan healers, prayer, and making restitution of some form (Ishida et al., 2001; Levy-Storms & Luben,
2006; Mishra et al., 2001; Tamasese et al., 2004). Explorations of health-world views revealed a somewhat different picture in this study. The specific ways of knowing identified in this study were personal, aesthetic, sociopolitical, empiric, and unknowing.

From these ways of knowing, participants in this study perceived themselves to be at risk for CVD and diabetes by virtue of family history and lifestyle. Specifically, empiric knowing in the form of factual knowledge from family, schools, media, and exposure to cultures outside Samoa and American Samoa resulted in knowledge of actual risk factors and consequences of CVD and diabetes. Participants referenced health care professionals, teachers, and family members’ advice as they discussed weight, lack of exercise, dialysis, and sores that didn’t heal in relation to why they perceived themselves to be at risk for CVD and diabetes. Personal knowing and aesthetic knowing were revealed in discussions about their personal health such as near death experiences, controlling how they felt physically and mentally by diet, exercise, and use of traditional medicines. Experiences of family members such as requiring dialysis and shorter or longer life expectancies also influenced their perceived risk. Specifically they believed they were at risk for those same conditions based on their current lifestyles. Personal responsibility was frequently mentioned with regard to their perceived risks of developing CVD or diabetes, demonstrating unknowing. This code emerged even in reference to family history in that family history was a cue to action not a sign of the inevitability of CVD or diabetes. Participants frequently cited changing sociopolitical context as influencing their perceived risks for disease. For example, the historic Samoan desirability of larger body sizes was changing in response to Western images of ideal
body sizes. The availability and convenience of fast foods was perceived as negatively affecting their health, but traditional foods such as ulu (breadfruit), taro, and fish were too expensive here in Hawaii to be able to eat them regularly. These ways of knowing have contributed to more accurate perceived risk of CVD and diabetes for participants in this study and would be useful additions to any interventions developed to support these participants efforts at improving their own health.

Health-world views also include beliefs, values, images, and ideas about health phenomena and also influence perceptions of risk. In this study, qualitative data identified a number of beliefs, values, images and ideas of health contributing to perceived risk. For example, fa’aaloalo, respect and religion, promoted harmony and balance and contributed to both healthy and unhealthy behaviors. Specifically, religion provided mental and spiritual comfort and one way to take care of their health. Religious leaders were seen as having enough influence to motivate their congregations to take better care of their health. Respect also emerged through listening to older family members’ health care advice and protecting family honor. Protecting family honor was also linked to overeating and unhealthy portions of food however. Family values emerged in multiple contexts with both short and long range effects. Participants talked about posterity, passing health knowledge on to their children, and putting family needs above their own. Family was also cited as a reason to make their own personal health a priority so that participants could fulfill family responsibilities but also to avoid negative health outcomes experienced by other family members.
Ideas about health were also multifaceted. Both traditional and Western treatment methods emerged as important. Traditional healers used herbs, massage, and prayer to promote spiritual and physical balance whereas Western medicines were better with ma’i Palangi. As previously mentioned, ideas about ideal body images were changing, but larger body sizes were still generally preferred. Perhaps the most dominant thoughts about health revolved around one’s personal responsibility. Regardless of family or personal health history, geographic location, or accuracy of perceived risks for CVD or diabetes, negative influences on health could be attenuated by personal action.

The effects of the larger cultural world view on health-world views surfaced as participants described trying to maintain fa’a Samoa here in the United States. Customs such as fa’alavelave continue to be practiced. Food is a central feature of fa’alavelave and tied to fa’aloalo, family honor, spiritual harmony, and personal responsibility. Preparing and eating large quantities of food was not balanced with the level of physical activity experienced living in Samoa/American Samoa. Processed and fast foods high in salt and fat are replacing diets previously made up of fish and items such as bananas and ulu the participants grew, harvested, and cooked themselves. Through experiences with other cultures such as Europe and the US participants became aware of differences between their images of what constituted normal size both with regards to types and quantities of food available and consumed at fa’alavelaves and ideal body sizes and how these differences were affecting their health.

Although health-world views and ways of knowing were not the focus of any of the studies identified in the literature review, three studies did discuss the importance of
culture and illness beliefs with perceptions of risk (Gabhainn et al., 1999; Graham et al., 2006; King et al., 2006). Graham et al. quantitatively explored perceived risk for diabetes and HTN in a predominantly African American population at community health fairs in several States. Relevant cultural factors were defined as perceptions of risk, willingness to accept standard treatment, and solicitation of available care. These cultural factors were discussed in relation to cognitive and motivating aspects of perceptions of risk as they related to development of optimistic bias found in the majority of participants in that study. Specific beliefs, values, images, and ways of knowing were not mentioned. Gabhaine et al. and King et al. operationalized culture as Irish and rural versus urban respectively. Gabhaine et al. identified three categories of knowledge, internal/external locus of control, and change as it related to lifestyle behaviors. Ways of knowing were not described but were reflected in the categories. Specifically, empiric and sociopolitical knowing were manifested in knowledge about diet and exercise and professional advice regarding health as well as financial and other resource related barriers to health. Another barrier to health identified by participants in the study by Gabhainn et al. were inconsistent recommendations from health care professionals. Aesthetic and personal knowing were identifiable into the descriptions of the feelings of well being or illness, family support, and personal philosophies. Unknowing was expressed as participants cited differences between their approaches to their health and those of health care professionals.

Similar concepts that could be related to ways of knowing were identified by King et al. (2006) Using a grounded theory approach, these investigators identified the
concepts of intra-personal, inter-personal, extra-personal, socio-demographic, and knowledge. Intra and inter-personal referred to personal feelings and beliefs, interactions between self and others including family, friends, and health care professionals which equate to personal, aesthetic, empiric, and unknowing. Aspects of sociopolitical and empiric knowing were noted with extra-personal and knowledge. For example King et al. listed environmental and sociodemographic factors such as health care resources, income, and lifestyle, and knowledge of risk factors for CVD. As with participants in this dissertation both King et al. and Gabhainn et al. (1999) found knowledge of CVD risk factors high among the participants but some confusion was present due to inconsistent messages from health care providers relating to risk factors and specific ways to improve their health. In contrast to participants in this dissertation, both King et al. and Gabhaim et al. described participants’ beliefs that people with risk factors died just like those who changed behaviors to lower their risks and therefore preferred their current quality of life. The idea of people dying regardless of their status was applied to skinny versus fat people but these Samoan participants were willing to change their behavior to have more quality time with their families.

An important point of agreement between these three studies and Turton’s (1997) original work with health-world views was that participants recognized that their health was ultimately their personal responsibility. Interestingly Nightingale expressed this same sentiment that health was ultimately an individual responsibility more than a century ago. Regardless of how beliefs, values and ways of knowing about health are described,
nurses can utilize these aspects and capitalize on the willingness of people to accept their health responsibilities to develop interventions to improve health for their clients.

