INVESTIGATION INTO THE RELATIONSHIP BETWEEN WORRY AND SELF-

EFFICACY AND SELF MANAGEMENT IN AN ASIAN PACIFIC ISLANDER

POPULATION WITH TYPE 2 DIABETES

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ASTRACT

Diabetes Mellitus is a complex chronic disease that is prevalent throughout the world (Wild, Roglic, Green, Sicree, & King, 2004). People living with this disease are confronted with lifestyle modifications that require daily attention to a myriad of self care behaviors and health practices. Adherence to these self care recommendations can prevent the devastating complications that are associated with diabetes (UKPDS Group, 1998; Stratton, Adler, Neil, et al., 2000). Though knowledge plays an important role in the self management of diabetes, education alone does not ensure adherence to life-long behavior changes (Norris, Lau, Smith, Schmid, & Engelgau, 2002; Krichbaum, Aarestad, Buethe, 2003). It is recognized that additional research is needed to understand barriers and facilitators to behavior change.

Studies have identified that people with diabetes have worries about their disease and specific sources of worries include worries about being able to carry out family responsibilities in the future, worries about their financial future, worries about weight, and worries about risk for hypoglycemia (Peyrot, Rubin, Lauritzen, Snoek, Matthews, & Skovlund, 2005). Investigation into the effects of worry on health has focused primarily on worry's motivational properties and little is known about how worry impacts self management adherence in the diabetic population.

The purpose of this study was to investigate the relationship between worry, self efficacy and adherence to self management recommendations in the API diabetic population. An analysis of data previously collected from a two arm randomized controlled intervention trial (ENHANCE project) was undertaken to answer the research questions.

The findings of this study suggest that levels of and types of worry have an effect on self efficacy and on self management adherence. Social worries had a direct effect on self efficacy and positively moderated self efficacy's impact on self management adherence. Disease specific worries had a negative direct effect on self efficacy and negatively moderated self efficacy's effect on adherence. In addition, our study supported the understanding that worry perception and impact may differ among ethnic groups. The Hawaiian and Pacific Islanders in our study experienced less worries as measured by our social worry tools than the Asian participants.

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Chapter 1: Introduction

Diabetes Mellitus is a complex chronic disease that is prevalent throughout the world (Wild, Roglic, Green, Sicree, & King, 2004). People living with this disease are confronted with lifestyle modifications that require daily attention to a myriad of self care behaviors and health practices. Adherence to these self care recommendations can prevent the devastating complications that are associated with diabetes (UKPDS Group, 1998; Stratton, Adler, Neil, et al., 2000). Traditionally efforts to facilitate adherence to self care recommendations focused on educating the client. Though knowledge plays an important role in the treatment of diabetes, education alone does not ensure this life-long behavior change (Norris, Lau, Smith, Schmid, & Engelgau, 2002; Krichbaum, Aarestad, Buethe, 2003). Meta-analysis results by Norris and colleagues (2003) showed that benefits of self management education decline after 3 months which suggests that additional research is needed to understand barriers and facilitators to behavior change.

Studies have identified that people with diabetes have worries about their disease and specific sources of worries include worries about being able to carry out family responsibilities in the future, worries about their financial future, worries about weight, and worries about risk for hypoglycemia (Peyrot, Rubin, Lauritzen, Snoek, Matthews, & Skovlund, 2005). Investigation into the effects of worry on health has focused primarily on motivational properties and little is known about how worry levels impact self management adherence in the diabetic population.

This study investigated the relationship between worry, self efficacy and adherence to self management recommendations in the API diabetic population. The

evidence produced by this study improves our understanding of the concept of worry and clarifies the role worry has as a motivator or barrier to diabetes self management.

Statement of the Problem

Diabetes Mellitus is part of a group of chronic diseases that is rapidly becoming a national health crisis. In 2008, the Centers for Disease Control and Prevention (CDC), released a report that estimates that there are 23.6 million people, or 7.8 percent of the United States (U.S.) population living with diabetes. Within this group, 17.9 million people are diagnosed and the remaining 5.7 million people remain undiagnosed and untreated. An additional 57 million people are estimated to have pre-diabetes. Cost for direct diabetes medical care in the United States in 2007 was estimated at $116 billion dollars with an additional indirect cost of $58 billion due to premature death, disability and work loss (Centers for Disease Control and Prevention, 2009). The Hawaii Diabetes Report published in 2004, reported that there are an estimated 72,000 to 100,000 people with diabetes living in Hawaii. Approximately 25,000 of these people are undiagnosed. Looking at the disease from a global standpoint, Wild, Roglic, Green, Sicree, and King (2004) used the World Health Organizations estimates of the prevalence of diabetes for the year 2000 to project the prevalence of diabetes in the year 2030. It was estimated that 2.8% of the world population had diabetes in 2000, and this would increase to 4.4% of the world population by the year 2030. This translates to approximately 366 million people worldwide with diabetes in 2030.

Diabetes is associated with both micro-vascular (retinopathy, neuropathy, and nephropathy) and macro-vascular (cardiovascular, hypertension and peripheral vascular) complications. In 2007, the CDC's report on prevalence of diabetes complications in

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persons 35 years and older in the United States reported 19.8% had visual impairment, 34.5 % reported cardiovascular disease, and 58.4% reported mobility limitations (CDC, 2009). In 2003, there were 18.8 hospitalizations for lower extremity conditions per 1000 diabetics and in 2002 there were 231.7 reported cases of end stage renal disease per 100,000 diabetics (CDC, 2009). The National Diabetes Fact Sheet for 2007 reported that adults with diabetes have 2 to 4 times higher rates of heart disease and stroke than adults without diabetes, and diabetes is the leading cause for new cases of blindness and kidney failure in the U.S. In addition, diabetes is associated with increased mortality ranking as the seventh leading cause of death on death certificates in the U.S. in 2006 (CDC, 2009). According to the 2001 report from the Agency for Healthcare Research and Quality (AHRQ), complication rates are higher for minorities than for whites diagnosed with diabetes. End stage renal disease was noted to be 2.6 times higher among African Americans than whites and retinopathy resulting in blindness was greater in minorities than whites. The reason for this disparity among ethnic groups remains unclear, although AHRQ funded research has shown that economic and cultural barriers may play a role in poor glycemic control.

Diabetes associated complications, which are found in both type 1 and type 2 diabetes, can be prevented through maintenance of glycemic control. The Diabetes Control and Complications Trial Research Group (1993) conducted a multicenter, randomized controlled clinical trial comparing intensive diabetes therapy to conventional therapy. Results demonstrated that tight glycemic control, attained through intensive insulin therapy, resulted in decreased incidence or slowed progression of retinopathy, nephropathy and neuropathy. The United Kingdom Prospective Diabetes Study

(UKPDS) investigated intensive versus conventional glucose control utilizing various hypoglycemic agents, targeting the population of clients with type 2 Diabetes. Results of the UKPDS study suggest that tight glycemic control resulted in decreased incidence of both macro vascular and micro vascular complications in type 2 diabetics (UKPDS Group, 1998; Stratton, Adler, Neil, et al., 2000.). Evidence provided by these landmark studies highlighted the importance of tight glycemic control and resulted in development of Standards of Care (American Diabetes Association, 2009). The American Diabetes Association (2009) practice guidelines recommend lifestyle modifications that require a myriad of self care decisions on a daily basis. In order to meet the challenge of maintaining glycemic control, clients modify their diet, self-monitor their blood glucose levels, administer daily medications, assess for signs and symptoms of acute and chronic complications of diabetes, and maintain an exercise regimen. Saydah, Fradkin and Cowie (2004) analyzed and compared data from the Third National Health and Nutrition Examination Survey III (NHANES) conducted in 1988-1994 to the NHANES 1999-2000 data. Results showed that only 37% of diagnosed diabetics achieved a desired hemoglobin A1C of <7%, 35.8% had blood pressure readings of <130/80 mmHg, and 50% or men and 53.8% of women had total serum cholesterol levels of 200 mc/dl or greater. This low level of goal achievement supports the need for research into development of interventions which enhance adherence to diabetes self management recommendations.

Barriers to adherence have been categorized as educational, socioeconomic, cultural or psychosocial (Lerman, 2005). Advanced educational background and higher levels of diabetes knowledge were associated with improved adherence rates.

Socioeconomic and cultural factors among ethnic minority and underserved populations were also found to be related to poor adherence (Lerman, 2005). Psychosocial barriers to adherence include stress, depression, low self efficacy and lack of family and social support (Glasgow, Toobert, & Gillette, 2001; Delahanty, et al., 2006; Lerman, 2005). The persistently poor rates of adherence coupled with the high rates of diabetes complications suggest that continued study in the area of facilitators and barriers to diabetes treatment adherence is warranted.

One of the identified facilitators of self care adherence is self efficacy. A number of recent studies in the field of diabetes self management have shown that greater perceived self efficacy resulted in greater adherence to self management recommendations and lower self efficacy resulted in decreased levels of self management (Aljasem, Peyrot, Wissow, & Rubin, 2001; Sarkar, Fisher, & Schillinger, 2006; Lee & Lin, 2009). These study results supported this relationship across genders and cultures. The theory of self efficacy proposes that the greater the confidence a client has in their ability to institute a behavior change, the greater the likelihood the behavior will be performed. For health behavior to change, belief in one's ability to cope with the physical and mental demands required to institute change is essential (Bandura, 1997). According to Bandura (1994, 1997), belief in one's efficacy affects intention to change, effort one is willing to invest in the change, and the degree one will steadfastly persevere to the change in the face of barriers.

Stressors of daily living in an urban society added to self care requirements create additive daily stress and worry (Fisher, Thorpe, DeVellis, & DeVellis, 2008), which may negatively impact adherence to self care regimens. Few studies have been conducted to

investigate the impact of worry on diabetes. What is known is that diabetic clients worry about their health, their future and the side effects of their medication (Delahanty et al., 2007; Peyrot et al., 2005; Mann et al., 2009, Di Battista, Hart, Greco,& Gloizer, 2009, Shiu & Wong, 2002). Delahanty, Grant, Wittenberg, et al. (2007) surveyed a total of 815 Type 2 diabetics with the Problem Areas in Diabetes (PAID) Scale and found that the top problem identified by patients was "worrying about the future." These studies suggest that clients with diabetes have worries and concerns about the impact this disease has on their health.

