

RELATION OF DEPRESSION TO
SUBSTANCE USE, CHRONIC ILLNESSES AND
ASIAN AMERICAN AND PACIFIC ISLANDER
ADULTS IN HAWAII

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Abstract

Asian Americans (AA) are often portrayed as the model minority but it is also known that both AA and Pacific Islanders (PI) are least likely to seek help for mental disorders. Few studies have focused on AAPI, and even fewer have reported findings for each AAPI subgroup separately despite the unique characteristics of each subgroup. Using the aggregate group makes identifying actual differences in health and mental health of these subgroups difficult. As a result, little is known about the specific characteristics of AAPI subgroups. To fill this gap in knowledge, the purpose of this study was to a) identify the prevalence of current depression, substance use (smoking and alcohol use) and chronic illnesses (diabetes, cardiovascular disease and asthma) among AAPI adults in Hawaii; (b) determine if there are significant differences in the prevalence of current depression, substance use, and chronic illnesses between AA and PI adults in Hawaii, and (c) determine if there is a relationship between current depression, substance use, chronic illnesses and individual characteristics (such as age, gender, employment status, educational level, frequency of emotional support, life satisfaction and healthcare access) among AAPI adults in Hawaii.

Using the 2008 data from Hawaii Behavioral Risk Factor Surveillance System (HBRFSS), significant differences in prevalence of current depression between AA and PI were found. PIs in Hawaii were two times more likely to have severe/moderately severe depression compared to AAs. The prevalence of moderate and mild depression, among AA and PI did not differ significantly. Several factors affect these prevalence rates. The results of the multiple logistic regression cumulative model indicated that smoking, chronic illness, gender, level of education completed, employment status,

frequency of emotional support, life satisfaction, health care coverage and age were strongly associated with current depression.

DEDICATION

This is dedicated to my lifetime partner and best friend, my husband, Raymond Samuel Armstrong, for all your love and support even though I am sometimes mean to you. I love you from the bottom of my heart. I am blessed to have you in my life.

To my children, Matthew, Brittany, Joy and Anthony, I thank God for having you to love and cherish.

To my parents, Arcadio Ramiro Aczon and Bonifacia Celebre Aczon, I know you're both watching and proud of me, what I have accomplished and what I will continue to accomplish. I love you both and looking forward to our reunion.

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To my sisters and brothers in Christ at Kailua Community Church, thank you for your love, prayers and spiritual uplifting.

This is what I hold on to every time I face challenges during my PhD journey:

"For I know the plans I have for you, says the Lord. They are plans for good and not for disaster, to give you a future and a hope". Jeremiah 29:11

"Our dreams are defined by our hearts...our future is designed by our dreams...just follow your heart and do your best, and all the potential within you is sure to be realized".

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CHAPTER 1

INTRODUCTION

The purpose of this study was to a) identify current depression, substance use (smoking and alcohol) and chronic illnesses (diabetes, cardiovascular disease and asthma) among AAPI adults in Hawaii; (b) determine if there were significant differences in the prevalence of current depression, substance use, and chronic illnesses between AA and PI adults in Hawaii and (c) determine if there was a relationship between current depression, substance use, chronic illnesses and individual characteristics (age, sex, and educational level, support system, life satisfaction and healthcare access) among AAPI adults in Hawaii.

Depression is one of the most common complications of chronic illness (Anderson, Freeland, Clouse & Lustman, 2001). It is estimated that up to one-third of individuals with a serious and chronic medical condition experience symptoms of depression (Tylee & Gandhi, 2005).

A chronic illness is one that lasts for a very long time and usually cannot be cured completely. Individuals with chronic illnesses such as diabetes, heart disease and respiratory conditions are twice likely to be at risk of depression compared to those who are not chronically ill (Danz, et al., 2003; Meduru et al., 2007). Many of these conditions can be improved through diet, exercise, and healthy living, in addition to medications.

People diagnosed with chronic illnesses must adjust to the demands of the illness as well as its treatment. The illness may affect a person's mobility, independence, way of life, self-perception, and relationship to others. These requirements can be stressful and cause a certain amount of despair or sadness that is normal. Prolonged despair or sadness can lead to depression and other serious mental health complications (Anderson, et al., 2001; Tylee & Gandhi, 2005).

There have been several studies (Goldberg, Kreyenbuhl et al., 2007; Jackson, Covell, Drake & Essock, 2007; Krein, Bingham, McCarthy, Mitchinson, Payes, & Valenstein, 2006; Piette, Heisler, Ganoczy, McCarthy & Valenstein, 2007) addressing the association of depression with chronic illness and substance use. Most of these did not specifically identify AAPI subpopulation.

Cigarette smoking and heavy alcohol use is associated with depression as well as with a number of physical illnesses including cardiovascular, respiratory and other chronic diseases (Bradley, Badrinath, Bush, Boyd-Wickizer & Anawalt, 1998). According to the National Survey on Drug Use and Health (NSDUH), 7.5% of all U.S. adults aged 18 or older (16.5 million people) in 2007 had at least one major depressive episode (MDE) in the previous year. Estimates from this survey indicated a strong association between MDE and daily cigarette smoking and between MDE and heavy alcohol use. For adults with history of MDE, 10.4% were heavy alcohol users; while for those who reported no MDE, the rate was 7.1%. Similarly, for adults with a history of MDE, the rate of daily cigarette use was 28.7%, and for adults who reported no MDE, the rate was 15.2%. Heavy alcohol users and cigarette smokers are 50% more likely to have MDE compared to those without.

In summary, studies have found a significant association of current depression with smoking and alcohol, and current depression with chronic illness. However, there is limited research addressing the association of current depression involving all conditions: smoking, alcohol and chronic illness. Simultaneous experiences of chronic illnesses or co-morbidities may increase the risk for depression (Menduru et al., 2007). The national survey does not show statistics on AAPI subpopulation which is important as there are significant differences in cultural practices and beliefs within these subpopulation. Diverse populations creates a diverse culture. However,

there are also limited research identifying the outcomes of AAPI subpopulations. These cultural differences will be discussed in Chapter 2.

Background and Significance of the Study

Asian American and Pacific Islanders

In 2000, about 4% of the total U.S. population was comprised of AAPI or 10.6 million people (U.S. Bureau of Census, 2000). The most recent estimate for the AAPI population is 4.7% or approximately 14.6 million people of the total U.S. population (U.S. Bureau of Census, 2008). The AAPI population is projected to reach 41 million, 11% of the total US population by the year 2050 (Ghosh, 2003). Hawaii's ethnic diversity is illustrated with approximately 48.4% of its population of AAPI descent (U.S. Bureau Census, 2009).

(<http://quickfacts.census.gov/qfd/states/15000.html>).

Nationally minority health is emphasized in its Healthy People 2010 objectives relevant to diverse ethnic group. As a working document Healthy People 2010 addresses two overarching goals. One was to advocate for the increase in the quality and years of healthy life. The second goal was to eliminate health disparities among different segments of the population. The focus on minority groups was codified into Healthy People 2010: Understanding and Improving Health as a result of these demographics as well as the progressive history of AAPI in America.

Concept of Depression

Depression is a reaction to a loss, whether the loss is related to physical, cognitive, motor, sensory, social or vocational functions or situations (Lubkin & Larsen, 2005). Sometimes it may be difficult to determine if depression is the direct consequences of a personal reaction to losses

associated with the loss of control over the situation or physiological damage to the brain. As individuals become increasingly aware of the losses, restrictions, and alterations in lifestyle, they may go through a grieving process that leads to depression. Prolonged or unresolved depression can result in self-destructive behaviors (Lubkin & Larsen, 2005).

Depression is a term that can be used in many ways. Depression can refer to a symptom, a syndrome, or a disorder or illness (Varcolis, 1994). In 1917 Sigmund Freud described depression in his psychoanalytical theory. Freud believed that depression was caused by early negative experiences that result in maladaptive coping mechanisms. He suggested that individuals initially feel anger and reproach towards someone they love when they are concerned with a negative experience. The feelings of anger and reproach may be inwardly directed and result in feelings of self-reproach and melancholia (Street, Sheeran, & Orbell, 1999).