Findings in the Context of the Conceptual Orientation

Millstein’s (2003) process model of risk perception proved a valuable guide for this study. This model proposes that individuals form perceptions of risk through three processes: Attention phase, primary appraisal, and secondary appraisal. Accuracy of perceived risk with regard to actual risk results from both the primary and secondary appraisal processes. Secondary appraisal considers “Am I at risk”, to what degree, and what are the consequences of that risk?. Individuals may consider current or future planned behavior during these three processes but behavior was not specifically included in the model as influencing perceptions of risk. The addition of health-world views provided another dimension in that specific areas contributing to inaccurate perceptions of risk could be targeted for intervention. Just as importantly however, health-world views help identify strengths clients may possess that can be included in these interventions, increasing the likelihood of success.

The importance of knowledge and personal and vicarious memories to the attention phase was validated by the emergence of codes such as knowledge, change, personal motivation, and personal responsibility. Participants recalled that prior to their exposure to other cultures, they had been unaware that their size put them at risk of CVD and diabetes. Being exposed to relatives’ negative health experiences also helped participants realize they also were at risk. Factors operating in the attention phase such as mood and context were particularly illustrated by the codes food, changes,
harmony/balance, and stress. For example the positive images and feelings in being able to help their family and community through *fa’alavelaves*, amounts and types of foods contributing to their happiness, and financial stress associated with expensive healthy foods all influenced the attention given to their risks for CVD and diabetes and their decisions as to whether or not they personally viewed themselves at risk. Behavior was a definite influence in both recognizing personal risk and accuracy of judgments concerning actual risk. Once participants in this study were cognitively aware that lifestyle increased risk for CVD and diabetes they related that to their personal situation and described current or planned behavior changes to lower their risk. Health-world views identified specific ways of knowing by which cognitive knowledge and affective states developed revealing opportunities for both clients and health care professionals to lower actual risk for CVD and diabetes in this population. Through sociopolitical knowing, respected community leaders such as church ministers and community and family matais can be engaged to develop or support health care policies and programs at the community and governmental levels. Unknowing can take advantage of the beliefs in personal responsibility by helping these participants identify ways they can reach compromises between unhealthy sociocultural practices such as portion sizes and body sizes and the need to make lifestyle changes to lower their actual risks for disease.

Finally, the use of mixed methods to explore perceived risk using this model was invaluable. Perceived risk for CVD and diabetes has not been studied in Samoans with metabolic syndrome features; therefore, questionnaires provided a means to quantify perceived risk for CVD and diabetes for these participants and as one way to compare
results from this study to existing literature. Qualitative data provided the key to identifying cognitive, memory, and affective states operating in these participants as well as critical aspects of health-world views influencing their perceived risks that would otherwise have not been uncovered. Specifically the ways and methods by which these participants had gained cognitive knowledge that promoted overall accurate perceived risk and their efforts to improve their health within a changing sociocultural and political context.

Implications for Research

This study was the first to explore perceived risk for CVD and diabetes in Pacific Islanders, Samoans at moderately high risk in particular. This is also the first mixed methods study this investigator is aware of informed by neomodernism and to explore ways of knowing with Samoan participants. Additionally, there is a paucity of specific methods to determine complementarity and convergence in mixed methods literature, few studies report using culture brokers to recruit minority participants, a relatively new sampling frame for mixed methods study was used and Millstein’s (2003) process model of risk perception was expanded to include health-world views then used in an adult population providing a wide range of opportunity for future research.

Design. The use of mixed methods design was vital to achieving the aims. Without the qualitative data, valid explanations for the optimistic bias noted in participants would not have been possible. For example, a lack of knowledge has been cited by other researchers as underlying optimistic and pessimistic bias with recommendations to develop education programs for participants (Christian et al, 2005;
Green et al., 2003; Kemple et al., 2005). By identifying the health-world views including ways of knowing used by these Samoan participants, a clearer picture of their educational needs and ways to remedy this was revealed. Specifically, better ways to relay knowledge regarding specific health threats such as gestational diabetes and Samoan values of fa’aaloalo and customs such as fa’alavelave were identified that could help tailor interventions and avoid the paternalistic approach that has frequently characterized care for Pacific Islanders and eroded their trust for Western providers. Additionally, more research is needed to identify appropriate body sizes for Pacific Islanders compared with European or Asian body types. Identifying such parameters will be more culturally acceptable and decrease the gap between a culturally identified and westernized ideal of a healthy body size. Researchers interested in reducing health disparities in non-Western cultures should consider using mixed method approaches when possible.

*Adaptation of the Process Model of Risk Perception.* Including health-world views in an existing model of risk perception helped identify specific attributes of participants’ health-world views that influenced perceptions of risk and validated the potential utility of using this model in adult minority populations. Ways of knowing were linked to specific cognitive factors and affective associations were also identified and linked with both cultural and individual features providing clear directions for both future research with this adapted model and Samoan participants and possibly other Pacific Island peoples as well.

*Culture broker.* Engaging a culture broker was key to successful recruitment. Ideally the culture broker should be embedded within the target population. Culture
brokers in this study were each well respected and trusted by community members. Although the leaders at one Church politely listened to a presentation regarding the study, took the information flyer and consent forms, and agreed to set up times for this investigator to talk to congregants, a return call was never received. A possible reason for this is the lack of a culture broker who was a member of the congregation of that church. This was confirmed as a possible reason through discussions with the other culture brokers and Samoan community members. This is also reflective of the reserve or distrust of Western researchers discussed in earlier chapters.

Methods. Aims of this study did not include exploring methods for mixed methods research, but during the dissertation process several serendipitous opportunities to discuss mixed methods concerns arose with respect to sampling and data analysis. Convergence and complementarity are established reasons to conduct mixed methods studies, yet only two studies (Voils et al., 2008; Woolley, 2009) and one in-press manuscript (Onwuegbuzie, Slate, Leech, & Collins, 2009) not available at the time of this writing contained descriptions of how to determine or validate convergence and complementarity during data analysis. Aspects from both Voils et al. and Woolley were combined as noted in Table 13. The process highlighted the appropriateness of using mixed methods for this study.

An integrated approach to sampling for mixed methods has received somewhat more attention, but overall literature on the topic remains sparse (Onwuegbuzie & Collins, 2007). This study used a relatively new sampling frame proposed by experts in
the field of mixed method research. The intent was not to test this new process but it did yield an adequate sample size for this descriptive study.