Many of the studies on health worry focus on worry's motivational properties to induce smoking cessation and adherence to cancer prevention guidelines (Dijkstra & Brosschot, 2003; Mosher, Lipkus, Sloane et al., 2008). Li, Cardinal, and Vuchinich, (2009) studied the effects of worry and exercise participation in the elderly. The study results revealed that high levels of worry, such as fears of falling, had a significant negative impact on physical activity and a significant indirect effect on walking difficulty which suggests that worry may be a barrier to exercise adherence.

The DCCT and UKPDS trials have demonstrated that complications from poor glycemic control are preventable, yet adherence to the recommendations for self management of diabetes remains poor. In studies specifically designed to investigate diabetes self-care, worry about hypoglycemia and self efficacy have been associated with adherence (Mann, Ponieman, Lenthatl, & Halm, 2009; Wild, Von Maltzahn, Brohan, Christensen, Clauson, & Gonder-Frederick, 2007). The relationship worry has to self efficacy as well as their combined relation to diabetes adherence/self management in areas other than medication adherence remains unclear and additional investigation may

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help the health care provider develop interventions that will enhance diabetes self management.

Significance of the Study

The concept of diabetes worry has been recognized as a concern for diabetic clients yet little is known about the relationship of worries to self efficacy and self management recommendations. It is important for practitioners to determine if worry has the same negative impact on self management adherence in the diabetic API population as it was found to have on exercise in the elderly (Li et al., 2009). Understanding these relationships may help guide the development of culturally appropriate diabetes self management interventions which can improve patient adherence to self management recommendations.

Purpose of the Study

Because of the potential importance of the relationship among the variables, worry, self efficacy and adherence, this study was formulated to explore the impact diabetes worry has on the client's self efficacy and adherence to recommended self management behaviors within the API population. The aims of the study are to:

1. Determine the relationship between worries and self efficacy and effect on adherence to self management recommendations.

2. Determine if perceptions of worry and type of worries differed between the two API subpopulations.

3. Determine if perceptions of worry and type of worries differed based on gender.

Hypotheses

1. Worries will be negatively correlated with self efficacy.

2. Worries will be negatively correlated with all five measures of adherence to self management recommendations.

3. Self efficacy will be positively correlated with adherence to self management recommendations.

4. Worries will moderate the relationship between self efficacy and adherence to self management recommendations.

5. There will be no differences in the perception of and type of worries experienced by the different API subpopulations.

6. There will be no differences in the perception of and type of worries experienced by the participants based on gender.

Chapter 2: Literature Review

A review of current literature regarding the concepts of worry and self efficacy and their relationship to adherence/self management in diabetes was undertaken. This review will discuss the definition of adherence/self management and then expand to the concepts of worry and self efficacy.

Adherence

Historically, the term "compliance" was utilized to describe how well a client followed recommended self management regimens. However, "compliance" has been replaced with the terms "adherence" or "self management" in response to concerns that the term compliance was value laden (blaming) and implied that the burden of diabetes management rests solely on the client (Bissonnette, 2008; Hearnshaw & Lindenmeyer, 2005; Ruggiero, Glasgow, et al., 1997). A clear definition of the term is essential to appropriately select valid tools that measure the concept of adherence. Another term utilized in research to describe adherence behavior is "concordance ". The definition of "concordance" refers to the consultation that occurs between the client and health care practitioners and the agreement that is reached regarding treatment goals and therapy. Hearnshaw and Lindenmeyer (2005) conducted a review of the literature regarding the definition of adherence in diabetes research and found no single definition of adherence. Five categories of definitions emerged from their search: "coincidence of behavior with professional advice", relationship as part of the process of care", "outcome and process targets", "taking the medication as prescribed" and "other". For the purposes of this study, the definition of adherence/ self management will refer to the "coincidence of behavior with professional advice"(Hearnshaw & Lindenmeyer, 2005, p. 722).

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Improving adherence to diabetes self-care regimens requires an understanding of the barriers to adherence. Lerman (2005) proposed that the barriers can be categorized into psychosocial, educational and socio/economic barriers. Psychosocial barriers have been identified as depression, stress, and low self efficacy (Glasgow et al, 2001, Lerman, 2005, Delahanty et al, 2006). Individual barriers have varying degrees of impact on the various self care behaviors required of diabetic clients. Therefore, the literature regarding barriers will be briefly summarized based on self-care behaviors.

One of the areas extensively investigated is medication adherence. Medication adherence rates in chronic diseases range from 0% to 100% with an average of only 50% (Haynes et al., (2008). Cramer (2004) conducted a comprehensive review of the literature and found the adherence rates for diabetic clients taking oral hypoglycemic agents ranged from 36 to 93% and in clients with type 2 diabetes taking insulin, adherence rates ranged between 62 to 64%. Odegard and Capoccia (2007) conducted a systematic review of the literature published between 1990 and 2007 to determine the identified barriers to medication adherence. The most common barriers were found to be complexity of regimen, dosing frequency (more than twice a day), remembering doses, depression, and fear of adverse effects. Grant and colleagues (2003), investigated medication adherence with a sample of 128 type 2 diabetics. The results of this study revealed that barriers to adherence were side effects, costs, and lack of confidence that the medication would be effective. Unlike Odegard's report, poly-pharmacy was found not to be a barrier but it should be noted that Grant's study included adherence to hypoglycemic medications as well as those that would treat hypertension and hyperlipidemia.

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Adherence to self monitoring of blood glucose (SMBG) has been reported by Karter and associates (2000) to be very poor. Their study with a sample of 44,141 adult participants revealed that 67% of the type 2 diabetes participants and 60% of the type 1 participants reported that they did not monitor their blood glucose as often as the ADA recommended. Karter found that predictors of non-adherence were length of time client had diabetes (longer), education, ethnic minority, less intensive therapy, age, gender, English competency, and cost. Similar results were found by Vincze and associates (2004) in their study with a sample of 933 adults with diabetes. Adherence for blood glucose testing was 52% and environmental barriers such as lifestyle interference, painfulness and cost were significantly associated with adherence.

The effect family and health provider support has on adherence has been investigated and results have been mixed. Social support had an important role in diabetes self-management behaviors in the study by Wen and associates (2004). Wen and colleagues examined the relationship between family support and self care behavior among Mexican Americans with type 2 diabetes. It was found that high levels of perceived family support and high levels of self efficacy were associated with greater adherence in diet and exercise self care behaviors. The study by Chlebowy and Garvin (2006), investigated the relationships of social support, self efficacy and outcome expectations on diabetes self care behaviors in Caucasians and African Americans with type 2 diabetes. There were no significant relationships between social support or self efficacy and self care behaviors for both the African American and Caucasian participants. African American participant's outcome expectations were associated with self care behaviors. Williams and Bond (2002) investigated the roles of self-efficacy,

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outcome expectations, and social support in diabetes self care. The researcher's findings

supported that self efficacy and outcome expectations were associated with aspects of self

care and social support was associated with exercise self care and diet self care. When

the effects of self efficacy were controlled, the effects of social support on self care were

no longer significant. The evidence is not conclusive regarding the effects of social

support on adherence and by its very nature, social support may be influenced by factors

such as culture, age and education level.

Worry

The frequency of worry in the diabetic population makes it imperative that

clinicians have a clear understanding of the nature of this concept. The term worry is

commonly utilized by laypeople and healthcare practitioners and is defined by Merriam –

Webster (2009), as "to feel concern or anxiety." This lay definition illustrates the

confusion that exists regarding the concept of worry and its relationship with the concept

of anxiety.

Borkovec, Robinson, Pruzinsky, & Depree (1983), proposed one of the most widely

utilized definitions of worry and was the definition of worry utilized for this study.

Worry is defined as,

> a chain of thoughts and images, negatively affect-laden and relatively
>
> uncontrollable. The worry process represents an attempt to engage in mental
>
> problem-solving on an issue whose outcome is uncertain but contains the
>
> possibility of one or more negative outcomes (p.10).

Davey and Tallis (1994), elaborated that the "most important, fundamental characteristic of worry is that it involves a type of internal verbal-linguistic activity, i.e. thinking. (p. 7.) Thus worry is described as a cognitive process.

To help add clarity to the definition, worry has been categorized in the literature as normal or pathologic. Normal worry has been described as a cognitive or mental activity focused on problem-solving (Borkovec, et al., 1983; Bruhn, 1990). In addition, Davey and Tallis (1994), describe normal worry as a constructive strategy employed to facilitate the process of dealing with normal life events. Tallis, Davey and Capuzzo (1994) investigated the phenomenology of non-pathological worry and their findings suggested that negative aspects of worry fall into four categories that include pessimism, problem exaggeration, performance disruption, and emotional discomfort. On the opposite spectrum, they found that worry had adaptive functions which may include cognitive attempts at problem solving and motivation.

The pathologic form of worry has been associated with detrimental effects to one's mental health and is characterized as uncontrolled (Boehnke, Schwartz, Stromberg, Sagiv, 1998; Ruscio, Borkovec, Ruscio, 2001), dangerous (Ruscio, Borkovec, 2004), and linked with anxiety. The Diagnostic and Statistical Manual of Mental Disorders (DSM IV) characterizes General Anxiety Disorder (GAD) as a chronic disorder with excessive pathologic, uncontrolled worry accompanied by symptoms such as insomnia, fatigue, muscle tension and restlessness (American Psychiatric Association, 1994).

Boehnke, Schwartz, Stromberg et al. (1998) attempted to further clarify the difference between normal and pathologic worry through examination of the factors that

cultivate the worry response. Micro worries, worries about self or close associates, were found to be related to poor mental health. Macro worries, which focus on the broader society and the universe, were associated with positive mental health and therefore, they concluded that these worries should not be included in the GAD diagnosis for anxiety. In addition, pathologic worriers spent more time worrying about greater number of topics than normal worriers (Ruscio, Borkovec, & Ruscio, 2001). Davey (1994) describes worry as highly related to the emotions of fear and anxiety and that the majority of worries were related to the future (46.9%) and the somatic activity associated with it was not as intense as that found in fear.

Ruscio, Borkovec, & Ruscio (2001) utilized a taxometric procedure to determine the latent structure of worry in hopes of better defining the difference between normal and pathologic worry. The Penn State Worry questionnaire (PSWQ) and GAD questionnaire (GAD-Q IV) obtained from 1588 college students were compared and analyzed. Based on their findings, the researchers suggested that instead of two distinct types of worry, normal and pathologic, worry should be viewed as a dimensional phenomenon on a continuum with varying degrees of intensity.