The DSM-IV criteria (Diagnostic Statistical Manual, American Psychiatric Association, 1994) provide a very specific definition of depression and outlines diagnostic criteria for depression disorders. Depression, elation, anger, and anxiety are common examples of universally experienced alterations in mood. A mood is a “pervasive and sustained emotion that, in the extreme, markedly colors the perception of the world” (APA, 1994).

Major Depressive Disorder (MDD) is identified in the DSM-IV with the following criteria: Impairment in the individual’s social or occupational functioning must be present in order to consider this diagnosis. Depression cannot be due to a substance condition or general medical condition or it cannot occur within two months of the loss of a loved one. Presence of at least five of the following symptoms and a noted change in the person’s previous level of functioning (at least one of the five must be #1 or #2) are criterias for MDD: 1) Depressed mood most of the day, 2) Markedly diminished interest or pleasure in all or most activities, 3) Significant weight

gain or loss (without dieting and more than 5% per month), 4) Insomnia or hypersomnia almost everyday, 5) Psychomotor agitation or retardation nearly everyday, 6) Fatigue or loss of energy nearly every day, 7) Feelings of worthlessness or excessive/inappropriate guilt nearly every day, 8) Diminished ability to think and indecisiveness nearly every day, and 9) Recurrent thoughts of death or suicide.

The American Psychiatric Association's recent revision of DSM-IV criteria (DSM-IV-TR) include somatic symptoms as a symptom of depression is indicative of an increasing awareness of the importance of somatic symptoms in the diagnosis of depression. The new criteria refer to "excessive worry over physical health and complaints of pain (e.g., headaches or joint, abdominal, or other pains) among the associated features of MDD. Until their recent revision, DSM-IV criteria for MDD did not include any mention of somatic symptoms (APA, 2003).

There are factors that influence the individual's perceptions of depression such as religion, family, support systems, coping styles, and indigenous culture-bound traits the individual (Sanchez & Gaw, 2007). There are unique cultural characteristics even within the same ethnic group. For example, in the Philippines, there are thousands of islands where inhabitants practice different cultural values and beliefs. The uniqueness in each group affects the way an individual react and perceive having depression and is described in the following section.

Some cultures allow their members to express themselves freely and others restrict its members from showing emotions and feelings in public (Tylee & Gandhi, 2005). Certain cultural groups, including African Americans, have a tendency to mention somatic symptoms more frequently, or to focus heavily on these symptoms when consulting with their primary care physician (Tylee & Gandhi, 2005).

Depression in the Filipino belief system reflects a weak spirit, divine reckoning, and consequences of personal and ancestral transgression. Perceived ridicule encourages hesitance to acceptance of depression. Avoidance of services are common notions of depression in the Filipino culture (Sanchez & Gaw, 2007).

Depending on his or her ethnic subgroup, a Filipino may assume a different perception of depression that would influence that individual's approaches to ailments and treatments (Reyes & Della, 2002). This is similar to the Chinese population with the use of herbs and acupuncture for medical and mental illnesses. The prevalence of depression among Asian patients in primary care settings is estimated to be around 14% with higher rates among Filipinos, compared with Japanese and Chinese (Kuo, 1984; Sanchez & Gaw, 2007). This may still be underestimated because of the cultural tendency of Filipinos to deny, somatize, and endure emotional problems.

Kaholokua (2007) discussed how "Kanaka Maoli" population survived the colonization and acculturation in Hawaii. Native Hawaiians (Kanaka Maoli) refers to the indigenous Polynesian people of the Hawaiian Islands or their descendants. Traditional individuals experience more depressive symptoms than bicultural and marginalized individuals. High degree of depressive symptoms among Kanaka Maoli could be attributed from acculturative stressors due to increased perceptions of racism and discrimination. This could also be contributing to their high susceptibility to health compromising behaviors (e.g. overeating and alcohol and substance use) (Kaholokua, 2007).

Smoking and Alcohol Use

Although estimates at the national level have shown an association between depression and alcohol use and between depression and cigarette smoking separately, there are few studies that

have looked at the association between depression, alcohol use and cigarette smoking in Asian American and Pacific Islanders (AAPI) with chronic illness. Numerous studies that have explored the relationship between depression symptoms, substance use and chronic illness but not specifically with AAPI population (Goldberg, Kreyenbuhl et al., 2007; Jackson, Covell, Drake & Essock, 2007; Krein, Bingham, McCarthy, Mitchinson, Payes, & Valenstein, 2006; Piette, Heisler, Ganoczy, McCarthy & Valenstein, 2007)

Reyes-Salvail, Liang & Nguyen (2008) examined the prevalence and disparity in Frequent Mental Distress (FMD) among the residents of Hawaii in 2005 through 2007. FMD is defined as fourteen or more days of self-reported mental health being “not good” in the past 30 days. This report presented the adult FMD prevalence rate in the state of Hawaii by county, age, sex, and ethnicity. There was a strong association between FMD and smoking while no association was found between binge drinking and FMD. These findings were presented to the program planners and healthcare providers to enhance their understanding and service to the segments of the state adult population in need of mental health care.

Salvail & Smith (2007) studied the prevalence of anxiety and depression among Hawaii’s adults but only did a bivariate analysis using current depression and another variable such as alcohol use, smoking, quality of life measures, some chronic diseases and socio-demographic attributes.

AAPI and Chronic Illness

For the purpose of this study, the chronic illness selected were diabetes, cardiovascular disease and asthma because of their high prevalence in the AAPI population in Hawaii (HBRFSS, 2008).

AAPI are at high risk for type 2 diabetes and its complications (National Diabetes Statistics, 2007). There are many factors that contribute to the development of diabetes in AAPI population including cultural lifestyle, including diet and exercise, which have direct effects on blood sugar levels (Norris, Nichols, Caspersen et al., 2002).

Diabetes is a group of diseases marked by high levels of blood glucose, also called blood sugar. This endocrine disorder results from defects of the insulin production, insulin action, or both. Diabetes can lead to serious complications and premature death. It is estimated that in the United States, 23.6 million people have diabetes, which is almost 8% of the total U.S. population. Out of 23.6 million affected, 17.9 million are diagnosed and 5.7 million remain undiagnosed (National Diabetes Statistics, 2007).

Data from the 2007 National Diabetes Fact Sheet (the most recent year for which data is available) identified 1.6 million new cases of diabetes being diagnosed in people aged 20 years and older each year. After adjusting for population age differences, 2004-2006 national survey data for age 20 years or older, 7.5 million Asian Americans were found to have been diagnosed with diabetes.

Some of the common complications of diabetes are heart disease and stroke. In 2004, heart disease was noted on 68% of diabetes related death certificates among people aged 65 years and older. Adults with diabetes have heart disease death rates about 2 to 4 times higher than adults without diabetes. The risk for stroke is 2 to 4 times higher among people with diabetes (National Diabetes Statistics, 2007).

Data collected by HBRFSS found that self-reported diabetes was highest among the Filipinos at 11.3% of total Hawaii population included in the 2008 survey. Chinese were the second

highest in diabetes prevalence at 10.3%, followed by Hawaiians at 9.9%. Diabetes during pregnancy was excluded from this data.

Cardiovascular disease (CVD) refers to a wide variety of heart and blood vessel diseases and conditions, including coronary heart disease (CHD), stroke, high blood pressure, and high blood cholesterol. CHD accounts for the largest proportion of heart disease, (US DHHS, 2000). CVD is frequently related to diabetes as poorly controlled sugar eventually affects the structure of blood vessels and vital organs (Punthakee, Werstuck & Gerstein, 2007).

Medical research continually contributes to a body of data that confirms that certain populations are disproportionately affected by diabetes and CVD (US DHHS, 2003; Punthakee et al., 2007). For example, there is a high prevalence of heart disease risk factors in some AAPI groups, and these factors vary among ethnic groups (Tamir and Cachola, 1994). More information about the other medical conditions among ethnic groups can be found in “Reducing Health Disparities in Asian American and Pacific Islander Populations: A Provider’s Guide to Quality & Culture Seminar”, <http://erc.msh.org/quality&culture>.