Recent examples from the literature illustrate these ongoing methodological concerns. In the study by Evans, Maiers, and Bronfort (2003) a mixed methods approach was used in a pilot study looking at issues important to clients when considering satisfaction with care and overall improvement in their condition. Face to face interviews were used as a way to obtain more depth, to understand the why behind the answers to quantitative questions. Sample size determination for the quantitative portion was not mentioned although this was a pilot study. The quantitative and qualitative results were reported separately, integration was not discussed. Similarly, in the study by Thomason, Evitt, Harrow, Love, Moore, Mullins, et al. (2007), focus group interviews and surveys were used in a descriptive study to explore providers’ perceptions of new treatment guidelines for pressure ulcers. Sample size determination was not mentioned other than stating sampling used purposeful and convenience samples. Also missing was a description of whether or not qualitative and quantitative data were integrated in the final analysis and how this was done. Similarly, Brazier, Cooke, and Moravan (2008) stated they did not employ specific methods directed towards looking for convergence or complementarity between the focus group data and the survey data in their study regarding at the impact of a cancer treatment program. However similarities/differences between themes from qualitative and quantitative data were examined.

The perceived risk response scale used in this study followed recommendations in the literature (Bruine deBruin et al., 2002; Kapadia-Kundu & Dyalchand, 2006;
Weinstein & Diefenbach, 1997). Specifically, a numeric response scale with referents (0, 10\% 20\% 30\% etc), and verbal anchors were used and the scale translated into the Samoan language. Participants in this study found the response scale easy to use however further research is needed to validate the utility of this scale in other Samoan communities and other Pacific Island people.

Theoretical perspective. It is beyond the scope of this dissertation to present a philosophical argument on the pros and cons of pragmatism versus neomodernism. Interested readers are referred to Morgan (2007), Tashakkori and Teddlie (2003), and Reed (1996). Briefly, pragmatism is described as linking both rationalistic and empiric approaches to open all possibilities of research lines of inquiry to focus on actual results. Approaching research from this stance allows for an iterative process between subjectivity and objectivity, induction and deduction, and context and generality and acknowledges the role of the researchers values on interpretation of results (Morgan, 2007; Tashakkori & Teddlie, 2003). Neomodernism embraces all methods and tools for knowledge acquisition, includes ways of knowing, and acknowledges the role of not only the researcher, but participants as well. The importance of including ways of knowing to uncover and understand participants’ perceived risk for CVD and diabetes and to be able to use that understanding both to direct future research with participants in this study and possibly the general Samoan population and other Pacific Island communities was clearly demonstrated.

Findings in this study supported the importance of mixed method approaches and the need for continued research regarding specific areas of such designs. The importance
of including health-world views in risk perception models and ways alternative theoretical perspectives can enhance mixed methods research were also revealed. Overall, this study added in small but important ways to both mixed methods research and research with minority populations.

Implications for Nursing Practice

Nightingale (1859/1992) recognized the importance of patients’ participation in their own care. This view is reflected today in the recognition of the importance of behavior to positive health outcomes by agencies such as the National Institute of Nursing Research (2004) and included in the Nation’s health goals (Healthy People 2010) and patient safety goals (NPSG, 2008). To help health care providers and patients achieve these goals, recommendations to monitor risk factors for CVD and diabetes are outlined in NCEP-ATP-III (2004) and the U.S. Preventative Services Task Force (2007). Specifically, starting at age 18 to 20 years, patient’s levels of risk should be identified and addressed on an individual level. The importance of these two recommendations was highlighted by findings in this study. Participants were younger than participants in similar studies but were already at moderately high risk for CVD and diabetes. These participants also clearly recognized their personal responsibility for their own health, factors that put them at higher risk, and the importance of healthy lifestyle choices in preventing CVD and diabetes for both themselves and their children. The holistic paradigm of nursing enables nurses to identify individuals for whom established guidelines may need to be adjusted. Screening should start earlier and capitalize on these participants’ family values. For example when counseling the parents, strategies for
lifestyle changes can include ways to promote healthy habits in their children. The response scale used in this study or something similar could be used as a starting point for discussions about actual risk and developing an individualized plan of care. Another example involves body sizes. Instead of focusing on a specific weight to achieve, goals of a treatment plan can be adjusted to include exercising so many days per week, decreasing the number of time per week fast foods are eaten, learning to prepare traditional foods using less fatty ingredients without increasing the food budget, and partnering with local Samoan healers to identify traditional therapies that can be utilized in health promoting programs. Deemphasizing weight and targeting a balanced healthier lifestyle that includes measures to decrease stress is congruent with cultural values, yet lowers actual risk for CVD and diabetes. There is evidence in the literature that pound for pound, Samoans have less body fat than their European counterparts (Defay et al., 2007) thus supporting this approach.

While overall general knowledge was high, specific gaps existed such as the long-term implications of gestational diabetes on health, which participants related to inconsistent messages from health care professionals. Confusion about messages from health care providers were also identified in the studies by Gabhainn et al. (1999) and Carroll et al. (2002) as impacting perceived risk for CVD and diabetes. These studies were described earlier in this chapter. Identifying specific areas to target for intervention can save limited resources for both healthcare professionals and their clients. When developing educational programs or individually counseling clients, messages need to be clear, concise, and direct. When applicable, inconsistencies in available research data can
be presented in ways that assist clients to make informed decisions given their particular circumstances.

For clients in this study, their particular circumstances included important cultural aspects. Using the identified ways of knowing to assist these clients in managing their health include using the values of *fa’aaloalo*, balance and harmony, and the importance of physical well being in educational programs about strategies to initiate or maintain health promoting behaviors. For example, *fa’aaloalo/respect* can be linked with personal responsibility to one’s self so that family and community obligations can be fulfilled. Nurses can also take advantage of the respect with which church leaders and *matais* are given by working with these individuals to develop community wide health promotion programs. This approach was used successfully in a Samoan community in New Zealand (Simmons, Fleming, Voyle, Fou, Feo, Gatland, 1998). Working closely with church leaders including the wives of the ministers, researchers developed a program that included educational materials including videos, cooking lessons, an exercise program with trained fitness experts, and participation in a national health week. The program was maintained throughout a two-year follow-up period. Success was attributed to using the church as the setting for the program and working within the cultural framework. A similar program with a Tongan community based on the 1998 study was not quite as successful however (Simmons, Voyle, Fout, Feo, & Leakehe, 2004). Although researchers were not able to determine the exact cause for the difference the need to individualize strategies even among similar Pacific Island communities was highlighted.
Florence Nightingale once remarked “‘I collected my figures with a purpose in mind, with the idea that they could be used to argue for change’” (Maindonald & Richardson, 2004). Data from this study identified specific ways of knowing and important cultural aspects that should be considered when developing interventions to reduce health risks in these participants. Nurses working with similar Samoan communities and possibly other Pacific Island peoples may be able to use these results as a starting point for their own communities.