Brosschot, Gerin, and Thayer (2006) reviewed the state of existing literature to investigate the relation of worry and rumination to stress and physiologic responses. Their work suggested that worry may mediate the effects of stress related to its ability to prolong the activation of the stress response. Brosschot et al. (2006) defined preservative cognition as "chronic activation of the cognitive representation of one or more psychological stressors" (p. 114). Worry was described as one of these cognitive representations. They proposed that worry functions as a warning system regarding an

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unresolved stress and may function to maintain the client in a prolonged state of "action preparation". The prolonged preparation resulting in worry and frequent thought intrusions may result in detrimental health effects.

Much of the early research studying the effects of worry on performance centered on educational testing. Results of these early studies suggested that worry interferes with task performance through diverting attention away from the task at hand (Wells, 1994). Flett and Blankstein (1994) reported that studies from their laboratory consistently showed that students who experienced worry and test anxiety, reported low self concept. Mulkey and O'Neil (1999) surveyed students after a simulated high stakes exam to determine their level of self efficacy and worry. Participants who passed the exam had high levels of self efficacy and low levels of worry whereas students who failed had low self efficacy and high levels of worry. These studies suggested that performance outcome has a direct effect on levels of worry and self efficacy.

Awang-Hashim and O'Neil (2002) studied the effect of ethnicity, effort, self efficacy and worry on student achievement in a statistics course in Malaysia. Worry and effort had a direct effect on achievement and self efficacy facilitated the effects of worry and effort. Participants that had high self efficacy were less worried and spent time and effort on the task which resulted in higher performance outcomes. Analysis of the effects of ethnicity revealed that native Malaysian participants had significantly higher levels of worry compared to their Chinese Malaysian counterparts. Chinese Malaysian and native Malaysian participants also reported higher levels of self efficacy and effort than Chinese students in Taiwan. The differences in level of self efficacy between the two ethnic groups studied suggested that ethnicity may influence how an individual

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interprets their level of worry and that self efficacy levels for Chinese participants varied by environment.

Health worry research has primarily focused on the motivational aspects of worry. The effect of worry on smoking cessation was studied by Magnan and associates (2009). An intervention that encouraged smokers to worry and think more about their smoking was investigated. The aim of the study was to determine if risk perception and worry served as predictors of contemplation to quit. Those smokers who received the intervention to increase their worry were found to have increased levels of worry (M=2.49, SD= 0.86) than the control group and had increased motivation to quit. At the time 2 (post test), those that received the intervention were more likely to try to quit smoking (29.7%, p<0.001). Dijkstra and Brosschot (2003) investigated the relationship of worry, self efficacy, and disengagement beliefs on smoking behavior change. Worry significantly correlated with disengagement beliefs (r= -0.38) but was not significantly associated with self efficacy. Worried smokers were more likely to attempt to quit smoking (OR – 1.027, p = 0.002). Self efficacy was not shown to be a significant predictor of quitting. Those participants that made an attempt to quit had a higher rate of relapse if they had low self efficacy combined with high disengagement beliefs and high worry. Thus, these studies support the belief that worries in combination with self efficacy may help smokers become motivated to quit.

The motivational effects of worry on other health behaviors have been investigated with conflicting outcomes. In one of the studies, the motivational aspects of worry were shown to increase adherence to recommendations for lifestyle modifications

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intended to reduce cardiovascular disease risk in cancer survivors but was not found to be a motivator for preventive health behaviors regarding future cancer diagnoses (Mosher, Lipkus, Sloane, et al., (2008). A recently published study investigated the direct impact level of worry had on a non-preventive health behavior, physical activity, in the elderly population (N= 7,527). The investigators found that high levels of worry, such as fears of falling, had a significant negative impact on physical activity (Beta=-.24, p<.001) and a significant indirect effect (Beta = -.22, p<.001) on walking difficulty (Li, Cardinal, & Vuchinich, 2009). The authors note that many health providers stress the negative impact failure to follow health recommendations can have on disease outcomes and that with the elderly, this may increase worry to such a high level it may inhibit adherence to recommendations.

Worries and regimen adherence were identified as frequent concerns for clients with diabetes in the Diabetes Attitudes, Wishes and Needs (DAWN) Study, a large international study funded by Novo Nordisk (Peyrot, Rubin, Lauritzen, et al., 2005. Diabetic participants (n=5104) and their health care providers (n=3827) in 13 countries were interviewed to examine the psychosocial problems and barriers to regimen adherence that were encountered by Type 1 and Type 2 Diabetics. Although there were significant baseline variations across the 13 countries, findings indicated that both Type 1 (mean= 36.6% range of countries = 27.3-52.1%) and Type 2 (mean = 34.6% range of countries = 27.6-52.8%) clients experienced diabetic worries and distress. In addition, regimen adherence was found to be poor in all countries. Type 1 patients had only 46% success with self care and Type 2 had 39% success (Peyrot, Rubin, Lauritzen, et al.,

2005). Topics identified by respondents as sources of worries and distress included worries about being able to carry out family responsibilities in the future, worries about their financial future, worries about weight, and worries about risk for hypoglycemia.

Research into the impact of diabetic worries on medication adherence often clustered the concept of worry with the concept of fear. Fear of hypoglycemia was associated with the concept of worry. This may have its roots in the development of the Hypoglycemia Fear Survey. This survey is composed of two subscales, worry and behavior. The worry subscale was designed to measure "patient worries about hypoglycemia." (Deary & Frier,1995). Wild and colleagues (2007) performed a critical review of the literature on fear of hypoglycemia in diabetes. Search terms included "hypoglycemia" and "worry " , "anxiety" , "concern" and "fear" and 34 appropriate articles were identified. It was concluded that fear of hypoglycemia (thus based on its association with worry) negatively impacted medication adherence and glycemic control. It has been hypothesized, though not adequately studied, that the fear of hypoglycemia may cause clients to take "counter active" action, resulting in high blood glucose results. Mann and colleagues (2009) investigated predictors of poor medication adherence and results suggested that medication beliefs, worrying about side effects, and self confidence were predictors. The effects of worry about medication side effects, especially hypoglycemia has resulted in decreased adherence to medication but it remains unclear if worry has a direct effect on adherence or if it is mediated or moderated by self efficacy. Understanding other aspects of adherence remains unclear and research on worry and self management is warranted.

Ethnicity and worry regarding medication adherence was investigated by Huang and colleagues (2008). Results suggested that Latinos and African Americans had higher levels of worry regarding their medication side effects than Caucasians. When asked if they were worried about medication side effects, 66% of the Latinos, 49% of the African American's and 39% of the Caucasians expressed worry. In addition, Huang and colleagues found that medication concerns such as concerns about medication routines, and concerns about dependency on medications were predictors for adding new medications to therapy in this population.

Shiu and Wong (2002) conducted a qualitative study to examine the perceptions, of Hong Kong Chinese participants who experienced fears and worries regarding diabetes complications and hypoglycemia. They found that these participants viewed hypo and hyperglycemia as constant threats which caused worry. Maintaining optimal glycemic control was not always practical with maintaining safety in the work environment, so the clients maintained higher glycemic levels than recommended. In addition, though they recognized blood glucose self monitoring as helpful, 8 of the 13 participants felt the test strips were too expensive so they would test when they felt symptoms such as dizziness. Ten participants felt that they had anxiety over the test results and worried the results would be at undesirable levels which would make them feel like failures, so they avoided testing their blood sugar levels. Of interest was that all 13 participants in the study admitted that they had no solution for these concerns and they did not feel they had control over the situation, so they attempted to cope by focusing on other subjects rather than diabetes control. Four participants coped by avoiding health professionals and did

not test their blood glucose. This study's results, suggested that worry about impending failure can result in decreased adherence.

Leake (2004) conducted a qualitative study designed to investigate how un-insured Filipino client's perceived their experience with self management of type 2 diabetes. Worry was found to be a common emotion experienced by the participants. The participants described worries which focused on their health, diabetes and complications. Similar studies which included other members of the API population were not found. Though this study was qualitative with a small sample, the results showed high rates of worry among the diabetes population which was consistent with other studies.

Self Efficacy

Previous studies have established a positive relationship between self efficacy and diabetes self management (Aljasem, Peyrot, Wissow, & Rubin, 2001; Sarkar, Fisher, Schillinger, 2006; Lee & Lin, 2009; Sigurdardottir, 2005). With this relationship identified, researchers have extended their investigation into determining potential mediating and moderating variables to self efficacy. Bandura was the first to define the concept of self efficacy and many of the studies into this concept have been based on Bandura's model of Social Cognitive Theory (SCT). According to SCT, personal factors and environment interact to determine behavior. Self efficacy and outcome expectations have been identified as personal factors. The relationship between self efficacy and outcome expectations to adherence/self management in diabetes has been investigated

and findings suggest a positive correlation to self care behavior (William & Bond, 2002; Wu, Courtney, Edwards, McDowell, Shortridge-Baggett, & Chang, 2007). William and Bond's investigation (2002) revealed a moderately significant correlation between self efficacy and self care and a significant correlation between outcome expectancies and self care. Multiple regression analyses were performed to test if outcome expectancies moderated the effects of self efficacy on self care behaviors and results were mixed. Outcome expectations moderated self efficacy's effects only on blood glucose testing. On the other hand, Wu and associates (2007) also investigated self efficacy, outcome expectations and self care behavior in a type 2 diabetic population in Taiwan. Results of their investigation showed a strong positive relationship between self efficacy and self care behavior and also a significant positive association between self efficacy and outcome expectations.

In the SCT model of behavior change, environmental factors impact behavior and self efficacy. Environmental factors include several socioeconomic factors such as culture and social support. Culture has been studied in several recent studies which sought to determine if improvement in self efficacy would improve self management behaviors across ethnic minority populations. Sarkar, Fisher, and Schillinger's study (2006) revealed that self efficacy was associated with diabetes self management behaviors in a diverse ethnic population consisting of 18% API, 25% African American, 42% Latino and 15% white. The self management domains of foot care, diet, exercise and monitoring blood glucose had significant ($p<0.001$) associations with self efficacy. Self efficacy was not significantly associated with medication adherence. Similar results were discovered by Bean and associates (2007) with a population of Europeans, South

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Asians, and Pacific Islanders from New Zealand. In addition, there were also differences in levels of self efficacy between these groups. Pacific Islanders had lower medication self efficacy ratings than the other two groups and also had the lowest level of medication adherence. South Asians had the highest dietary self efficacy ratings. Though self efficacy was associated with self management behaviors in these multi-ethnic populations, the authors recommended that additional studies be conducted to determine barriers to self efficacy and to determine if their findings could be replicated.