The major risk factors for cardiovascular disease are diabetes, hypertension, smoking, hypercholesterolemia, high alcohol consumption, and lack of physical activity. Lack of knowledge or awareness of the role of cholesterol in CVD is especially typical of Hawaiian and Filipino Americans and among those in Southeast Asian ethnic groups (Tamir and Cachola, 1994). This may contribute to the high prevalence of CVD among AAPI.

Another prevalent chronic disease in Hawaii is asthma. Asthma is a disease that affects the lungs. It causes repeated episodes of wheezing, breathlessness, chest tightness, and nighttime or early morning coughing. Asthma can be controlled by taking medicine and avoiding the triggers that can cause an attack. One must also remove the triggers in the environment that make asthma

condition worse. This is problematic in the State of Hawaii, specifically the Big Island due to the volcanic activities in the area. Eight percent or 78,400 adult self-reported current asthma prevalence rates in 2007 for the state of Hawaii. In terms of current asthma prevalence by ethnic group, asthma is most prevalent among Hawaiians/Part-Hawaiians at 12.7% followed by Filipinos at 8.3% and Japanese having the lowest prevalence at 6.1%.

In summary, chronic illness such as diabetes, cardiovascular disease and asthma are prevalent among the AAPI population and seem to be related in different ways. One may imply that diabetes and cardiovascular disease in AAPI population are attributable to the cultural, dietary and exercise habits of this ethnic group. For example, rice and taro are some of the staple foods for Filipinos and Hawaiians respectively. Both are high in carbohydrates which when processed by the body turns into blood sugar. The famous roast pig is a common delicacy for the Filipinos and Hawaiians and known to have very high contents of fats and cholesterol. Consumption of foods high in cholesterol and fats lead to build-up of blockage in the blood vessels causing heart attack and/or stroke. The required changes in cultural, dietary and exercise habits pose extreme challenges to this ethnic population. These changes could lead substance use and depression.

Purpose of the Study

Because of the significance of depression and chronic illnesses and lack of data relevant to the AA and PI population, the purpose of this study was to attempt to fill this gap in knowledge by a) identifying current depression, substance use (smoking and alcohol use) and chronic illness (diabetes, cardiovascular disease and asthma) among AAPI adults in Hawaii; b) determining if there are significant differences in the prevalence of current depression, substance use, and chronic illness between AA and PI adults in Hawaii, and c) determining if there is a relationship

between current depression, substance use, chronic illness and individual characteristics (age, sex, ethnicity, marital status, employment status, educational level, support, life satisfaction and health plan access).

CHAPTER 2

LITERATURE REVIEW

Literature pertaining both to depression and AAPI was included in this review. The following electronic databases were explored to identify published literature via EBSCO Host: Academic Search Premier, Alt Healthwatch, CINAHL, ERIC, Health Source: Nursing/Academic Edition, Library Literature & Information Science, MasterFILE Premier, MEDLINE, Pre-CINAHL, Primary Search, Psychology & Behavioral Sciences Collection, Religion and Philosophy Collection, PsychLIT/PsychINFO and Google Scholar data bases were searched through September 2009. The searches were supplemented by hand searches of key journals from the Department of Psychiatry such as General Hospital Psychiatry, Clinical Psychology & Psychotherapy, Transcultural Psychiatry, and Psychiatric Services. Also cross-referencing was used to search for relevant articles. From a review of the titles (and abstracts when available), studies were selected with terms such as “depression”, “depressive symptomatology”, “concept of depression”, “depressive disorder”, and “culture and depression”.

The second group of literature reviewed included substance use (smoking and alcohol use) and chronic illness (diabetes, cardiovascular disease and asthma) in the AAPI population. A total of 32 articles were reviewed with the following headings: “AAPI and depression” (17); Depression and substance use (1); Chronic disease and depression (12); Chronic illness and substance use (1); and AAPI and diabetes (1).

Asian American and Pacific Islanders

According to the Census Bureau (U.S. Bureau of Census, 2008), AAPIs represent a vast array of cultures and hundreds of languages and dialects. Asian Americans refer to Americans with origins from one or more of the 28 Asian nations. Pacific Islanders refer Native Hawaiians and other natives living in the U.S. protectorates of Guam, American Samoa, and the Commonwealth of the Northern Marianas, or Americans with origins from one or more of the 19 Pacific Island nations. (Note that Native Hawaiians and individuals born in the U.S. protectorates are considered native-born).

Recent estimate reports 14.6 million AAPI living in the U.S. or about 4.7% of the total population (U.S. Bureau of Census, 2008). By 2020, the AAPI population is projected to reach 20 million, and by 2050, approximately one out of every 10 Americans will be of Asian or Pacific Islander descent (38 million). Up to 70% of AAPIs are recent (first generation) immigrants and/or refugees. The Philippines, China, and Vietnam were among the 10 leading countries of birth of America's foreign-born population. An estimated 40-50% of AAPIs are limited-English proficient (<http://www.epa.gov/aapi/primer.htm>). Table 1.0 below list the different nationalities considered under the AAPI group.

Table 1. East/South East Asian American and Pacific Islanders

Asian	Native Hawaiian or Other Pacific Islander
Asian Indian	Chamorro
Bangladeshi	Fijian
Burmese	Guamanian
Cambodian	Hawaiian
Chinese	Mashallese
Filipino	Micronesian
Hmong	Northern Mariana Islander
Indonesian	Palauan
Japanese	Samoan
Korean	Tahitian
Laotian	Tongan
Malayan	All other Pacific Islander
Okinawan	
Pakistani	
Sri Lankan	
Thai	
Vietnamese	
All other Asian	

Source: U.S. Bureau Census, 2008

AAPI are diverse in ethnicity and in their cultural and historical experiences. There are many Asian American and Pacific Islanders who have lived in the U.S. for several generations, but there are also a high number of recent immigrants who contribute to a great diversity in language and culture among this group (APA, 2007).

Asian Americans are often portrayed as the model minority, bright shining example of hard work and patience, well achieving the “American Dream”, getting a good education, working at a good job and earning a good living (Menaster, 2003; Okazaki, 2000). For many, this is true. However, reports also indicate that half of all Asian Americans and Pacific Islanders have difficulty accessing mental health services because of economic barriers, social and cultural differences, language disparities, and the lack of culturally competent providers (Menaster, 2003; Okazaki, 2000; Tsai & Chentsova-Dutton, 2002).

Culture and Depression

Among all ethnicities, Asian American and Pacific Islanders are the least likely to seek help for mental disorders (Menaster, 2003). Asian cultural values of self-reliance and reservation and fear of shaming the family keep many from seeking assistance with emotional problems (Tsai & Chentsova-Dutton, 2002). As a result these disorders and problems are not easily identified or treated in the AAPI ethnic groups.

One explanation for the lack of help seeking behavior is that depression is not recognized as a treatable disease entity in most Asian cultures (Kim, 1999; Yeung et al., 2002). Mental illness is considered an out-of-control behavior, a sign of weakness, and brings disgrace to the family. Mental illness is highly stigmatized and mental health services are avoided as much as possible.

The casual use of depression with the expression “feeling blue” by most Americans does not always apply to other cultures. For example, this frequently used metaphor of depression in America does not have the same meaning when directly translated into Korean; Koreans use “black” as a metaphor to express depressed feelings (Kim, 1995).

Depression manifests in a variety of ways, from the classical symptomatology of excessive grief to the phenomenologically incongruous “smiling” depression. This explains how Filipinos “smiles” a lot even when in emotional pain (Tompar-Tiu & Sustento-Seneriches, 1995).

Dr. Tompar-Tiu (1995) conducted a five-year study resulting in a book titled “Depression and Other Mental Health Issues: The Filipino American Experience”. The result of the study revealed that Filipinos have a way of denying that they are suffering from depression. It seems, Filipinos do not acknowledge depression, and despite the mountain-load of problems, can manage to smile or even laugh. “Filipinos smile a lot, in fact, we have no word for depression” (Tompar-Tiu, 1995).