Strengths and Limitations

Strengths

Strengths identified in this study included using a systematic approach to determine convergence and complementarity between quantitative and qualitative data that could be used in other mixed method studies. A relatively new sampling frame developed specifically for mixed methods studies was used. Use of neomodernism rather than pragmatism as a theoretical perspective was appropriate for this study. In addition to focusing on results, useful ways of uncovering these results were identified such as how the ways of knowing were linked to formations of perceived risks. These strengths expand in a small way tools currently available to researchers wanting to use mixed method designs.

Perceived risk for CVD and diabetes has not been studied to any degree from a specific cultural perspective or in a Samoan population, a group with particularly high rates of both CVD and diabetes. There is also limited qualitative information about perceived risk for CVD and diabetes in any population, minorities in particular. Results
from this study highlighted the importance of including culture in models of risk perception. Exploring perceived risk from a cultural perspective identified important strengths and limitations of these participants such as beliefs about personal responsibility and the importance of food that should be useful in developing interventions to lower actual risk of these participants. Data uncovered through the use of qualitative methods, supported existing literature regarding the role behavior has on the accuracy of perceived risks for CVD and diabetes and not including behavior may lead to researchers to inaccurately classifying participants as demonstrating optimistic or pessimistic bias.

Limitations

Limitations of this study included self-reported data, issues related to demographics, and recruitment challenges. Additionally lack of established guidelines for determining convergence and complementarity may have affected results of this study.

Self-Reported Data. Self-reported data potentially affected both construct and content validity and confirmability in this study. Specifically, data on the validity of conclusions with regards to actual risk factors present in this group of participants. During the data collection process, 1-2 participants in each group originally answered no to the questions about their risk factors however after talking with them, the answer was actually yes. For example women with a history of gestational diabetes initially answered no they had never been told their blood sugar was elevated. Clearly, the construct of “history of elevated blood sugar “ was different for these participants as they consistently did not associate gestational diabetes with elevated blood glucose. This also happened
with the question about cholesterol. Some had been told several years earlier but had not been back to a provider in years and so had initially answered no. This was not noted with the HTN question however. To the best of this investigator’s knowledge, this did not occur with questions about family history. However, family history questions were limited in that no information was asked about age of onset of disease in family members. Qualitative data yielded more information on this subject however some participants alluded to siblings and age of relatives who were affected, but not the age of onset.

**Demographics.** No attempt to separate focus group participants by age was made. Several participants indicated that the older generation may have a different perspective about their risk of CVD and diabetes such as the comment about “if you die you die.” Codes supporting this observation did not emerge during content analysis although the oldest participant was 55 years old. Time, finances, and recruitment challenges made any attempt to separate the groups by age impractical. This limits generalizability and transferability of results from this study.

**Recruitment.** Information was not available about the church that did not participate. Sampling was purposeful and took place within a relatively small geographical location. This added to the depth and richness of qualitative data; however this limits generalizability and transferability.
Summary

Pacific Islanders—Samoans in particular—are a marginalized population with regard to research and recognition of the extent of risk factors and disease present in this population. As one of the fastest growing populations in the U.S., Samoans are also experiencing one of the highest rates of CVD and diabetes in the Nation. Behavioral approaches are the irreplaceable foundations of any program directed at improving health disparities and are fundamentally connected to perceptions of risk for these diseases. Perceptions of risk evolve from the unique health-world views of people and their larger cultural world views. Pacific Islanders have a unique health-world view that interconnects with the ways of knowing in Nursing and aligns with the holistic cultural world view of nurses. By creating partnerships with Samoans and other Pacific Island peoples, goals of the NINR and Healthy People 2010 are achievable and Nightingale’s dream of relevant and far-reaching change continued.
APPENDIX A
## Indicators and focus areas for Healthy People 2010

<table>
<thead>
<tr>
<th>Indicators</th>
<th>Focus areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical Activity</td>
<td>1. Access to Quality Health Services</td>
</tr>
<tr>
<td>2. Overweight and Obesity</td>
<td>2. Arthritis, Osteoporosis and Chronic Back Conditions</td>
</tr>
<tr>
<td>3. Tobacco use</td>
<td>3. Cancer</td>
</tr>
<tr>
<td>4. Substance abuse</td>
<td>4. Chronic Kidney Disease</td>
</tr>
<tr>
<td>5. Responsible Sexual Behavior</td>
<td>5. Diabetes</td>
</tr>
<tr>
<td>6. Mental Health</td>
<td>6. Disability and Secondary Conditions</td>
</tr>
<tr>
<td>7. Injury and Violence</td>
<td>7. Educational and Community-Based Programs</td>
</tr>
<tr>
<td>8. Environmental Quality</td>
<td>8. Environmental Health</td>
</tr>
<tr>
<td>10. Access to Health Care</td>
<td>10. Food Safety</td>
</tr>
<tr>
<td></td>
<td>11. Health Communication</td>
</tr>
<tr>
<td></td>
<td>12. Heart Disease and Stroke</td>
</tr>
<tr>
<td></td>
<td>13. HIV</td>
</tr>
<tr>
<td></td>
<td>14. Immunizations and Infectious Diseases</td>
</tr>
<tr>
<td></td>
<td>15. Injury and Violence Prevention</td>
</tr>
<tr>
<td></td>
<td>16. Maternal, Infant, and Child Health</td>
</tr>
<tr>
<td></td>
<td>17. Medical Product Safety</td>
</tr>
<tr>
<td></td>
<td>18. Mental Health and Mental Disorders</td>
</tr>
<tr>
<td></td>
<td>19. Nutrition and Overweight</td>
</tr>
<tr>
<td>20. Occupational Safety and Health</td>
<td></td>
</tr>
<tr>
<td>-----------------------------------</td>
<td></td>
</tr>
<tr>
<td>21. Oral Health</td>
<td></td>
</tr>
<tr>
<td>22. Physical Activity and Fitness</td>
<td></td>
</tr>
<tr>
<td>23. Public Health Infrastructure</td>
<td></td>
</tr>
<tr>
<td>24. Respiratory Diseases</td>
<td></td>
</tr>
<tr>
<td>25. Sexually Transmitted Diseases</td>
<td></td>
</tr>
<tr>
<td>26. Substance Abuse</td>
<td></td>
</tr>
<tr>
<td>27. Tobacco Use</td>
<td></td>
</tr>
<tr>
<td>28. Vision and Hearing</td>
<td></td>
</tr>
</tbody>
</table>
Seven-step Mixed Methods Sampling Process

1. Determine the Goal of the Study
2. Formulate Research Objectives
3. Determine Research Purpose
4. Determine Research Question(s)
5. Select Research Design
6. Select the Sampling Design
7. Select the Individual Sampling Schemes