The concepts of self efficacy and worry are also associated with adherence. In the diabetes literature, both self efficacy and worry (specifically worry about adverse reactions) were related to medication adherence (Odegard & Capoccia, 2007). No studies measured the effects of both self efficacy and worry on other diabetes self care behaviors. In this literature search two studies measured both self efficacy and worry levels in relationship to exercise adherence behaviors in non-diabetic populations. Martin and associates (2008) investigated adherence to exercise recommendations utilizing a sample of hypertensive African American women. Women with high exercise self efficacy had less worry barriers to exercise and were more adherent. Finnegan and colleagues (2007) investigated physical activity in childhood survivors of cancer. Both self efficacy and worries were noted to be associated with physical activity. Those participants with higher self efficacy and lower levels of worry were more physically active. Worries were moderately associated with physical activity cons (barriers to deciding to exercise). The authors of the report suggest that this moderate association may indicate that the more worries a client has, the greater the effect of perceived physical activity "cons".

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The literature has established that diabetic clients have a variety of worries and levels of worry have an impact on health. Worry can act as a motivator but its impact is not always statistically significant on the outcome measured. The impact of worry appears to vary based on the nature of the outcome being measured, levels of self efficacy, ethnicity, environment and level of effort invested by the participant. Self efficacy has been associated with adherence to diabetes self management in all areas except for mediations. This suggests that other variables such as economics, social support, and worries have a role in establishing adherence. The impact worry has on a client's self efficacy and their adherence level has not been extensively investigated within the diabetic population and gaps in our knowledge and literature exist regarding these concepts.

Theoretical Framework

Social cognitive theory (SCT) was selected to guide the development of this study. The SCT provided a theoretical framework to identify the determinants for human behavior change and understand their relationship to perceived self efficacy. Diabetes is a chronic disease which requires changes in client behavior to successfully adhere to self management recommendations. The SCT theory recognizes that humans do not live in isolation, instead, social and environmental factors have an impact an individual's behavior and thus, an impact on behavior change as illustrated in the figure below (Bandura, 1997).

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Figure 1. Bandura's Model of SCT

Behavior

Personal Factors
(Cognitive, affective,
And biological events)

Environmental
Factors
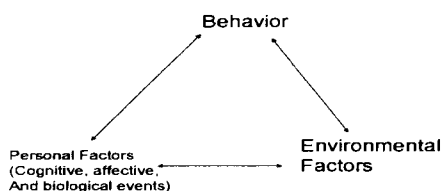
Bandura (1997), describes SCT as a theory of human behavior which is based on

"triadic reciprocal causation" (interaction) between three interdependent determinants

categorized as personal, environmental and behavioral (figure 1). A person's behavior is

viewed as being influenced by the interaction of these determinants. Personal

determinants include biological factors and cognitive factors such as knowledge,

perceived self efficacy, and personal goals (Bandura, 1997, 2004). Environment is

viewed in a broad sense and includes physical, organizational and social economic

factors.

According to Bandura, a key central component of this model is the concept of

perceived self efficacy. Bandura (1997) defined perceived self efficacy as "beliefs in

one's capabilities to organize and execute the course of action required to produce given

attainments (p. 3)." If a person does not have high levels of self efficacy and they do not

believe they can achieve the desired goal, they will have no incentive to act and will be

easily deterred from persevering with the behavior change (Bandura, 2004).

Bandura (1997) explained that self efficacy beliefs are developed from four

sources. The first is "mastery experience" or the interpretation of how well one

performed in previous experiences. The second is vicarious experiences which entails

observing others performing the task. Verbal persuasion from others within the

individual's social network is the third source. The fourth influence is one's physiologic

and emotional state. Stress and the subsequent physical symptoms that may be aroused

can have the ability to decrease self efficacy (Bandura, 1997).

Conceptual Model

The following conceptual model, based on SCT and the review of the literature,

describes the hypothesized relationship between the variables in this study:

Figure 2.
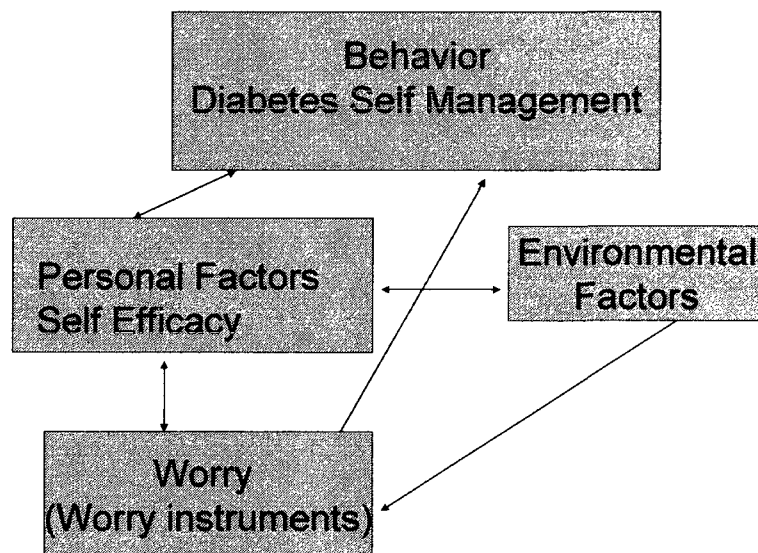
Chapter 3: Methodology

The proposed study is an analysis of data previously collected from a two arm randomized controlled intervention trial with longitudinal follow up (ENHANCE project #NINR 5R01NR007883.) Data from 207 participants in the ENHANCE project were used to answer the research questions.

The aim of the ENHANCE project was to evaluate the effectiveness of a cognitive behavioral intervention program on improving the quality of life, general health, glucose control and depression in the API population. A repeated measures, 2 X 4 design was utilized comparing the "condition group" (control, intervention) and time (baseline, post intervention, six months and 12 months). Participants were randomized into the Cognitive Behavior Group or the Social Support Group. The Cognitive Behavior Group received six sessions which covered the following self management units: mood management, relaxation, biofeedback, cognitive restructuring, values clarification and cultural responses to life styles. The Social Support group had six sessions that focused on sharing and social support. The Committee on Human Studies at the University of Hawaii granted approval of the ENHANCE project and informed consent was obtained from all participants.

The Enhance Project participants consisted of Asian/Pacific Islanders with type 2 diabetes. To be eligible for inclusion participants were required to be asymptomatic for hyperglycemia and between the age of 18 and 70 years. Exclusion criteria included physical difficulties that compromised mobility and diabetic complications such as severe eye disease, renal failure requiring dialysis, organ transplantation, foot amputations, heart

failure and stroke. Subjects were recruited through a university based endocrinology specialty clinic and the private practice of a collaborating endocrinologist. Referral of potential clients reached 1891 and after prescreening was conducted for eligibility and exclusion criteria, 631 were found to be eligible to participate. The enrollment goal was reached with a total of 207 study participants. Of those who agreed to participate, 94 were males and 113 were females with the mean age 59 years, ranging from 19 to 76 years old. Sixty-three percent self identified as Asian (Japanese, Chinese, Korean, Filipino, and South East Asians), 33% as Hawaiian or Pacific Islanders, and the remaining four percent were classified as other.

Baseline data from the ENHANCE parent study was analyzed for this research study. The Committee on Human Studies at the University of Hawaii approval was granted (CHS#17345). The following measures were utilized to address the specific aims of the study.

Measures:

Specific Aim 1, "to determine the relationship between worries and self efficacy and their effects on adherence to self management recommendations" was analyzed utilizing the following instruments. The independent variables were worry and self-efficacy, the dependent variable was adherence/to self management recommendations.

Worry

Worry was measured with four tools. The Diabetes Quality of Life Scale (DQOL) scale had two worry subscales, diabetes specific worries and social/vocational worries. The DQOL is a self measurement tool first developed by the DCCT Research Group in the 1980's for utilization in the DCCT trials. It was designed to measure the

impact diabetes treatment regimen had on quality of life. The 46 items in the tool measured four concepts related to quality of life: satisfaction with treatment, impact of treatment, diabetes specific worries and social/vocational worries. The DQOL was originally developed for clients who had type 1 diabetes, but was subsequently utilized in trials with type 2 diabetes. The worry subscales were designed for adolescent population and the authors of the DQOL recommended that scales for elderly should be developed to attain relevance to the social worries that may impact this group. The authors assessed the tool for reliability and validity with two separate studies. The initial study utilized a sample of type 1 diabetics and the second study had both type 1 and type 2 diabetics. Test-retest reliability of the initial study was reported at .78 to .92 and the internal consistency Cronbach's alpha score was significant at .52-.93. Construct validity was established through comparison with the Symptom Checklist 90 R, the Bradburn Affect Balance Scale, and the Psychosocial Adjustment to Illness Scale (PAIS). Both the social/vocational and diabetes worry scales had their strongest correlation with the psychological distress in the PAIS range of .46 to .59 ($p<.001$) (Jacobson & The DCCT Research Group ,; Achhab, Nejjari, Chikri, & Lyoussi, 2008).

An adjusted diabetes worry and adjusted social/vocational worry subscale were utilized for this study. As Jacobson and colleagues suggest, the social/vocational worry subscale was developed for the adolescent and may not have had relevance for the adult and retired population. Content matter experts reviewed the DQOL scales taking into consideration the study population and recommended that four items from the social/vocational worry subscale and one from the diabetes worry subscale be eliminated

from the subscale analysis. The decision to remove the items was supported when frequency distributions were obtained for the items eliminated from the subscales, and 80-90% of the participants rated all eliminated items as not applicable or "never worried". Based on concerns regarding the social worry scale, the two DQOL worry subscales were not combined as an aggregate score.

Two additional worry items, obtained as baseline measures were utilized. One item was obtained from the Diabetes Health Belief Scale item 11 (DHBS-11), which asked "How much do you worry about what you eat?" The other single item was obtained from the Multidimensional Diabetes Questionnaire item 16 (MDQ-16) and asked "To what extent do you worry about your diabetes?" These items were deemed valuable and were treated as separate independent variables that measured worry.