There are a variety of ways that cultures describe emotional states and feelings. More specifically, these expressions do not necessarily have direct English equivalents. There is a range of emotional states and expression of sadness in all communities and societies. An example is describing and expressing feelings and/or symptoms under the broad heading of “sadness” or “tristeza” (Barnes et al., 2004).

The Japanese word “jodo” has been translated as the equivalent of the English word “emotion” but the range of the person’s emotional states change the English translation into either “lucky”, “motivated”, or “calculating” (Matsuyama et al., 1978).

There are limited studies related to determining the rate of depression among Asian American compared to those of the Pacific Islanders. However, researchers have examined mental-health problems by measuring the prevalence of symptoms among AAPI population (Menaster, 2003).

Some studies have indicated that Asian Americans who use mental-health services are more severely ill than other groups (Lin & Cheung, 1999). Evidence suggests this is because many Asian Americans delay seeking treatment because of the stigma associated with using mental-health services in addition to cultural and linguistic barriers to mental health care access (Lin & Cheung, 1999; Okazaki, 2000).

Numerous studies have been conducted to understand how culture influences stress and mental disorders including depression (Lopez & Guarnacia, 2000). Due to increasing cultural heterogeneity in the United States, healthcare providers are beginning to realize the need for understanding sub cultural differences in the experience and presentation of depression in the provision of appropriate clinical care (Kanazawa, White, & Hampson, 2007).

The impact of culture on the experience and presentation of depressive symptom has been attributed to ethnic differences in the conceptualization of depression. Previous research

suggests that at least three cultural factors may contribute to the presentation and diagnosis of depression: cultural representations of the self, mind-body relations, and emotional regulation of expression (Tsai & Chentsova-Dutton, 2002).

Individuals from different cultures identify themselves as an integral part of the group and make decisions with the group in mind. The same individuals may identify themselves as independent individuals and making decisions based on their individual needs. Some cultures express their emotions through somatic symptoms. Some allow their members to express themselves freely, while others restrict its members from showing emotions and feelings in public. Certain cultural groups, including African Americans, have a tendency to mention somatic symptoms more frequently, or to focus more heavily on these symptoms when consulting their primary physician care physician (Tylee & Gandhi, 2005).

The Centre for Addiction and Mental Health (CAMH) (2008) conducted a collaborative study of clinical researchers from the University of British Columbia and Xiangya Hospital of Central University, People's Republic of China. The study recruited more than 200 participants, half from an outpatient clinic in China and half from a clinical research department outpatient clinic at CAMH. East-Asian participants did report a significantly higher level of somatic symptoms when reported through spontaneous interview and structured clinical interviews. The results suggest that the observed cross-cultural differences in somatic symptom scores relate, in part, to cultural differences in internal thinking versus external manifestations. The data from this study may help clinicians be more aware of how culture can impact how people talk or communicate about their illness.

Smoking and Alcohol Use

Epstein, Induni & Wilson (2009) found a 9.2% prevalence of current depression in California. There was a higher prevalence of depression among Hispanics compared to Whites. The prevalence of current depression was higher among daily smokers who were also binge drinkers. AAPI were not identified in the analysis. The researchers used data from the 2006 California BRFSS with a sample that was randomly selected within 2 strata consisting of Los Angeles County and the rest of California.

Smoking and alcohol use and abuse by AAPI were analyzed by Price, Risk, Wong and Klinge (2002) from four national epidemiological studies. The authors found among disaggregated AAPI groups, Japanese Americans had the highest substance use rates. The use of major substances was lowest for AAPI groups. Mixed-heritage AAPIs were identified as high risk for substance use even after controlling for confounding variables (Price et al., 2002). The preliminary results point to the importance of rethinking ethnic and racial classifications for estimating substance use and abuse problems in mixed-heritage population.

Chronic Illness and Mental Health in AAPI

Dealing with the multifaceted issues surrounding mental health is a key factor in reducing the impact of chronic diseases on AAPI (Ohira et al., 2001; Piette et al., 2007; Rubin et al., 2004). When a person is depressed, there is tendency to have a sedentary lifestyle, poor diet, a high prevalence of smoking and cognitive impairment (Tylee & Gandhi, 2005). Since depression has such great impact on chronic disease self-care (Goldberg et al., 2007; Jackson et al., 2007; Krein et al., 2006), clinicians need to be aware that such conditions manifest different reported

symptoms depending on the cultural beliefs and practices of their patients. Clinically significant depression is also associated with poorer glycemic control and increased rates of diabetic complications (Goldberg et al., 2007). Several studies (Goldberg, Kreyenbuhl et al., 2007; Jackson, Covell, Drake & Essock, 2007; Krein, Bingham, McCarthy, Mitchinson, Payes, & Valenstein, 2006; Piette, Heisler, Ganoczy, McCarthy & Valenstein, 2007) suggest that chronic diseases doubles the risk of depression compared to those without the disorders.

Salvail & Smith's (2007) study of the prevalence of anxiety and depression among Hawaii's adults found persons with diabetes were significantly more likely to have had current depression than individuals who were not diabetic. This points to the importance of addressing potential mental health problems such as depression in persons with chronic illness such as diabetes.

A meta-analysis of depression and diabetes indicated that depression was twice as prevalent among persons with diabetes compared to persons without diabetes (Anderson, Freedland, Clouse & Lustman, 2001). Despite the availability of measures to screen for depression, it is estimated that less than 25% of those with depression are diagnosed and treated (Rubin, Ciechanowski, Egede, Lin & Lustman, 2004).

Research has shown that depression is commonly associated with diabetes. People who have both diabetes and depression have higher risk of complications, tend to have more severe symptoms of both diseases and use more medical services than those who only have diabetes alone (Lin, Rutter, Katon, Heckbert, Ceinchanowski, Oliver et al., 2010). Lin and her colleagues from Group Health Research Institute in Seattle, WA and the University of Washington, examined the association between type 2 diabetes and depression among 4,623 patients enrolled in Group Health. They first interviewed the participants between 2000 and 2002, and then

conducted follow-up interviews between 2005 and 2007. Their results indicated that those with type 2 diabetes and coexisting major depression were more likely to experience life-threatening complications than those without co-existing major depression (Lin et al., 2010). To reduce the risk of diabetes complications, better interventions are needed that not only treat the diabetes but address any accompanying depression as well.

Depression has been associated with risk factors for cardiovascular disease in addition to smoking and physical inactivity (Hayward, 1995). Depression or depressive symptoms are also predictive of having a stroke: persons with significant depressive symptoms are approximately twice as likely as those with few depressive symptoms to have a stroke within 10 years (Jonas & Mussolino, 2000; Ohira et al., 2001).

A formative research study was done in August 2000 funded by the Asian and Pacific Islander Health Forum to gain a greater understanding of the attitudes toward and knowledge of health practices related to cardiovascular disease (CVD) (APIAHF, 2000). Heart disease is the leading cause of death for Filipinos (APIAHF, 2000), representing about 32 percent of all Filipino deaths. One of the major risk factors that is quite prevalent among Filipinos, is high blood pressure which increases their risk of heart disease.

Depression has been linked to cardiovascular disease and death (Glassman, 2007). However, only during the last 15 years has scientific evidence supported this linkage as researchers began to accumulate community-based epidemiological evidence that medically healthy, depressed patients followed for long periods of time were at increased risk of both cardiovascular disease and cardiac death. In the mid-1990's evidence appeared to indicate that depression following a heart attack increased the risk of death (Glassman, 2007).

Asthma was also found to be associated with depression. Persons with current asthma are significantly more likely to have had current depression than former asthma sufferers or those who have never experienced it. Nearly 50% of asthma patients may suffer from clinically significant depressive symptoms as attributed to the stress of having a chronic illness. It appears that the symptoms, rather than the diagnosis of asthma are associated with depression or anxiety. Increase in depression symptoms also have been associated with poorer asthma outcomes (Mancuso, Peterson & Charlson, 2000).