Two-Dimensional Sampling Model for Mixed Methods

APPENDIX C
Data Collection Sheet with Perception of Risk Questions

1. Male   Female

2. Date of Birth: __________   Place of birth __________

3. Single  Married  Widowed  Divorced  Living with a partner

4. How long have you lived in Hawaii __________ In the United States __________

5. What languages do you speak at home? __________________________

6. Education-highest level/degree completed: ______________________

7. What type of work do you do? _________________________________

8. Smoking history: Current Smoker   Never smoked

   Prior Smoker   How long ago did you quit? __________

9. Does your Mom, Dad, Sisters, or Brothers have:

   Heart disease  Stroke  Diabetes  High blood pressure
   High Cholesterol

10. Have you ever been told your blood sugar is too high? Yes  No

11. Have you ever been told you have high blood pressure? Yes  No

12. Have you ever been told you have high cholesterol? Yes  No

13. How many times a year do you see your health care provider? __________

14. How long has it been since you saw your health care provider? __________

15. Please list all the medications you are taking both prescribed and over the counter

   ________________________________
   ________________________________
   ________________________________

   ________________________________
16. What do you think your risk is of developing heart disease in your lifetime if you make no changes in your current lifestyle (diet, activity level, tobacco use, stress level)?

<table>
<thead>
<tr>
<th>None/very low</th>
<th>High</th>
</tr>
</thead>
</table>

17. What do you think your risk is of developing diabetes in your lifetime if you make no changes in your current lifestyle (diet, activity level, tobacco use, stress level)?

<table>
<thead>
<tr>
<th>None/very low</th>
<th>High</th>
</tr>
</thead>
</table>

18. Waist circumference ____________

Note: The reading level of this questionnaire is 6.2 on the Flesch-Kincaid grade level scale.
Fesili e fa’atau ia oe lava

1. Tama/Male Tina/Female

2. Aso fanau/Date of Birth: __________ Nu’u nae fanau ai/Place of birth________

3. E le’i fai ava-Faipoipo _____ Maliu lou taane/ava _____ Tete’a _____

   Nofo ma seisi _____

4. O le a le umi na e nofo ai i Hawaii ______________ Po’o Amerika __________

5. O lea le gagana o lo’o fa’aaogaina i lou aiga? _______________________

6. O lea le mauluga o ‘au a’oaoga?: ____________________

7. O lea le toaiga galuega o lo’o e faia? _______________________

8. E te alaula sikaleti?

   Oute le alaula Ua ou le toe alaula Oute alaula

9. Oa ni ma’i e maua i lou aiga?

   Ma’i fatu Stroke Suka Totomaualuga Cholesterol

10. Pe ua logo atu oe e lau forma’i, o lou suka ua mauluga tele? Yes No

11. Pe ua logo atu oe e lau forma’i, o lou toto ua mauluga? Yes No

12. Pe ua logo atu oe e lau forma’i, o lou cholesterol ua mauluga? Yes No

13. Pe faafia ona e vaai lau foma’i le tausaga? ____________________

14. O le a le umi talu ona e vaai i lau forma’i? ____________________

15. Lisi aufualaa mau lo’o e fa’aaogaina, po’o inua i le taimi nei

   ________________________________ ________________________________
   ________________________________ ________________________________
   ________________________________ ________________________________
16. O le’a sou lagona pe’a fa’apea o le a maua oe i le fa’ama’i o le fatu pe’a leai se suiga i le tausiga o lou soifua maloloina?

17. O le’a sou lagona pe’a fa’apea o le a maua oe i le fa’ama’i suka pe’a leai se suiga i le tausiga o lou soifua maloloina?

18. Waist circumference ____________
Welcome, thank you for taking the time to be a part of this discussion about health, heart disease, and diabetes. My name is Leilani Siaki. You have been asked to participate because you have risk factors for CVD and diabetes. The purpose of the discussion today is to talk about your views and beliefs about health, types of things that cause illness or “cause” health, and your beliefs about your risks for CVD and diabetes, I would like to stress that there are no right or wrong answers. If your view is different from what someone else says or you want to add to what someone else has said, feel free to disagree or give an examples of what you mean. You do not have to respond to all the questions, but your opinions are very important and I am here to ask questions and listen to what you have to say. If you have a lot to say and are talking a lot, I may ask you to let someone else share his/her thoughts so that everyone has a chance to talk. Everything that is said here today is important, so I’ll be taking notes and taping the session. I may ask you to clarify something you have said, but all of this information is confidential, no names will be included in any reports. There are pupus (refreshments) feel free to get something any time.
## Focus Group Guide

<table>
<thead>
<tr>
<th>Research Aim</th>
<th>Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research Aim</strong></td>
<td><strong>Questions</strong></td>
</tr>
<tr>
<td>Opening prayer</td>
<td><em>Opening prayer</em>&lt;br&gt;Welcome &amp; Thank you/Fa’afetai&lt;br&gt;Review study purpose, confidentiality, format for the discussions, rules of engagement, audio taping, introductions*</td>
</tr>
<tr>
<td><strong>Aim 3:</strong> Describe the relationship among participants’ health-world views, perceived risk of CVD/diabetes and health seeking behaviors pertinent to metabolic syndrome.</td>
<td>1. What are your beliefs about health, things that keep people healthy or cause illness/disease? CVD/stroke/diabetes in particular&lt;br&gt;2. Does your culture have anything to do with your health?&lt;br&gt;3. Of the things that are most important to you, your life, where would you place health in your list of priorities? Any cultural influences?&lt;br&gt;4. You were all invited to participate because you have risk factors ie obesity, HTN, elevated cholesterol, history of elevated blood glucose-have those conditions affected your views of health?&lt;br&gt;5. When you first arrived, you answered two questions about what you thought your risk of CVD/diabetes was, tell me more about why you answered the way you did ie 10%, 20% 50%, 100% etc&lt;br&gt;6. Does your culture have anything to do with how you answered the question?&lt;br&gt;7. What kinds of things increase or decrease your risk for CVD and or diabetes (primary and secondary appraisal)&lt;br&gt;8. Tell me more about how those fit with your beliefs about health.</td>
</tr>
<tr>
<td><strong>Prompts</strong></td>
<td><strong>Prompts</strong>&lt;br&gt;What does health look like if you close your eyes and picture it in your mind?&lt;br&gt;Would you explain that a little more or give an example?</td>
</tr>
<tr>
<td><strong>Aim 1:</strong> Describe participants’ perceptions of risk of CVD and diabetes.&lt;br&gt;<strong>Aim 2:</strong> Compare and contrast participants’ actual risk of CVD and diabetes based on presence of components of metabolic syndrome, and their perceived risk for CVD and diabetes</td>
<td>1. What types of things can cause CVD?&lt;br&gt;Diabetes?&lt;br&gt;Tell me a little bit more about how those fit with your beliefs about health. Tell me more about how you</td>
</tr>
</tbody>
</table>
Aim 3

9. Tell me a little bit more about your feelings about your risk for CVD/diabetes (secondary appraisal)

10. Is there anything else you’d like to say about your beliefs about health, risks of diabetes, best ways health care providers can help you stay healthy and lower your risk for CVD and diabetes?

decided on your answer?