Self efficacy

Self efficacy was measured utilizing the self efficacy subscale in the Multidimensional Diabetes Questionnaire (MDQ). The MDQ was developed specifically for the type 2 diabetes population and was theoretically linked to the social learning theory of diabetes. This instrument included 41 items which are categorized into three subsections: perceptions related to diabetes and social support; positive and misguided reinforcing behaviors related to self care; and self efficacy and outcome expectancies (Talbot, Nouwen, Gingras, Gosselin, & Audet, 1996). The seven self efficacy questions were designed to measure confidence in ability to perform diabetes self care activities on a scale of 0 (not at all confident) to 100 (very confident). Self efficacy in self care regarding taking medications, self monitoring of blood glucose, diet, exercise, and general diabetes self management were measured. Confirmatory factor analyses for the

self efficacy and outcome expectancy subscale revealed adequate construct validity (confirmatory fit index, CFI .93) the model fit improved when adjustments were made for correlated uniqueness (CFI .96) . The internal consistency for the entire tool was adequate with the Cronbach alpha scores in the range of .70-.91. The individual Cronbach alpha score for the self efficacy subscale was adequate at .89 (Talbot, Nouwen, Gingras, Gosselin, & Audet, 1996).

Adherence/self management

Adherence/ self management was measured utilizing the "Summary of Diabetes Self-Care Activities" (SDSCA) instrument. The SDSCA questionnaire measures self reported information regarding diabetes self-management during the 7 days prior to answering the questionnaire. Items assess diet, exercise, blood-glucose monitoring, foot care and smoking. The authors of the instrument assessed reliability and validity of the tool from 7 different studies that included a total of 1,988 diabetics, of which the majority were type 2 diabetics whose mean ages ranged from 45-67 years of age. The internal consistency of the subscales was assessed utilizing inter-item correlations and was all viewed as acceptable (mean of .47) except the subscale for diet which the authors felt was unreliable with an r of 0.07-0.23. The test – re-test correlations for reliability were reported as moderate with a mean r of 0.40. The content validity of the diet subscale was assessed based on comparisons with self reported food records, The Food Habits Questionnaire and the Block Fat Screener. Validity for exercise was assessed through comparisons with The Stanford 7 day recall, the Physical Activity Scale for the Elderly, and reported activity data (Toobert & Glasgow, 1994).

Specific Aim 2, "to determine if perceptions of worry and type of worries differed between the 2 API subpopulations" and Aim 3, "to determine if perceptions of worry and type of worries differed based on gender" were analyzed with the following variables. The independent variables, ethnicity and gender were self reported data obtained from the demographic form administered in the parent study. The dependent variable, worry was measured utilizing the previously described worry scales.

Data Analysis

Data analysis was conducted utilizing SAS version   and Mplus version 3.12. Data analysis methods included descriptive statistics, correlation, multiple regression, and structural equation modeling. For all variables raw scores were converted to z scores, standard scores with a mean of zero and standard deviation of one. Z scores of the means of all data were utilized in the analysis.

Analysis of Specific Aim 1, "to determine the relationship between worries and self efficacy and their effects on adherence to self management recommendations" was tested in a multi-step approach.

First a correlation matrix, using Pearson's product moment correlation analysis, was developed to examine the relationship between the worry variables and self efficacy. Variables that had a significant correlation between worry and self efficacy were identified and a series of regression analyses were conducted to identify the direction of the relationship. First, self efficacy was regressed on the worry subscales. Then the worry subscales were regressed on the self efficacy scale.

Another Pearson's correlation matrix was developed to determine the relationship between the worry subscales, self efficacy and the 5 adherence subscales. Based on the findings of the correlation matrix, variables were selected for further analysis utilizing regression equations and path analysis with Structural Equation Modeling (SEM). Path analysis with the SEM software was utilized to test the proposed model of the relationship between worry, self efficacy and adherence/self management (Holmbeck, 1997 ; MacKinnon, 2008). Only the most statistically significant variables within the correlation matrixes were used in the final analyses.

Figure 3. Model of moderation effects

Model 1: Worry moderates the effect of self efficacy on adherence.
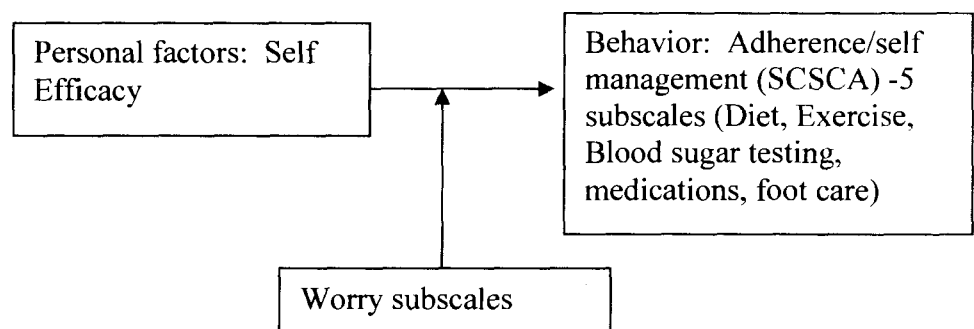
A variable is defined as being a moderator if it has an impact on the predictor variable's effect on the dependent variable (Baron & Kenny, 1986). According to Holmbeck, " a moderator variable is one that affects the relationship between two variables, so that the nature of the impact of the predictor on the criterion varies according to the level or value of the moderator." (Holmbeck, , 1997, p. 599.). To test for moderation, a path analysis was conducted utilizing Mplus software to determine the interaction effects of worry and self efficacy on the adherence outcome variables.

A model was created for worry subscales to determine its relationship with self efficacy and each adherence outcome variable. The endogenous predictor variable for each model was self efficacy and the exogenous predictor was the worry subscale. The outcome criterion (dependent variable) was each of the SDSCA subscales.

Analysis of Specific Aim 2 and 3: " to determine if perceptions of worry and type of worries differed between the 2 API subpopulations" and "to determine if perceptions of worry and type of worries differed based on gender" were conducted utilizing the General linear model. The independent variables were ethnicity (measured at two levels, Asian and Hawaiian/Pacific Islanders) and gender. The dependent variables were the worry subscales.

Protection of Human Subjects

Institutional Review Board approval was obtained from the University of Hawaii Committee on Human Studies. The data utilized in this study was obtained from the ENHANCE project and upon enrollment into the study, informed consent was obtained.

Chapter 4: Results

Participant Demographics

Data from 207 participants in the ENHANCE project were used to answer the research questions. Participants ranged in age from 18 and 76 years (M=56.6 years). The participant age limit is higher than the original inclusion criteria, due to difficulty in recruitment efforts, permission was requested and granted to extend the age limit from 70 to 76 years. Participant demographics are summarized in Table 1. Males comprised 45.4% (n=94) of the sample and women comprised 54.6% (n=113). The ethnic populations targeted for the ENHANCE project were Asian and Pacific Islanders. For purposes of this study, all Hawaiian, Part Hawaiian, and Pacific Islanders were categorized in one group titled "Hawaiian/Pacific Islander" and made up 28.79% (n=57) of the sample population. All other Asian ethnic groups were combined into one category, "Asian", and represented 69.2% (n=137) of the sample. The majority of the participants self identified as being married (69.8%, n=141), 12.9% (n=26) as single, 10.4% (n=21) as separated or divorced, and 6.93% (n=14) as widowed. The education level of the participants was high with 79.5% (n=159) attaining college education, of these 32.5% (n=65) had some college or an Associate Degree, 27.5% (n=55) received a Bachelor's Degree, and 19.5% (n=39) received a graduate degree. Only 9.5% (n=19) did not complete 12th grade, and the remaining 11% (n=22) listed High School as their terminal degree.

Table 1. Summary of Demographics

	n	%
Gender		
Male	94	45.4
Female	113	54.6
Ethnicity		
Asian	137	69.2
Hawaiian/Pacific Islander	57	28.79
Marital Status		
Single	26	12.9
Married	141	69.8
Separated/Divorced	21	10.40
Widowed	14	6.93
Education (highest level)		
Less than 12th grade	19	9.5
High School graduate	22	11
Some College/Associate Degree	65	32.5
Bachelor's Degree	55	27.5
Graduate School	39	19.5

Descriptive Analysis of Independent and Dependent Measures

Descriptive data (mean, standard deviation) of raw scores for all the independent and dependent variables utilized in the analysis are included in Table 2. For analysis, raw scores of all variables were converted to z scores, with a mean of zero and standard deviation of one. For analyses, Z scores of the means of all data were utilized, thus instruments with different scales were easily compared. Also included in Table 2 are the reliability calculations for independent and dependent variables using Chronbach's alpha coefficients.

Worry was measured utilizing the adjusted social worries scale (ASW), adjusted diabetes worry scale (ADW), MDQ-16 and the DHBS-Q11. ASW and ADW were measured with a scale that ranged from 1=never worried to 5=always worried. For ease

of interpretation, calculated scores were not reversed scored. Therefore, 0 represents no worries and 100 highest levels of worry. Participants had a mean calculated score of 79.08 with a SD of 26.60 for ASW and a mean of 66.79 with a SD of 26.47 for ADW. The MDQ-16 asked to what extent do you "worry about your diabetes?" and was measured as 0=low to 6=high. Participants had a mean worry level of 4.10 with a SD of 1.86. The DHBS-11 asked "How much do you worry about what you eat?" and was measured as 1=not at all and 4=very likely. Participants had a mean worry level of 2.86 with a SD of 0.83.

Self efficacy beliefs were measured with the MDQ self efficacy subscale which asked questions regarding confidence in ability to self care using a scale of 0= not at all to 100=very confident. The mean score for the participant's self efficacy subscale was 62.23 with a SD 24.75.

Adherence was measured utilizing five SDSCA subscales, diet, exercise, blood sugar testing, medication and foot care. Participants responded based on reflections about their self care behavior in the past 7 days. Medication adherence (M=4.88, SD=2.01) and blood glucose testing (M=4.44, SD=2.45) had the highest level of adherence followed by diet(M=3.60, SD=2.32), foot care (M=3.30, SD=2.40) and exercise (M=2.75, SD=2.14). This pattern of greater adherence to medical components rather than to the lifestyle change components of self care is consistent with findings by creators of the SDSCA tool (Toobert & Glasgow, 1994, Williams & Bond, 2002).

Table 2. Descriptive Data for Independent and Dependent Variables

Measure	M	SD	Cronbach's α
Adjusted Social worry (ASW)	79.08	25.60	0.68
Adjusted Diabetes worry (ADW)	66.79	26.47	0.73
MDQ – 16	4.10	1.86	na
DHBS - 11	2.86	0.83	na
MDQ – Self efficacy	62.23	24.75	0.91
SDSCA – diet	3.63	1.37	0.66
SDSCA – exercise	2.75	2.14	0.87
SDSCA – glucose testing	4.44	2.45	0.84
SDSCA – foot care	3.60	1.53	0.61
SDSCA – medication	4.87	2.01	na

Note: na – single item

Analysis of Aims

Results Aim 1: To determine the relationship between worries and self efficacy

and their effects on adherence to self management recommendations.