Summary

The grouping of AAPI population together in one ethnic category is problematic. The mixture of immigrants and refugees living in the U.S and the multigenerational factor contributes to the difficulty in categorizing subpopulations . The diversity of the AAPI population creates a variation in how mental and chronic medical illnesses are being perceived by its subpopulation. As mentioned by Kaholokua (2007), traditional Hawaiian individuals experience more depressive symptoms than bicultural and marginalized Hawaiian individuals. This can be said about the AA population with the different cultural practices and beliefs between subpopulations. In addition to this mixture of culture, language and dialects, there is also a group of foreign-born AAPI with different cultural upbringing compared to the AAPI population who recently migrated from their country of origin (U.S. Bureau of Census, 2008).

The variation in cultural values and beliefs such as self-reliance, reservation, and fear of shaming the family affects the self-management of chronic diseases among AAPI with undiagnosed depression. Complications of chronic disease in AAPI increase as they delay seeking treatment for depression. The increasing cultural heterogeneity in the U.S. forces

healthcare providers to understand the sub-cultural differences in the experience and presentation of depression to effectively manage mental illness and chronic illnesses among AAPI.

The articles reviewed for this study clearly indicated significant relationships among depression, substance use and chronic illness. However, few studies have identified the relationship of these variables between the subgroups of AAPI population. This study will bridge some of the gaps in knowledge relative to ethnic variations and mental health.

Guiding Framework

This study intended to describe and identify the relationships of current depression with substance use, chronic illness and individual characteristics among AAPI adults in Hawaii

The Behavioral System Model (BSM) (Johnson, 1990) was used to hypothesize the relationships of identified variables: AAPI, current depression, substance use, chronic illness and individual characteristics. Nursing may be identified as one of the support systems under individual characteristics.

BSM views nursing as:

“an external regulatory force which acts to preserve the organization and integration of the patient’s behavior at an optimal level under those conditions in which the behavior constitutes a threat to a physical or social health, or in which illness is found” (Johnson, 1980, p214).

Dorothy Johnson’s model considers the person experiencing the disease more important than the disease itself. Healthcare providers tend to focus on the illness and how to treat them rather than paying attention to the person, a human being in front of them. And in these human beings are individual characteristics such as ethnicity with different cultural beliefs and practices.

This model conceptualize human as a behavioral system that strives to make continual adjustments to achieve, maintain or regain balance. Functional requirements are input that the system must receive to survive and develop. Health is seen as the opposite of illness. Environment is not directly defined, but it is implied that it includes all elements surrounding the human system.

AAPI adults and their individual characteristics are part of the behavioral system in Johnson's model. Within this environment, individuals in the behavioral system strives to achieve and maintain balance in the system. Current depression and substance use are considered behaviors that contribute to the success or failure to maintain balance in the system. Chronic illness is the opposite of health. The support system and healthcare access are identified as functional requirements. AAPI must receive this support in order to survive and develop.

Figure 1 below illustrates the relationship of current depression with substance use, chronic illness and individual characteristics among AAPI adults in Hawaii used in this study.

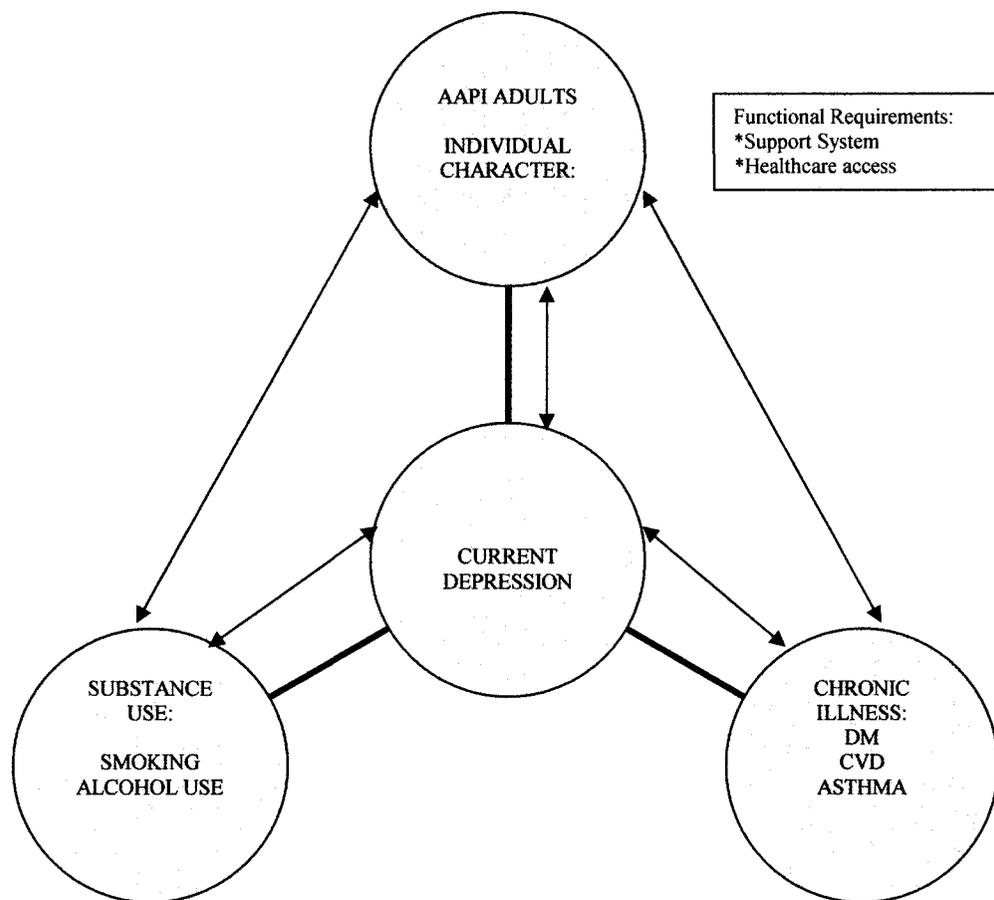


Figure 1. Relation of Substance use, AAPI ancestry, and Chronic illness to Current Depression in Hawaii. The Behavioral Systems Theory (Dorothy Johnson).

Protection of Human Subjects/Ethical Consideration

Those who participated in the Hawaii Behavioral Risk Factor Surveillance System (HBRFSS) telephone survey were randomly selected adult residents 18 years and older. The total numbers of participants were 6,446. For this particular study, a subset of 3,113 was used. The data received from HBRFSS were coded and participants were unidentifiable during the statistical analysis. An approval for exempt status from the University of Hawaii Committee on Human Studies was obtained prior to data analysis (CHS# 17814).

CHAPTER 3

METHODS

Data Source

The data analyzed presented in this report were derived from HBRFSS survey collected in 2008. HBRFSS is part of the national Behavioral Risk Factor Surveillance System (BRFSS) of the Centers for Disease Control and Prevention (CDC) since 1986. The national BRFSS is the largest on-going telephone interview survey of randomly selected non-institutionalized adult 18 years or older in household with telephone access in each state of the nation, U.S. territories of Guam, Virgin Islands and Puerto Rico. The focus of the survey is on behaviors that directly or indirectly affect health and on other health related topics.

The BRFSS collects data on socio-demographic characteristics, chronic illness, health behaviors, access to health care, and other health-related information. Given its large sample size, the BRFSS can produce local, state, and national estimates. Each of the participating states conducts their respective random telephone survey following the national BRFSS protocols and guidance.

Through the BRFSS surveys, states, CDC, and other federal agencies have learned much about these and other harmful behaviors and conditions. This information is essential for planning, conducting, and evaluating public health programs at state, local, and national levels.

A national profile as well as participating state profiles about the general result of BRFSS are available on-line on the CDC's website, www.cdc.gov. The State of Hawaii's website is at <http://hawaii.gov/health/statistics/brfss/index.html>.