Summary of main points and closing prayer-fa’afetai
APPENDIX E
### Methods for Trustworthiness for Qualitative Data

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Definition</th>
<th>Methods</th>
</tr>
</thead>
</table>
| Credibility/interpretive validity | How accurately data reflects perspectives of informants reflected in clear, accurate descriptions of informants perspectives. | 1. Focus group questions was reviewed with subject matter experts to verify congruency with study aims.  
2. Transcripts were verified against audiotapes with a random sample verified by an independent researcher.  
3. Transcripts were entered into Atlas ti as soon as possible after for the accuracy is verified.  
4. Notations were made during each reading of the transcripts  
5. Verified categories/codes with participants.  
6. Expert researchers reviewed the coding scheme. |
| Fittingness/transferability | Findings fit other similar contexts; readers find the information meaningful to their experiences. Data within each code, category, and sub-category match or have similar dimensions/qualities | 1. Codes, and categories were reviewed with expert researchers at regular intervals throughout analysis  
2. Codes and categories were verified with participants.  
3. Detailed description of data, context, and findings were written at completion of study in chapter 4 |
| Auditability/descriptive validity | Readers can follow the flow and thought process of researcher. Factual reporting, attention to detailed accuracy, verified by informants | 1. Back up copies of transcripts, audiotapes, and summaries were kept in a separate location.  
2. Ongoing review with experienced researcher regarding the consistency of the analysis process.  
3. Detailed description of codes and categories with illustrative quotes from participants were presented. |
| Confirmability/theoretical validity | Findings and conclusions supported by the data. Conclusions are coherent and do not contradict each other | 1. A final review was completed with interested participants  
2. An independent researcher was asked to review a draft of the final chapters |

*Note: Milne & Oberle, 2005; Morse et al. 2002; Morgan, 1993; Munhall, 2007; Sandelowski, 1986; Tashakkori & Teddlie, 2003*
Steps in the Revised Brislin's Translation Model for Cross-cultural Research

1. Two bilingual experts make simultaneous independent translations from the source language to the target language.

2. Two new bilingual experts individually blindly back-translate the target language version.

3. The four bilingual experts meet with investigators and review differences between the versions, adapting the version with the most accurate culturally equivalent meanings.

4. Two more bilingual experts independently back translate.

5. The process is repeated until the team agrees on the culturally equivalent meanings on both versions.

6. Back-translated versions are pilot tested on bilingual participants for reliability and equivalence.

APPENDIX G
October 21, 2008

Leilani ACL Siaki, Doctoral Student
Advisor: Lois Loescher, PhD
Nursing
PO Box 210203

RE: PROJECT NO. 08-0972-02 PERCEIVED RISK FOR CARDIOVASCULAR DISEASE AND TYPE 2 DIABETES AMONG SAMOANS WITH METABOLIC SYNDROME

Dear Leilani Siaki:

We received your research proposal as cited above. The procedures to be followed in this study pose no more than minimal risk to participating subjects and have been reviewed by the Institutional Review Board (IRB) through an Expedited Review procedure as cited in the regulations issued by the U.S. Department of Health and Human Services [45 CFR Part 46.110(b)(1)] based on their inclusion under research categories 6 and 7. Although full Committee review is not required, the committee will be informed of the approval of this project. This project is approved with an expiration date of October 20, 2009. Please make copies of the attached IRB stamped consent documents to consent your subjects.

The Institutional Review Board (IRB) of the University of Arizona has a current Federalwide Assurance of compliance, FWA00004218, which is on file with the Department of Health and Human Services and covers this activity.

Approval is granted with the understanding that no further changes or additions will be made either to the procedures followed or the consent form(s) used (copies of which we have on file) without the knowledge and approval of the Institutional Review Board. Any research related physical or psychological harm to any subject must also be reported to the appropriate committee. Approval is also granted with the condition that all site authorization letters will be submitted to the IRB prior to data collection.

A university policy requires that all signed subject consent forms be kept in a permanent file in an area designated for that purpose by the Department Head or comparable authority. This will assure their accessibility in the event that university officials require the information and the principal investigator is unavailable for some reason.

Sincerely yours,

Elaine G. Jones, PhD, RN, FNAP
Chair, Social and Behavioral Sciences Human Subjects Committee

EGJ/klk
Cc: Departmental/College Review Committee
Informed Consent

Perceived Risk for Cardiovascular Disease and Type 2 Diabetes Among Samoans
with Metabolic Syndrome

Introduction

You are being invited to take part in a research study. The information in this form is
provided to help you decide whether or not to take part. The researcher doing the
study will be available to answer your questions and give you more information. If
you decide to take part in the study, you will be asked to sign this consent form. A
copy of this form will be given to you.

What is the purpose of this research study?

The reason for this study is to learn more about your views of health, illness, and
well being as a Samoan, how those views and beliefs affect your views about
your risk of getting diabetes, heart disease, or stroke.

Why are you being asked to participate?

You are being invited to be in this study because you are

1. Samoan
2. You are 18 years old or older
3. You have risk factors for heart disease, stroke, and diabetes including
   obesity and at least one other risk factor such as high blood pressure, high
   cholesterol, or high blood sugar but you do not have heart disease, stroke
   or diabetes.

How many people will be asked to participate in this study?

Approximately 50. persons will be asked to participate in this study.

What will happen during this study?

If you agree to be in this study, you will:

1. Talk to the researcher doing the research and talk about your views of health,
   what you do to stay healthy, what you think about your risk for heart
disease, stroke, and diabetes in a group setting of 6 to 12 people who
   have also agreed to be in the study.
2. The group interviews will be conducted in English.
How long will I be in this study?

About 2 hours will be needed to complete the group interview for this study.

Are there any risks to me?

Although we have tried to avoid risks, interviews may make you tired. You may feel frustrated trying to explain your opinion during the interview. You may feel some anxiety about your risk of heart disease or diabetes. You can stop being in the study immediately if you get tired, frustrated, or you feel too stressed or anxious. We can give you information about individuals who may be able to help you with these problems. There is no physical or financial risk by being a part of this study.

Are there any benefits to me?

1. You will not get any individual benefit from being in this study.
2. Being in this research study may help health care professionals know how to better help you and other people like you take care of or improve their health.

Will there be any costs to me?

Aside from your time, there are no costs to you to be in this study.

Will I be paid to participate in the study?

You will not be paid for your participation.