. Hypothesis 1, "Worries will be negatively correlated with self efficacy", was supported

for MDQ-16 but not for the other worry measures. A correlation matrix, using Pearson's

product moment correlation analysis, was developed to examine the relationship between

the worry variables and self efficacy (Table 3). A significant positive correlation (r

=.166, p<.05, R^2= .027) was found between adjusted social worries (ASW) and self

efficacy and a negative correlation (r = -0.185, p<.01, R^2=.034) between the MDQ – 16

and self efficacy. The strength of both correlations was very low. Only 2.7% of the

variance was shared between ASW and self efficacy and 3.4% of the variance was shared

between MDQ-16 and self efficacy. All other worry variables were not significantly

correlated with self efficacy. These statistically significant variables, (ASW and MDQ-

16) were utilized in subsequent analyses.

Table 3. Correlation between worry scales and self efficacy

	ASW	ADW	MDQ-16	DHBS-11
Self Efficacy	0.166 *	0.123	-0.185 **	0.093

*p<.05; **p<.01

To analyze the predictive relationship between the significant worry variables and

self efficacy, multiple regression analyses were conducted (Table 4). ASW (F=5.40,

p<0.05, R^2=0.027) and MDQ-16 (F=7.01, p<0.01, R^2=0.034) were significant predictors

of self efficacy, with ASW accounting for 2.7 % of the variance in self efficacy, and

MDQ-16 accounting for 3.4% of the variance seen in self efficacy. In addition, the

relationship remains the same in the opposite direction, with self efficacy predicting

social worry (F=5.40, p<0.05, R^2=0.027) and MDQ-16 (F=7.01, p<0.01, R^2=0.034).

Higher levels of adjusted social worries predicted higher levels of self efficacy. Higher

self efficacy also predicted higher social worries. Participants who had higher MDQ-16

levels, which asked "To what extent do you worry about your diabetes?", had lower

levels of self efficacy. In addition, lower levels of self efficacy predicated higher levels of worry measure by the MDQ-16.

Table 4. Regression analysis: adjusted social worry (ASW), MDQ, and self efficacy

IV	DV	R^2	F(p value)	beta (p value)
ASW	self efficacy	0.027	5.40 (p<.05)*	0.165 (p<.05)*
MDQ-16	self efficacy	0.034	7.01 (p<.01)**	-0.184(p<.01)**
Self efficacy	ASW	0.027	5.40 (p<0.05)*	0.165 (p<.05)*
Self efficacy	MDQ -16	0.034	7.01 (p<.01)**	-0.187 (p<.01) **

*p<0.05;**p<0.01

Hypothesis 2, "Worries will be negatively correlated with all five measures of adherence to self management recommendations", was not supported. To determine the relationship between the worry variables, self efficacy and the five adherence subscales, a correlation matrix was developed (Table 5). No significant correlations were found between social worries, diabetes worries and the MDQ-16 and all five of the SDSCA subscales. The only worry measure that had a significant correlation to any of the adherence measures was the DHBS-11, ("How much do you worry about what you eat?") which had a positive correlation (r= 0.173, p<0.05, R^2=.029) with exercise. The strength of the correlation was very low with worry accounting for only 2.9% of the variance between exercise and DHBS-11.

Hypothesis 3," Self efficacy will be positively correlated with adherence to self management recommendations." was supported for all subscales except medication. There was a moderately significant positive correlation found between self efficacy and

all adherence measures (SDSCA subscales) except medications. Self efficacy was positively correlated with exercise (r=0.48; p<.01, R^2=0.23), blood glucose testing (r=0.31; p<.01, R^2= .096), foot care (r=0.26; p<.01, R^2=0.06), and diet (r=0.32; p<.01, R^2=0.10). A very low positive significant correlation was found between DHBS-11 and exercise (r= 0.173, p<.05, R^2=.029), which accounts for only 2.9 % of the variance between exercise and DHBS -11.

Table 5. Relationships among worry subscales, self efficacy and SDSCA subscales

	SDSCA –e	SDSCA-bg	SDSCA-f	SDSCA-d	SDSCA-m
Self efficacy	0.484**	0.317**	0.264**	0.316**	-0.052
ASW	0.036	0.005	0.140	0.117	-0.041
ADW	0.090	-0.012	0.015	0.114	-0.019
MDQ-16	-0.069	-0.070	0.064	-0.069	0.087
DHBS-11	0.173*	0.073	0.139	-0.001	0.081

SDSCA-e= SDSCA – exercise subscale, SDSCA-bg= SCSCA blood glucose subscale, SCSAC-f= SDSCA foot care, SDSCA-d= SDSCA diet, SDSCA-m= SDSCA medication; *p<0.05, **p<0.01.

Hypothesis 4, Worries will moderate the relationship between self efficacy and adherence to self management recommendations, was supported for ASW and MDQ-16 but not for all other worry measures (Figure 4; Table 6 and 7) Data presented in tables 6,and 7 are presented with z scores.

Figure 4. Model tested: Worry moderates the effect of self efficacy on adherence.
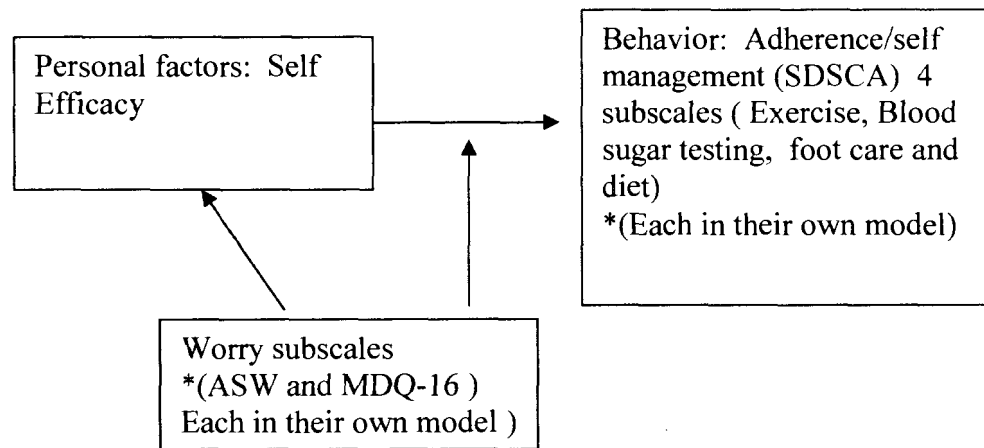
ASW moderated the effects of self efficacy on diet but not on other SDSCA subscales. MDQ-16 moderated the effects of self efficacy on exercise but not on other SDSCA subscales.

In each of the models, worry (ASW and MDQ – 16) was shown to have a direct effect on self efficacy with beta scores ranging from -0.18 to 0.16. The only model that had a significant direct effect of worry on SDSCA subscales was found between MDQ-16 (beta 0.03, p<.05) and foot care, all other paths between worry and SDSCA subscales were non-significant. Self efficacy was shown to predict all SDSCA subscales with beta scores ranging from 0.128 to 0.513. An interaction effect, thus moderation, between worry and self efficacy was found between ASW and self efficacy (Beta= 0.172; p=0.0036) (Figure 5) on diet and MDQ-16 and self efficacy (Beta =-0.129; p=0.039)on exercise (Figure 6). The goodness of fit measure for the ASW model was 0.927 and for MDQ-16 model it was 0.903. According to Munro (2005), a good fitting model has a goodness of fit (GFI) or Comparative fit index (CFI) greater than 0.90 and a root mean squared residual (RMR) near zero. Munro states that fit of the model improves as the

RMR nears zero with zero indicating a perfect fit. An RMR that is greater than .10 is considered a poor fit.

Table 6. Strength of association: ASW on self efficacy and Adherence outcomes.

IV moderator (worry)	Beta	p-value	DV	Conclusion	CFI
1. ASW	0.164	0.02*	Self efficacy	\	0.955
ASW	0.046	0.465	Exercise		
Self Efficacy	0.468	<.001 **			
ASW x self efficacy	-0.085	0.1236		No moderation	
2. ASW	0.164	0.02*	Self efficacy		0.913
ASW	-0.053	0.435	Blood Glucose		
Self Efficacy	0.349	<.001**			
ASW x self efficacy	0.115	0.054		No moderation	

Table 6. (Continued) Strength of association: ASW on self efficacy and Adherence outcomes.

ASW	0.164	0.02*	Self efficacy		0.878
ASW	0.253	0.129	Foot care		
Self efficacy	0.610	<0.001**			
ASW x self efficacy	0.117	0.052		No moderation	
4. ASW	0.164	0.02*	Self efficacy	Indirect effect	0.927
ASW	-0.066	0.327	Diet		
Self efficacy	0.344	<.001**			
ASW x self efficacy	0.172	.0036*		Moderation	

*p<.05, **p<.01

Table 7. Strength of association: MDQ -16 on self efficacy and adherence

IV	(worry)	Beta	p-value	DV	Conclusion	CFI
1.	MDQ-16	-0.184	0.008**	Self efficacy	Indirect	0.903
	MDQ-16	0.062	0.34	Exercise		
	Self Efficacy	0.513	<.001 **			
	MDQ-16 x self efficacy	-0.129	0.039*		Moderation	
2.	MDQ-16	0.184	0.008**	Self efficacy		0.789
	MDQ - 16	-0.014	0.0512	Blood Glucose		
	Self Efficacy	0.320	<.001**			
	MDQ-16 x self efficacy	0.088	0.21		No moderation	
3	MDQ-16	0.184	0.008**	Self efficacy		0.785
	MDQ - 16	0.235	0.03*	Foot care		
	Self efficacy	0.454	<.001**			

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Table 7. (Continued) Strength of association: MDQ -16 on self efficacy and adherence

MDQ – 16 x self efficacy	-0.127	0.234		No moderation	
3. MDQ-16	0.184	0.008**	Self efficacy		0.815
MDQ - 16	0.032	0.65	Diet		
Self efficacy	0.350	<.001**			
MDQ – 16 x self efficacy	-0.131	0.0548		No moderation	

*p<.05, **p<.01

Figure 5. Model of ASW indirect effect on diet and moderates effect of Self efficacy (SE) on diet
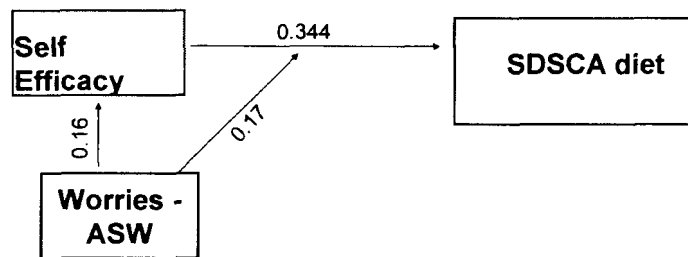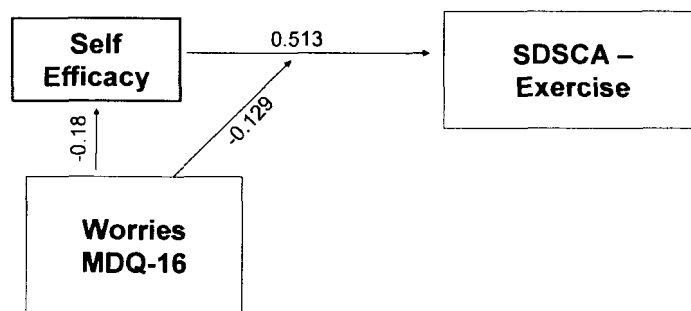
Model CFI .927; RMR .04*

Figure 6. Model of MDQ-16 indirect effect on exercise and moderates effect of self

efficacy (SE) on exercise.