Methodology

The study design uses descriptive statistical analysis of cross-sectional data collected by the Hawaii Behavioral Risk Factor Surveillance System (HBRFSS) in calendar year 2008. The initial analysis used univariate and bivariate analysis. In-depth analysis was conducted using multivariate method specifically multiple logistic regression. The cumulative model of multiple logistic regression was used because the categories under the current depression definition can be assumed as ordinal in nature rather than nominal (Tabanick & Fidell, 2007). The categories of the current depression used in this study were severe and moderately severe, moderate, mild and none. Overall, the variables used in this study included current depression, alcohol use, smoking and selected chronic illness (current asthma, diabetes and cardiovascular disease) and individual characteristics (age, sex, employment status, educational level, support system, life satisfaction and healthcare access) among AAPI adults in Hawaii. Age was used as a continuous variable in the multiple logistic regression analysis since age is available as a continuous variable.

Estimates, Confidence Intervals, Significance, and Reliability

Statistical Analysis Software (SAS) callable SUDAAN version 10 was used in all statistical analyses for all the computation of estimates and confidence intervals in this study. The SUDAAN procedures are suited for complex sample designs.

The prevalence rates presented in this statistical analysis were derived from surveying a sample of adults rather than all adults in the population; therefore, the rates are estimates of the true values. For this reason, estimates are presented together with their associated confidence intervals. A confidence interval is a range of values around an estimate, which is calculated to represent the range that contains the hypothetical true value. This report presents 95% confidence intervals (95% CI). Therefore, we are 95% confident that the confidence interval contains the true value that we are estimating (Tabanick & Fidell, 2007).

Significance is the term used for statistical analyses to describe prevalence estimates for a group that will be tested against a particular group and found to be significantly different from each other. Statistically significant differences between estimates are traditionally determined using statistical tests such as a *t*-test or chi-squared test (Tabanick & Fidell, 2007; Welkowitz, Ewen & Cohen, 2000). However, when comparing estimates from surveys with a large number of respondents, such as the BRFSS, these statistical tests can indicate statistically significant differences even when there are only small variations in prevalence. This method would label most of the estimate comparisons as significantly different.

Two prevalence estimates are said to be “significantly” different when the 95% confidence intervals (CIs) associated with each of the estimates do not overlap. In other words, it can be stated with 95% certainty that the difference found between the two prevalence estimates is not a random occurrence. Although this is not the “classical” statistical test of differences, it is a better

method of highlighting the BRFSS results important to the design of effective and efficient health promotion interventions (HBRFSS, 2008). Identifying differences as significant by this method targets the characteristics most strongly associated with a particular health condition or risk behavior, and directs attention to the largest changes in prevalence overtime. Adjectives such as slight, minor, and little will be used in this study to describe notable differences that are not considered significant by this definition because the confidence intervals do overlap a little.

For predictor variables, logistic regression analyses provided odds ratios and confidence intervals. An odds ratio greater than 1.0 indicates the likelihood of the outcome (criterion) occurring as the predictor increases one unit, whereas an odds ratio below one indicates that as the predictor increases, the odds of the outcome occurring decreases (Field, 2005). For example, an odds ratio of 1.50 for current depression with current smoking as the predictor variable indicates current depression is 1.50 times more likely to occur given the presence of current smoking. Odds ratios are also a useful measure of effect size (i.e., an objective measure of the magnitude of an observed effect) for categorical data (Field, 2005). Confidence intervals are typically reported for odds ratios. Ninety-five percent confidence intervals were reported in this study indicating that the true value of the odds ratio will fall within the confidence interval 95% of the time. Odds ratios are deemed statistically significant if 95% confidence interval for the related odds ratio does not include the value 1.00 (i.e., odds ratio differs significantly from 1.00) (Tabachnick & Fidell, 2007).

Statistical Analysis

Research Question 1 (RQ1): What is the percentage of AAPI adults in Hawaii with current depression, substance use (smoking and alcohol use) and chronic illness (diabetes, cardiovascular disease and asthma)?

Descriptive statistics were used to address RQ1. Frequency tables were developed to identify the prevalence of current depression, substance use (smoking and alcohol use) and chronic illness (diabetes, cardiovascular disease and asthma).

Research Question 2 (RQ2): Are there significant differences in the prevalence of current depression, substance use and chronic illness between AA and PI adults in Hawaii?

Bivariate analysis like correlation and chi-square tests were employed to address RQ2. Logistic regression was used to calculate the adjusted odds ratios (AORs) for levels of current depression, smoking and alcohol use. All estimates were weighted, and all standard errors were calculated by using SAS Callable SUDAAN version 10 to accommodate the complex sampling design of BRFSS. The results were weighted to represent the population of Hawaii adults. Significant differences were considered at $\alpha \leq .05$.

Research Question 3 (RQ3): Is there a relationship between current depression, substance use, chronic illness and individual characteristics (age, sex, educational level, marital status, support system, life satisfaction and healthcare access) among AAPI adults in Hawaii?

The categories for depression severity as described by Kroenke and Spitzer (2002) namely severe, moderately severe, moderate, mild and none were viewed as ordinal in nature. These categories were the basis for the current depression variable used in this study. To control for the simultaneous effects of the independent variables on the dependent variable, i.e., current depression, multiple logistic regression was used. However, the current depression dependent

variable in this study is ordinal in nature thus the cumulative logit model was used rather than the generalized logit model. The generalized logit model is suited for nominal dependent variable (Tabanick & Fidell, 2007). Both models of multiple logistic regression produced adjusted odds ratios (AORs). The cumulative logit model summarized the AOR's as one number. Adjusted odd ratios (AORs) with 95% confidence intervals (95% CIs) and P values were calculated for all variables that assessed current depression. The independent variables associated with the AAPI population may not be applicable when the AAPI population is disaggregated as AA and PI. Thus, three multiple logistic regressions using cumulative logit model were run. The first one was for the whole population AAPI, the second one was for the AA population and the last one was for the PI population. The results are shown in Tables 9 – 10.

Measures

Current Depression

Current depression was derived from self-reported depressive symptoms expressed in the patient health questionnaire (PHQ-8) (Kroenke & Spitzer, 2002). Current depression prevalence is a measure of depression being experienced by the adult population in the state of Hawaii two weeks prior to the interview. The module used for the telephone interview included the following questions:

- 1 Over the last 2 weeks, how many days have you had little interest or pleasure in doing things?
- 2 Over the last 2 weeks, how many days have you felt down, depressed or hopeless?
- 3 Over the last 2 weeks, how many days have you had trouble falling asleep or staying asleep or sleeping too much?
- 4 Over the last 2 weeks, how many days have you felt tired or little energy?
- 5 Over the last 2 weeks, how many days have you had a poor appetite or ate too much?
- 6 Over the last 2 weeks, how many days have you felt bad about yourself or that you were a failure or had let yourself or your family down?

- 7 Over the last 2 weeks, how many days have you had trouble concentrating on things, such as reading the newspaper or watching the TV?
- 8 Over the last 2 weeks, how many days have you moved or spoken so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you were moving around a lot more than usual?

Scoring of PHQ-8 as Depression Indicator

The depression indicator was derived using PHQ-8 questions which were fielded in calendar year 2008 HBRFSS. When a participant does not respond to even one question in the PHQ-8 set of questions, that participant is excluded in the overall data analysis. In the BRFSS, each question asks about the number of days a symptom occurred during the last 2 weeks. To score the questions, days are converted to points (0-1 day = 0 points, 2-6 days = 1 point, 7-11 days = 2 points, and 12-14 days = 3 points) and summed to obtain a total score. The total score across the eight questions was grouped to indicate the depression symptom severity (a total score of 1-4 indicates no to minimal depression, 5-9 indicates mild depression, 10-14 indicates moderate depression, 15-19 indicates moderately severe depression and 20 or higher indicates severe depression) (Kroenke & Spitzer, 2002). These groupings follow the Kroenke & Spitzer's classification namely a) no depression, b) mild depression, c) moderate depression, d) moderately severe depression, and e) severe depression shown in Table 2 from Kroenke & Spitzer's "PHQ-9 Scores and Proposed Treatment Actions".

For this study the classification for moderately severe depression and severe depression was combined to form severe depression group since the proposed treatment action is similar for these two categories (see Table 2 from Kroenke and Spitzer, 2002). For the detailed analysis with covariates, current depression included the mildly depressed to severely depressed categories.