Will audio recordings be made of me during the study?

We will make an audio recording during the interviews. This will help the researcher doing the study make sure she has your answers correct. If you agree to this, please check the box below.

☐ I give my permission for audio recordings to be made of me during my participation in this research study.

☐ I do not give my permission for audio recordings to be made of me during my participation in this research study.

Will the information that is obtained from me be kept confidential?

The only people who will know that you were in this study will be the research personnel and the researcher doing the study. Her name is Leilani ACL Siaki, MS, RN, FNP.
Your records will be confidential. You will not be identified in any reports or publications resulting from the study. It is possible that representatives of the sponsor that supports the research study will want to come to The University of Arizona to review your information. Representatives of regulatory agencies (including The University of Arizona Human Subjects Protection Program) may access your records.

May I change my mind about participating?

Your participation in this study is your choice. You can change your mind at any time during the study. Any new information we find out about the research during this study will be given to you. This information could change your decision to be in the study.

Whom can I contact for additional information?

You can get more information about the study and talk about any concerns you have. You can complain if you want to. To do this, call the researcher doing the study; Lelani ACL Siakl, MS, RN, FNP 623-229-6454 or 806-744-6943. You may also call the University of Arizona Human Subjects Protection office toll-free number at 1-866-276-1455. You can call them if you
1. Have questions about your rights of being in this study.
2. Have questions or concerns.
3. Have complaints about the study.
4. Would like to give information about the study and cannot reach the researcher.
5. Want to talk to someone other than the researcher.

If you would like to contact the Human Subjects Protection Program via the web, please visit the following website: http://www.irb.arizona.edu/contact/.

Your Signature

By signing this form, I affirm that I have read the information contained in the form, that the study has been explained to me, that my questions have been answered and that I agree to take part in this study. I do not give up any of my legal rights by signing this form.

Name (Printed) ____________________________

Participant’s Signature ____________________________ Date signed ____________

Version: 10 October 2006 Page 3 of 4 Participant’s Initials _____
Statement by person obtaining consent

I certify that I have explained the research study to the person who has agreed to participate, and that he or she has been informed of the purpose, the procedures, the possible risks and potential benefits associated with participation in this study. Any questions raised have been answered to the participant's satisfaction.

________________________________________
Name of study personnel

________________________________________
Study personnel Signature               Date signed
Informed Consent

Perceived Risk for Cardiovascular Disease and Type 2 Diabetes Among Samoans with Metabolic Syndrome

Upu Tumua / Introduction

Ua ou augani atua te oe, e te'auai i lenei su'esu'ega. O lenei pepa e fa'amagonia ai lou fia 'auai i lenei saililiiga/ su'esu'ega. E fa'ataunu'una lenei su'ega e le teine foma'i ma sei nate fa'aililiina ma fa'amalamalamaina le su'ega. A'e fia 'auai lenei su'esu'ega ona e fa'atumuina lea o lenei pepa. E te mauainia fo'i se kopi of lenei su'esu'ega pe a mana'omia se kopi.

O le a le mafuaga o lenei saililiiga?

O le mafuaga ua faia ai lenei saililiiga po'o su'esu'ega ina ia malamalama oe le tagata Samoa i au amioga ma lou iloa, ua ala ai ona e maua le ola tului ma le ola maloloinina, e fa'amana'uta ai fo'i le iuga po'o ni mea e tupu ai le ma'i ole suka ma ma'i ole fatu.

Ai sea ua fa'afesiligia ai oe e te au ai i lenei sailiga/su'esu'ega?

E mana'omia e te 'auai i lenei saililiiga ona o oe

1. Samoa
2. E 18 aga'i luga au tausaga
3. E iai ni fa'afaitega e maua ai oe i le ma'i fatu, po'o le stroke, po'o le suke

E to'afia ni tagata e au ai i lenei su'esu'ega?

Po'o le 50 tagata.

I le taimi o le saililiiga o ni mea e faia?

Afa'i e te 'au ai ma e talla lenei sailiga . . .

1. E lua te talanoa ma le teine foma'i e saililiil ai lou malamalama ma lou iloa le mafuaga ua ala ai ona e ola maloloinina, ma su'esu'eina ai lou iloa i le mea ua tupu ai le ma'i fatu, stroke, ma le suka fa'atasi ma nei tagata e 5 po'o le 8 tou te talanoa.
2. E pule oe pe lai se fa'ailiiiu upu i le taimo e le talanoaga.
3. E avanoa se fa'ailiiiu upu e fesoasoani i le taimo e le su'esu'ega

Version: 10 October 2008           Page 1 of 3           Participant's Initials_____
O lea le umi o le nei saililiiga?

O le interview fa'atasi ma isi tagata pe na'o 90 ile 120 minute

E lai se mea e totogi e a'u?

E leai se tau o le nei saililiiga, na'o lou taimi e mana'omia

O lea le penefiti o le nei saililiiga la te a'u?

1. E leai se penefiti e maua e ce lava ia
2. O lau 'auai i le nei saililiiga e fesoasoani i le galue o le tausiga male maloloina a ce fa'apea le toatele o tagata o le tatou atonu'u

E lai se mea e totogi e a'u?

E leai se tau o le nei saililiiga, na'o lou taimi e mana'omia

A ou 'auai i le nei su'esu'ega e maua sa'u totogi?

I le taimi leene o le'oi iai se alaga tupe e totogi se tasi e 'auai i le nei saililiiga

E pu'ea leo i le nei su'esu'ega?

Ioe, e pu'ea lou leo i le nei su'esu'ega. E fai lea ma fa'amaoniga i ou tali o fesiili. A'e tallia, fa'amolemale fa'aekise le pusa lena i lalo a'e

☐ Oute tu'uina atu la'u fa'atagana e pu'ea ai lo'ou leo a ou 'auai
i le nei saililiiga

E puipuiua tatau tusitusi o le nei saililiiga?

O le nei saililiiga/ su'esu'ega e fa'aaoagaina na'o le teine foma'i ia Leilani A. Siaki ma le e fesoasoani la te ia.

Afai e iai se afaina, e mafia ona suia lo'u mafaufaga i le'auai i le nei saililiiga/ su'esu'ega?

O le saililiiga/su'esu'ega le nei e te'auai e tu'u lea i lou lava fa'i tallia. I so'o se taimi e te fa'alogo ai ua e musu, na'o logo lava i le o lo'o faia le nei su'esu'ega.O ni malamalamaga fou i nei mataupu o lea su'esu'ega matou te maua matou te iboa e fai lea ma fa'amalosiaga la te oe matou te fia faaioa atu lea ia te oe ina ia mau a i lou filifiliiga e te'auai pe'a i le nei saililiiga.
O ai oute fa'afeso'atai pea iai se mea oute le malamalama ai?