Model CFI .903; RMR 0.06

General linear model (GLM) was utilized to analyze specific aim two and three, The independent variables were ethnicity (measured at two levels, Asian and Hawaiian/Pacific Islanders) and gender. The dependent variables were the four instruments utilized to measure worry. Hypothesis 5,"There will be no differences in the perception of and type of worries experienced by the different API subpopulations" was supported only for DHBS-11 (Table 8 and 10). T-tests of the mean scores for ADW, ASW and MDQ-16 for Hawaiian/PI participants were found to significantly differ from the Asian participants. This relationship was confirmed utilizing the GLM. Hawaiian participants had significantly less worries as measured by the diabetes worries scale (beta=-0.430, F=7.60, p<0.01), social worries scale (beta= -0.414, F=6.98, p<.01), and significantly more worries as measured by the MDQ-16 (beta=0.435, F=7.81, p<0.01). There was no significant relationship found between ethnicity and worries measured by the DHBS-11.

Hypothesis 6, "There will be no differences in the perception of and type of worries experienced by the participants based on gender," was supported (Table 9 and 10). Gender did not have a significant relationship with type of worries experienced by participants.

Table 8. Comparison of Means for types of worries by ethnicity

Type of Worry	Hawaiian/PI	Asian
ADW*	50.095 (32.98)	66.094 (22.85)
ASW*	63.58 (30.42)	82.004 (22.88)
MDQ-16*	4.22 (1.82)	3.57 (1.82)
DHBS-11	2.7 (0.84)	2.68 (0.83

*p<.05; **p<.01

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Table 9. Comparison of Means for types of worry by gender

Type of Worry	Male Mean (SD)	Female Mean (SD)
ADW	62.99 (26.92)	60.26 (26.115)
ASW	80.22 (22.89)	78.11 (27.78)
MDQ-16	4.33 (1.75)	3.89 (1.93)
DHBS-11	2.77 (0.76)	2.92 (0.88)

*p<.05; **p<.01

Table 10. GLM of Type of worries experienced by API subpopulations and gender

Type of Worry	Hawaiian/PI			Gender		
	Beta	F	p-value	Beta	F	p-value
ADW	-0.430	7.60	0.006**	-0.160	1.30	0.255
ASW	-0.414	6.98	0.009**	-0.118	0.69	0.408
MDQ-16	0.435	7.81	0.006**	-.020	2.18	0.141
DHBS-11	0.157	0.89	0.35	0.19	1.67	0.199

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Chapter 5. Discussion

The aim of the study was to gain an understanding of the impact that worry has on self efficacy and self management within the API type 2 diabetic populations. Discussion of results are organized around the study questions and hypotheses.

Aim 1 investigated the relationship between worries and self efficacy and their effects on adherence to self management recommendations. To analyze these relationships, four hypotheses were generated. Hypothesis 1, "Worries will be negatively correlated with self efficacy". Worry measured by the MDQ-16 and ASW were significantly correlated with self efficacy but the strength of the correlations were very low (only 3.4% and 2.7% of variance associated with the correlations). Thus over 90% of the variance was not accounted for and these results were deemed not meaningful.

Though the results were deemed not meaningful, levels of the MDQ-16 which measured responses to the question "To what extent do you worry about your diabetes," negatively correlated with levels of self efficacy. This result is consistent with Bandura's (1997) explanation that self efficacy beliefs are developed through mastery experience, vicarious experiences, verbal persuasion from others within the individual's social network, and one's physiologic and emotional state. The physical symptoms that may be aroused secondary to emotional state can have the ability to decrease self efficacy (Bandura, 1997). The heightened emotional state as evidenced by increased levels of worry may be arousing physical symptoms that decrease self efficacy.

Adjusted social worry was found to be positively correlated with self efficacy, though at a very low level. This scale measured level of worry regarding the following social/vocation issues: worry about being denied insurance, missing work or being able

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to take a vacation. Respondents who had high levels of these social worries were found to have high levels of self efficacy. Only 2.7% of the variance in between ASW and self efficacy leaving 97.3% unaccounted for. Based on the model of SCT, environment, which refers to socioeconomic factors such as education and income can impact self efficacy and may have accounted for some of this variance. In addition, these social worries may be acting as motivators to the participant enhancing their beliefs that they should and can accomplish their diabetes self management.

Hypothesis 2: "Worries will be negatively correlated with all five measures of adherence to self management recommendations". Worries did not have a direct correlation to any of the adherence measures. This association was exploratory in nature as no studies were identified that describe the relationship between worry levels and adherence measures in the diabetes population. Li and colleagues (2007) studied health worry in older adults and found that participants with high levels of worry engaged in less recommended physical activity (Beta=-.24, p<.001). The one direct correlation in this study was found between DHBS -11 and exercise. This correlation was a positive correlation, which is not consistent with Li and colleagues (2007) findings. Unlike the participant's in Li's study, we found that the higher a participants level of worry, the greater the adherence to exercise recommendations. This association may be logical in the diabetic population because ADA practice guidelines (2007) stress the importance of client education regarding exercise and diet to prevent complication and in the management of glucose levels.

The DHBS – 11 did not correlate with diet was an unexpected finding. It would appear logical that the DHBS -11 which asks "How much do you worry about what you eat?" would correlate with diet adherence.

Hypothesis 3: "Self efficacy will be positively correlated with adherence to self management recommendations". There was a moderately significant positive correlation found between self efficacy and all adherence measures (SDSCA subscales) except medications. Self efficacy was positively correlated with exercise ($r=0.48$; $p<.01$, $R^2=0.23$), blood glucose testing ($r=0.31$; $p<.01$, $R^2= .096$), foot care ($r=0.26$; $p<.01$, $R^2=0.06$), and diet ($r=0.32$; $p<.01$, $R^2=0.10$). In the literature, self efficacy has consistently been associated with self care practices regarding exercise, blood glucose testing, foot care, and diet. It has occasionally been associated with medication adherence (Williams & Bond, 2002; Bean et al, 2007, Aljasem, et al, 2001).

The lack of association between self efficacy and medication adherence in this study may be consistent with the model of SCT. According to the SCT, behavior (adherence) is affected by both physical and environmental factors. Studies have shown that medication adherence is influenced by multiple factors such as remembering to take medications, adverse reactions, cost, and confidence in the benefits of the medication regimen (Walker, et al, 2006; Grant, Devita, Singer, Meigs, 2003). Thus, even if a client had high self efficacy regarding medication administration adherence may be negatively affected by finances and access to a pharmacy.

Hypothesis 4: "Worries will moderate the relationship between self efficacy and adherence to self management recommendations". ASW moderated the effects of self

efficacy on diet but not on other SDSCA subscales. As levels of ASW increased, self efficacy's effect on diet adherence increased. In all other SDSCA subscales, ASW was found to have indirect effects through self efficacy on the four SDSCA subscales. The ASW scale measured participants levels of worry on being denied insurance, missing work and ability to take vacations and trips. These social worries may be responsible for increasing motivation to improve health outcomes and indirectly adherence to self care. The motivational effects of worry on smoking cessation and cancer prevention have been investigated and increased levels of worry have resulted in increased smoking cessation and in some cases increased adherence to cancer prevention recommendations (Dijkstra & Brosschot, 2003; Magnan et al., 2009; Mosher, et al., 2008).

MDQ-16 moderated the effects of self efficacy on exercise but not on other SDSCA subscales. As levels of MDQ-16 increased, the effect of self efficacy on exercise decreased. MDQ-16 measured responses to the question, "to what extent do you worry about your diabetes?" These findings are consistent with those from Li and colleagues (2007), which found that increased worries directly resulted in decreased exercise. Exercise is a physical activity that requires physical exertion and along with it increased cardiac output. Clients with worries about their diabetes may worry that exercise will increase their risk for problems that are related to their disease such as a heart attack and stroke. These worries may undermine their confidence and decrease adherence to recommendations. Unlike Li's study the effect of worry on exercise was found to be indirect and moderating its effect through self efficacy. This suggests that worry is an important variable that needs to be addressed during health care visits.

Aim 2: determine if perceptions of worry and type of worries differed between the 2 API subpopulations. Hypothesis 5, "There will be no differences in the perception of and type of worries experienced by the different API subpopulations". Clients who self identified as Hawaiian or Pacific Islanders were found to have significantly less ADW and ASW but more MDQ-16 worries than clients who self identified as Asian. Ethnic differences in worry levels regarding drug side effects and medication dependency have been identified in the literature. Latino and African Americans were found to have higher levels of worry than Caucasians with type 2 diabetes (Huang, et al., 2009). Awong and colleagues (2002), also found ethnic differences in levels of worry among Chinese Malaysian and native Malaysian participants. The result of this analysis suggest that ethnic differences in the worry experience within the API diabetic population and further studies into understanding the nature of these differences are warranted .