Reliability and Validity

According to the article of Kroenke and Spitzer (2002), PHQ-8 is an alternative depression severity measure for some types of research. Because the PHQ-9 has been increasingly used in clinical research, there have been certain types of projects in which omitting the ninth item inquiring about “thoughts that you would be better off dead or of hurting yourself in some way” is desirable. These include population or clinical samples in which one or more of the following three criteria are met: (1) the risk of suicidality is felt to be extremely low or negligible; (2) depression is being assessed as a secondary outcome in studies of other medical conditions; and/or (3) data is being gathered in a self-administered fashion rather than by direct interview, such that further probing about positive responses to item nine is not feasible. Examples include mailed questionnaires, telephone-administered interactive voice recording, or Internet surveys.

Therefore, Kroenke and Spitzer analyzed data from the original PHQ studies to determine the operating characteristics of the PHQ-8 (i.e., all items on the PHQ-9 scale except the ninth item). The PHQ depression module classifies patients into three groups: major depression, other depression (which includes patients with both dysthymia and minor depression), and no depression. First, the PHQ-8 and PHQ-9 were compared in their ability to predict any depressive disorder (i.e., either major depression or other depression). As shown in Table 3, there is a similar likelihood of any depressive disorder on the PHQ-8 and PHQ-9 at each level of depression severity level. Second, the authors focused on major depression, and compared the sensitivity, specificity, and positive predictive value of the PHQ-8 and PHQ-9 across a range of cutpoints that were

examined in the original PHQ-9 paper. Again, as shown in Table 3, the PHQ-8 and PHQ-9 had similar operating characteristics, regardless of the cutpoint. The reason that deletion of the ninth item has only a minor effect on the actual PHQ-9 score is that thoughts of death or self-harm are typically less common in a primary care depressed population than in the more severely depressed patients referred to a mental health specialist (Kroenke and Spitzer, 2002). Also, even patients who endorse this item often do so at a low threshold (i.e., “several days”). Thus, this item typically contributes, on average, only a point or two to the overall PHQ score. In using the PHQ clinically, it is obviously essential to include this ninth item so that those patients endorsing it can be further questioned about suicidal ideation. However, even in primary care patients depressed enough to warrant antidepressant therapy, few of those endorsing this ninth item actually have true suicidal ideation when further probed about the meaning of their response. Still, because nearly half of suicide victims have contact with a primary care provider within 1 month of suicide, the PHQ-9 should be the measure of choice in most instances where the aim is to evaluate clinical populations for depression. However, the PHQ-8 may be an acceptable alternative to the PHQ-9 in certain research studies that meet one of the three criteria initially outlined above. According to Kroenke and Spitzer, the suggested treatment actions in response to those various levels of PHQ-9 depression severity are shown on Table 2.

PHQ-9 Score	Depression Severity	Proposed Treatment Actions
1 to 4	None	None
5 to 9	Mild	Watchful waiting; repeat PHQ-9 at follow-up
10 to 14	Moderate	Treatment plan, considering counseling, follow-up and/or pharmacology
15 to 19	Moderately Severe	Immediate initiation of pharmacotherapy and/or psychotherapy
20 to 27	Severe	Immediate initiation of pharmacotherapy and, If severe impairment or poor response to therapy, expedited referral to a mental health specialist for psychotherapy and/or collaborative management

Source: The PHQ-9: A New Depression Diagnostic and Severity Measure (Kroenke & Spitzer, 2002)

PHQ Severity Score	Percent With Any Depression		Likelihood Ratio*	
	PHQ-8	PHQ-9	PHQ-8	PHQ-9
1 to 4	0.2%	0.1%	0.010	0.006
5 to 9	12.9%	12.6%	0.79	0.76
10 to 14	58.0%	54.9%	7.3	6.5
15 to 19	91.5%	90.6%	57.0	51.3
20 to 27	98.9%	97.5%	475.5	203.8

*The likelihood ratio expresses how much more likely it is for a patient with a certain disease to have a given test result than it is for a person without the disease. Thus, a patient with any depressive disorder is 7.3 times more likely to have a PHQ-8 score in the 10 to 14 range than a person with no depressive disorder.

Martin, Rief, Klaibert and Braehler (2006) assessed the validity of PHQ-9 as a screening for depression in the general population. The internal consistency of the PHQ-9 was measured by Cronbach's alpha coefficient. For validity analysis, both criterion and convergent validity was determined. Criterion validity tests a scale's performance in comparison to a gold standard such as the Beck Depression Inventory (BDI), the 12-item General Health Questionnaire (GHQ-12), and the Short Form (36) Health Survey (SF-36). Strong associations between PHQ-9 depression severity and convergent variable were found. Cronbach's alpha for the total scale was 0.73 with BDI and 0.59 with GHQ-12).

The English language PHQ-9 was translated into Thai to test its reliability and validity as a screening tool for major depression in primary care patients (Lotrakul, Sumrithe & Saipanish, 2008). PHQ-9 was administered to patients in a family practice clinic. Patients were further assessed using the Thai version of the Mini International Neuropsychiatric Interview (MINI) and the Thai version of the Hamilton Rating Scale for Depression (HAM-D). The Cronbach's alpha for the total scale was 0.79 which is lower than in the studies from the United States (alpha coefficient = 0.79-0.89). However, its reliability was within the acceptable range. For a self-report instrument to be reliable, it is suggested that Cronbach's alpha be at least 0.70 (Streiner & Norman, 1995).

There were limited studies that have tested the validity and reliability of PHQ-8 in measuring depression since this questionnaire was recently implemented into the national survey approximately four years ago. One study by Pressler and her colleagues Pressler et al. (2010) that recently tested PHQ-8 for validity and reliability measuring depressive symptoms in heart failure patients. Pressler et al. (2010) administered PHQ-8 and the Living With Heart Failure

Questionnaire to 249 patients with chronic heart failure. The confirmatory factor analysis model reflected the emotional and somatic dimensions of depressive symptoms and displayed a good fit with the data. The χ^2 value of the PHQ-8 was 24.75 with 18 degrees of freedom ($P = .13$) and the goodness-of-fit index was 0.98. The PHQ-8 was significantly correlated with the total and subscale scores on the Living With Heart Failure Questionnaire ($P < .001$ for all correlations). The PHQ-8 internal consistency reliability (Cronbach alpha) was 0.82 which is within the acceptable range of measurement for reliability of a self-report instrument.

Substance Abuse and Mental Health Services Association (SAMHSA) and the national BRFSS initiated an agreement in 2005 to include the PHQ-8 in the data collection for calendar year 2006 and subsequently for calendar year 2008. The State of Hawaii participated in this project. The Centers for Disease Control and Prevention funded the Hawaii BRFSS to collect the PHQ-8 for both calendar years. Thus, the 2008 HBRFSS included the PHQ-8 questions. Kroenke and his colleagues (Kroenke, Strine, Spitzer, Williams, Berry, & Mokdad, 2009) assessed the PHQ-8 as depression measure in a large, epidemiological population-based study and determined the comparability of depression as defined by the PHQ-8 diagnostic algorithm versus a PHQ-8 cut point ≥ 10 . The prevalence of current depression was similar whether defined by the diagnostic algorithm or a PHQ-8 score ≥ 10 (9.1% vs. 8.6%). Depressed patients had substantially more days of impairment across multiple domains of health-related quality of life (HRQoL). The impairment was nearly identical in depressed groups defined by either method. Of the 17,040 respondents with a PHQ-8 score ≥ 10 , major depressive disorder was present in 49.7%, other depressive disorder in 23.9%, depressed mood or anhedonia in another 22.8%, and no evidence of depressive disorder or depressive symptoms in only 3.5%.

Independent Variables and Covariates

The main independent variables for this research study were current smoking, alcohol use and chronic illness (diabetes, cardiovascular disease and asthma) to determine their association with dependent variable, current depression. The association with age, race/ethnicity, sex, marital status, employment status, education level, healthcare access, life satisfaction and support system were considered as covariates in the data analysis to explore their relationship with current depression.