So'o mea e te mana'omia po'o ni fesili fo'i e te fia malamalama ai na'o lou valu ia Leilani A. Siaki i le telefoni (623) 229-6454 po'o (808) 744-6943. E mafai fo'i ona e valu i le ofisa o le University of Arizona Human Subjects Protection i le (800) 278-1455 e te fesili ai

1. Fa'amoaia ai lau aia tatau
2. So'o fesili i lenei sailliligia
3. Po'o sau fa'atuiose
4. O ni mataupu ua e iloa e fesoasoani i le fa'alauta e lega o lenei su'esu'ega ona ua e le maua Leilani A. Siaki
5. Pe e te fia talanoa i seisi tagata e iuga i lenei lava sailliligia

O lau saini / Your signature

Oute sainia lenei laupepa, ma ou fa'amautunia oute

1. Malamalama i mataupu o lenei sailliligia
2. Ua fa'amalamalamaina mai la te a'u le uliga o le sailliligia
3. Ua talia uma a'u fesili
4. Ua ou talia ma oute fia 'auai i lenei sailliligia, ma oute tu'ulina atu le fa'atakana e fa'aaoagaina ai lenei su'esu'ega o lomia i tusi Fa'afoma'i, ma le a'aoga o nei mataupu ma so'o se su'esu'ega fa'asalentisi
5. Oute malamalama e le fa'alioaina lo'u suafa. O su'esu'ega uma e pulpul i le talafoana le malo o Amerika.
6. Oute le tu'ulina atu lau ai a tatau i le sainia o lenei pepa

Lou Igoa
Sainia Lou Igoa
Aso lenei

Statement by person obtaining consent

I certify that I have explained the research study to the person who has agreed to participate, and that he or she has been informed of the purpose, the procedures, the possible risks and potential benefits associated with participation in this study. Any questions raised have been answered to the participant's satisfaction.

Name of study personnel

______________________________  ______________________________  __________________________
Study personnel Signature  Date signed

Version: 10 October 2008  Page 3 of 3  Participant's Initials
07 October 2008

Leilani A.C.L.Siaki  
92-917 Welo St. unit 107  
Kapolei, HI 96707  
Phone/FAX: (808) 744-6943 cell: (623) 229-6454  

Dear Leilani  

I have reviewed your request regarding your study and am pleased to support your research project entitled  

"PERCEIVED RISK FOR CARDIOVASCULAR DISEASE AND DIABETES TYPE 2 AMONG SAMOANS WITH METABOLIC SYNDROME".  

Your request for my services to translate documents used in your study is granted. This includes Informed consent and Use and Disclosure of Protected Health Information, data collection sheet, perceived risk questions, and any Samoan words participants may use in the focus group interviews. Additionally, I agree to act as culture broker and introduce you to community leaders and potential participants.  

As agreed, I will be reimbursed for any direct costs I incur such as printing or copying expenses.  

This authorization covers the time period of 07October2008 to 15May2009. We look forward to working with you.  

Sincerely,  

[Signature]  

Luana Sula  
87-208 Holopono St  
Waianae, HI 96792
31 October 2008

Leilani A.C.L Siaki
92-917 Welo St. unit 107
Kapolei, HI 96707
Phone/FAX: (808) 744-6943 cell: (623) 229-6454

Dear Leilani

I have reviewed your request regarding your study and am pleased to support your research project entitled

"PERCEIVED RISK FOR CARDIOVASCULAR DISEASE AND DIABETES TYPE 2 AMONG SAMOANS WITH METABOLIC SYNDROME".

Your request for my services to act as culture broker and introduce you to community leaders and potential participants, advise you on Samoan cultural customs and protocols, and translate Samoan words participants may use in the focus group interviews is granted.

As agreed, I will be reimbursed for any direct costs I incur such as printing or copying expenses.

This authorization covers the time period of 07October2008 to 15May2009. We look forward to working with you.

Sincerely,

[Signature]

Muliagatele T. Lea’ana
Mesa, AZ 85204
Kapolei, HI 96707
07 October 2008

Leilani A.C.L.Siaki
92-917 Welo St. unit 107
Kapolei, HI 96707
Phone/FAX: (808) 744-6943 cell: (623) 229-6454

Dear Leilani

I have reviewed your request regarding your study and am pleased to support your research project entitled

“PERCEIVED RISK FOR CARDIOVASCULAR DISEASE AND DIABETES TYPE 2 AMONG SAMOANS WITH METABOLIC SYNDROME

Your request to use Lighthouse Outreach Center Assembly of God as a research recruitment site is granted. The research will include filling out a short questionnaire and participating in focus groups.

This authorization covers the time period of 07 October 2008 to 15 May 2009. We look forward to working with you.

Sincerely,

[Signature]

Pastor Joe Hunkin Jr
Lighthouse Outreach Center Assembly of God
94-230 Leokane
Waipahu, HI 96792
Re: mixed methods request to cite

From: TonyOnwuegbuzie@aol.com
Sent: Thu 9/11/08 11:14 PM
To: hulalady1@msn.com
Cc: kathycollinskob@aol.com

Dear Leilani,

Thank you for your email. Sorry for my delay in responding but I recently returned from a trip and since then I have been distracted by the hurricane that is heading towards Houston, which is only 25 miles away from my home. I now teach at Sam Houston State University in Huntsville, Texas.

Thank you for your interest in our work. Yes, you have our permission to include Figure 1 and Figure 2 from our 2007 article entitled, *A typology of mixed methods sampling designs in social science research*, providing you cite the article.

With regard to your second question pertaining to sample size, you stated that her samples are identical; so, it appears that your sample would consist of 48 individuals (i.e., 4 focus groups with 12 members in each group) participating in the Quant and Qual components of your study.

I hope that this helps.

Good luck with your research.

Warmest regards,

Tony Onwuegbuzie

Anthony J. Onwuegbuzie, Ph.D., P.G.C.E., F.S.S.
Professor
Department of Educational Leadership and Counseling
Sam Houston State University
Editor, *Educational Researcher: Research News & Comments*
Co-Editor, *Research in the Schools*
Licensed Secondary School Teacher
Hi Leilani,
I'm very happy to hear that you're interested in using the model and am happy to give you permission to use it! I didn't see any attachment and would be interested in hearing how you'll be applying it.
Shana Millstein

Shana (Susan) G. Millstein, Ph.D.
Professor of Pediatrics
University of California, San Francisco
Division of Adolescent Medicine
3333 California Street, Suite 245, Box 0503
San Francisco, CA 94143-0503
USA

Private Voice Line: (415) 820-1611

millsteins@peds.ucsf.edu
References


Kinloch, P. J. (1983). To love them and to leave them? A review of a Samoan community and health service research project in New Zealand. *Social Science Medicine, 17*(8), 461-470.