The differences found between the Hawaiian and Asian subgroups in this study may have been related to the questions asked in the ASW and ADW subscale. The questions were designed to assess social as well as diabetes worries and concerns, but the content of the subscales may not be culturally relevant to the Hawaiian people. Family or 'ohana is a central concept in the Native Hawaiian culture. According to McCubbin (2006),

> The Native Hawaiian concept of self is grounded in social relationships (Hardy & Pukui 1972) and tied to the view that the individual, society and nature are inseparable and key to psychological and physical health. Such relational and emotional bonds that shape the 'ohana and its world view have implications for psychological functioning and well being (Kanaiaupuni, 2004). (p. 172).

These close ties with family, society and nature shape the values of the Hawaiian people. The questions in the ASW did not assess worry about family, society or the land and therefore, the ASW questions may not have captured the social worries of the Hawaiian people.

Aim 3: "determine if perceptions of worry and type of worries differed based on gender." Hypothesis six was supported, and gender was found not have a significant relationship with type of worries experienced by participants. McQueen, Vernon, Meissner, and Rakowski (2008) investigated the relationship of gender to risk perceptions and worry among cancer patients. Women were noted as having greater worry about gender specific cancers than men. Lindsey and colleagues (2006), investigated type of worry content, based on age group and gender. Worries were categorized as financial worries, work worries and health worries. Women worried about relationships and family (OR = 2.00, 95% confidence interval (CI) and health (OR= 1.23, 95% CI) and men worried about work (OR = 1.62, CI = 95%). Health and financial worries did not differ by gender.

Gender was not found to have a significant relationship with the type or worries measured in this study. This finding is consistent with Lindsey's study, where men and women did not differ in worry about health and finances. The instruments utilized in our study to measure social worry were not designed to assess worries about family which may be the reason no gender differences in type of worry were detected.

Limitations

Limitations related to the study design include an analysis conducted on the baseline data previously collected for a two arm randomized controlled intervention trial. The cross-sectional nature of baseline data limits causal inference.

Utilization of data previously collected restricted the accessible instruments to measure level of worry. Therefore worry was measured by four different instruments, the DQOL worry subscales (Diabetes related worry and Social/Vocational worry), one question from the MDQ and one from the DHBS scale. It was recognized that the DQOL was originally developed for type 1 diabetes and that it might not capture social worries of the retired and older population and was therefore adjusted. It is recommended that future studies utilize worry measures that specifically target the type 2 diabetes age group. In addition, conduction of small focus group discussions regarding the API population's specific worries and their coping mechanisms may have provided an explanation for the ethnic differences in worry experience.

All measures utilized in this study were self-report questionnaires and therefore are subject to issues concerning validity and accuracy inherent in self-report measures. Researchers are cautioned to recognize that participants may attempt to answer questions in a socially desirable manner and therefore acknowledge that "trustworthiness" of information may be a concern (Polit & Beck, 2008). In addition, poor memory and recall of activities may affect the results of the SDSCA which asks respondent to recall activities in the past 7 days. To improve the recall, tools such as diet and self care diaries may be useful to validate responses.

Implications for Nursing Practice

One of the goals of nursing practice is to improve the physical as well as mental health of our clients. Adherence to self management guidelines can help diabetic clients prevent complications and improve their health outcomes. Therefore, it is vitally important that nurses have an understanding of factors that impact client adherence to self care regimens. The concept of worry needs to be considered when working with clients with diabetes. Results of this study suggest that social worries may have a motivational effect on adherence and disease specific worries may have a detrimental effect. Therefore, one must not automatically assume that inducing worry about potential complications will improve a client's self care behavior.

Suggestions for future research include further investigation into the meaning of worry in the different API population, investigation into the impact age and socioeconomic factors have on worry content and disease outcomes. Another area of interest would be to investigate the impact worry has on the diabetic client's quality of life.

Conclusions

In summary, this study highlights the importance of understanding the concept of worry, specifically that of worry in the type 2 diabetic population. The findings of this study suggest that levels of and types of worry have an effect on self efficacy and on self management adherence. Social worries had a direct effect on self efficacy and positively moderated self efficacy's impact on self management adherence. Disease specific worries (MDQ-16) had a negative direct effect on self efficacy and negatively moderated self efficacy's effect on adherence.

These findings suggested that social worries may be a motivator to self management adherence. These motivational effects of worry have been shown to be effective in enhancing smoking cessation and health professionals may assume that increasing clients worry will enhance adherence to diabetes self management recommendations. Contrary to that belief, our findings suggest that increased disease specific worry may actually decrease client adherence to exercise recommendations. Therefore, attention to client's psychological wellbeing and worry levels should be considered when educating clients about their diabetes.

In addition, our study supported the understanding that worry perception and impact may differ among ethnic groups. The Hawaiian and Pacific Islanders in our study experienced less worries as measured by our social worry tools than the Asian participants. This difference may have resulted from utilization of a tool which was not culturally competent and did not survey for the social worries that are deemed important by the ethnic groups.

Worry is worthy of our concern as health professionals and additional investigation into this concept is warranted.

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Appendix A. Demographic Data Form
University of Hawaii School of Nursing and Dental Hygiene: ENHANCE Project

I. <u>DEMOGRAPHIC INFORMATION</u> (* = From Charts)
(Code 9 = no answer)
   ID #:_____

   2*   Gender: 1 = Male
                      2 = Female   _____

   3*   Height _____ft _____in.

           Weight _____lbs
   STAFF TO COMPLETE QUESTIONS #3 & #4

   4*   Blood Pressure _____mmHg

   5*   Birth Date _____

   6*   Address (if OK)   _____

                             _____

                             _____

   7*   Telephone _____ (home)

                     _____ (work)

                     _____ (other)

   8.   Email: _____

                 _____

   9*   Ethnicity: _____

   10.   Marital Status: 1 = Single   _____
                              2 = Married
                              3 = Separated
                              4 = Divorced
                              5 = Widowed
                              6 = Nonmarried partner

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12.   Family Income: 1 = Less than $10,000   _____
                                2 = $10,000 – 14,999
                                3 = $15,000 – 24,999
                                4 = $25,000 – 34,999
                                5 = $35,000 – 44,999
                                6 = $45,000 – 54,999
                                7 = $55,000 – 69,999
                                8 = over $70,000

13.   Medical Insurance _____

14.   Occupation: _____
            1 = Professional, Managerial
            2 = Technical, Clerical and Sales
            3 = Service
            4 = Agricultural, Fishery, Forestry, Related
            5 = Precision production, craft and repair
            6 = Operators, fabricators, and laborers
            8 = Miscellaneous

15.   Education: _____
            1 = Less than 9th grade
            2 = 9th to 12th grade
            3 = High school graduate
            4 = Some college, no degree
            5 = Associate degree
            6 = Bachelor's degree
            7 = Graduate or Professional degree

16.   In an emergency, who would you like us to contact?

        _____Phone:_____

        _____Phone:_____

        _____Phone:_____

II. HEALTH HISTORY

A. MEDICATIONS/VITAMINS/SUPPLEMENTS

17. Are you currently taking any medications/vitamins/supplements? If **yes**, please list

Medications   **Supplements**

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

_____   _____

B.   SUBSTANCE HISTORY

18.   Smoke: 1 = Don't smoke   _____
                       2 = Less than 1 pack per day
                       3 = 1 to 2 packs per day
                       4 = More than 2 packs per day

19.   How long have you smoked?   _____

20.   Alcohol use: 1 = Don't drink alcohol
                       2 = 1 – 3 drinks per week
                       3 = 4 – 6 drinks per week
                       4 = More than 6 drinks per week

21.   Other substance use: 1 = Yes   2 = No   _____

C.   ALTERNATIVE THERAPIES

Besides the mainstream medicine, many individuals also use complementary therapies to help them, like Chinese herbs, vitamins, acupuncture. Do you do or use anything?

                       1 = Yes   2 = No   _____

Please check: How much/How often

22. _____ massage   _____

23. _____ herbs   _____

24. _____ enemas   _____

25. _____ imagery   _____

26. _____ meditation   _____

27. _____ tai chi or chi gung   _____

28. _____ yoga   _____

29. _____ acupuncture   _____

30. _____ exercise   _____

31. _____ Other   _____

     List_____   _____

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D. MOODS/EMOTIONS

Now, I'd like to ask some questions about your feelings. If you are uncomfortable about sharing, it's really okay to leave blank.

32. Have you ever been depressed?   1 = Yes   2 = No   _____

33. So depressed that you couldn't function very well? Or you sought out the help of a professional?

                1 = Yes   2 = No   _____

STOP HERE

⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛⬛

STAFF TO COMPLETE
THE RES

E. COMPLICATIONS   _____

34*. (From charts) *co-morbid condition*

F.   (Need at three points)

35.   Entry   A1C level _____

                Lipid profile_____

                BMI_____

36.   After TX   A1C level _____

                Lipid profile_____

                BMI_____

37.   One year   A1C level _____

                Lipid profile_____

                BMI_____

(11/02/05)

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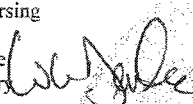
MEMORANDUM

August 25, 2009

TO: Lorrie Wong, RN
             Principal Investigator
             Department of Nursing

FROM: William H. Dendle
             Executive Secretary

SUBJECT: CHS #17345- "Investigation into the Relationship Between Worry and Self-Efficacy on Self-Management in Asian Pacific Islander Population with Type 2 Diabetes"

Your project identified above was reviewed by the Chair of the Committee on Human Studies through Expedited Review procedures. The project qualifies for expedited review by CFR 46.110 and 21 CFR 56.110, Category (5) of the DHHS list of expedited review categories.

This project was approved on August 24, 2009 for one year. If in the active development of your project you intend to change the involvement of humans from plans indicated in the materials presented for review, prior approval must be received from the CHS before proceeding. If unanticipated problems arise involving the risks to subjects or others, report must be made promptly to the CHS, either to its Chairperson or to this office. This is required in order that (1) updating of protective measures for humans involved may be accomplished, and (2) prompt report to DHHS and FDA may be made by the University if required.

In accordance with the University policy, you are expected to maintain, as an essential part of your project records, all records pertaining to the involvement of humans in this project, including any summaries of information conveyed, data, complaints, correspondence, and any executed forms. These records must be retained for at least three years from the expiration/termination date of this study.

The CHS approval period for this project will expire on August 24, 2010. If your project continues beyond this date, you must submit a continuation application to the CHS at least four weeks prior to the expiration of this study.

We wish you success in this endeavor and are ready to assist you and your project personnel at any time.

Enclosed is your certification for this project.

Enclosure