Alcohol Use

The extent of drinking was classified into three categories: non-drinker (no alcohol use in the past 30 days), binge drinker, and heavy drinker. Heavy drinking by definition is having more than two drinks per day for men and more than one per day for women. For men, binge drinking was defined as having 5 or more drinks on at least 1 occasion during the past 30 days. For women, binge drinking was defined as having 4 or more drinks on at least 1 occasion in the past 30 days (HBRFSS, 2009).

Smoking

Extent of smoking was also classified into three categories: nonsmoker, former smoker, and current smoker. Respondents were classified as current smokers if they reported having smoked 100 cigarettes or more during their lifetimes and acknowledged smoking everyday or some days. Respondents were classified as former smokers if they had smoked 100 cigarettes or more during their lifetimes but had not at all smoked in recent past.

Chronic Illness (Diabetes, Cardiovascular Disease and Asthma)

Chronic Illness was measured as a binomial variable, coded 1 for those with a chronic illness or disease and coded 2 for those without a chronic illness. The chronic illness indicator was derived from a set of questions relating to diabetes, asthma and cardiovascular disease such as stroke, heart attack and angina. These questions are as follows:

“Have you ever been told by a doctor that you have diabetes?” 1) Yes; 2) Yes, but female told only during pregnancy; 3) No; 4) No, pre-diabetes or borderline diabetes; 5) Don’t know / not sure; and 6) Refused,

“Has a doctor, nurse, or other health professionals ever told you that you had any of the following: (Ever told) heart attack also called a myocardial infarction? (Ever told) you had angina or coronary heart disease? (Ever told) you had a stroke? 1) Yes; 2) No; 3) Don’t know / not sure; and 4) Refused

“Have you ever been told by a doctor, nurse, or other health professional that you had asthma”? 1) Yes; 2) No; 3) Don’t know / not sure; and 4) Refused and “Do you still have asthma”? 1) Yes; 2) No; 3) Don’t know / not sure; and 4) Refused

A positive response (yes response) to any of the questions above categorized the respondent as having chronic illness. All other responses were considered as absence of chronic illness. Refusals to all the questions above were excluded in the analysis.

Individual Characteristics: Ethnicity/Culture; Age; Sex; Educational Level; Employment status, Health Plan, Life Satisfaction and Frequency of emotional support

For the purpose of this study, ethnicity/culture was identified as AA and PI. However, the subpopulation comprising the AAPI was disaggregated into Filipinos, Japanese, Chinese, and

Hawaiian/Part-Hawaiians for initial examination. The age group had six-level categories: a) 18-24; b) 25-34; c) 35-44; d) 45-54; e) 55-64; f) 65-99. This age grouping was used only in the univariate and bivariate analysis. Age was used as continuous variable in the multivariate analysis. Employment status was coded as employed for wages, self-employed, out of work 1 year or more, out of work less than 1 year, homemaker, student, retired, or unable to work. Education level was based on less than high school, high school graduate including GED recipients, some college and college graduates.

CHAPTER 4

RESULTS

The total sample for the study was 3,113. The mean age of the participants for this study was 51.5 years with more than one in four (26.1%) belonging to age 65 years or older. In addition, three out of five participants were female (60.6%). The majority of the participants identified themselves as AA (74.2%). The sample distribution by ethnic subgroups were: Japanese (1,273; 40.9%), Hawaiians/Part-Hawaiians (728; 23.4%), Filipinos (618; 19.9%) and Chinese (321; 10.3%).

The present study examined the prevalence and relationship of current depression, substance use (smoking and alcohol use), and chronic illness (diabetes, cardiovascular disease and asthma) among AAPI adults in Hawaii. Results of the analysis are presented in the two following sections.

The first section addresses Research Question 1 (RQ1) and Research Question 2 (RQ2) regarding the prevalence of current depression, substance use (smoking and alcohol use) and

chronic illness (diabetes, cardiovascular disease and asthma) among AAPI adults in Hawaii. Section one also address RQ2, significant differences in the prevalence of current depression, substance use, and chronic illness between AA and PI adults in Hawaii. The second section addresses RQ3 by identifying the results of multiple logistic regression analyses applying the cumulative logit model to examine the pattern of relationships between current depression, substance use, chronic illness and individual characteristics (culture, age, sex, employment status, educational level, marital status, support system, life satisfaction and health plan access). Additional variables such as health plan, life satisfaction and frequency of emotional support were added to explore other possible predictors for prevalence of current depression among AAPI adults in Hawaii.

The results for RQ1 and RQ2 were combined in the first section.

RQ1: What is the percentage of AAPI adults in Hawaii with current depression, substance use (smoking and alcohol use) and chronic illness (diabetes, cardiovascular disease and asthma)?

RQ 2: Are there significant differences in the prevalence of current depression, substance use, and chronic illnesses between AA and PI adults in Hawaii.

Prevalence of depression, substance use and chronic illness in AAPI adults, demographic of the two groups (AA and PI) and subgroups (Filipino, Japanese, Chinese, Hawaiians/Part-Hawaiians) are presented in Tables on below .

Table 4. Sample size used in the study by age, sex and ethnic groups.

Characteristics	Frequency	Percent
Age group		
18-24	205	6.6
25-34	332	10.7
35-44	537	17.3
45-54	653	21.0
55-64	573	18.4
>=65	813	26.12
Median age in years	51.5	
Sex		
male	1226	39.4
female	1887	60.6
Ethnic group		
AA	2309	74.2
Filipinos	618	19.9
Japanese	1273	40.9
Chinese	321	10.3
Other Asians	97	3.1
PI	804	25.8
Hawaiians/Part Hawaiians	728	23.4
Other PI	76	2.4
Total Sample	3113	100.0

As mentioned earlier, there were four levels of current depression identified for this study: (1) severe to moderately severe, (2) moderate, (3) mild and (4) no depression.

Current Depression

At least 23.9% of adult residents in Hawaii who participated in the 2008 HBRFSS had some form of depression. This ranged from mild depression to severe depression.

Approximately 16.5% of those who completed the PHQ-8 survey were identified with mild depression, almost 5% with moderate depression and approximately 3% with severe to

moderately severe depression. Looking at the ethnic group under consideration, the prevalence of current depression among PI was consistently higher than AA across the categories of depression and nearly twice at category severe and moderately severe (4.8% compared to 2.7%, $\chi^2(1, N=3113), p < 0.05$). Disaggregation of data for PI adults indicated that there was no significant difference in prevalence between Hawaiians and other Pacific Islanders. The same can be said for subgroups within AA. However, within AA, the Filipinos had the highest prevalence of depression across categories of depression in comparison to the rest of the AAs. (Table 5, Prevalence of Current Depression by severity and by AA and PI, HBRFSS 2008).

The following tables summarize the prevalence of current depression, substance use, and chronic illness by ethnicity and AAPI subpopulation.

Table 5. Prevalence of Current Depression by severity and by AA and PI, HBRFSS 2008

	<i>severe + moderately severe</i>	95% CI		<i>moderately</i>	95% CI		<i>mild</i>	95% CI		<i>Total</i>
		Lower Limit	Upper Limit		Lower Limit	Upper Limit		Lower Limit	Upper Limit	
State	2.7	2.2	3.3	4.7	4.0	5.6	16.5	15.1	17.9	23.9
AA	1.5	1.0	2.3	3.5	2.5	4.9	16.1	14.1	18.3	21.1
Filipinos	2.3	1.2	4.2	5.1	3.09	8.3	17.29	13.66	21.65	24.7
Japanese	1.1	0.6	2.0	3.35	1.98	5.63	14.48	12.05	17.3	18.9
Chinese	1.6	0.4	5.9	1.27	0.4	3.94	17.36	11.72	24.95	20.2
Other Asians	0.9	0.2	3.4	1.35	0.42	4.2	22.19	12.23	36.87	24.4
PI	4.8	3.1	7.2	6.4	4.4	9.2	17.6	14.0	21.8	28.7
Hawaiians	4.8	3.0	7.4	5.69	3.8	8.43	17.12	13.43	21.57	27.6
Other PI	4.7	1.5	13.8	10.39	4.23	23.34	20.13	10.85	34.29	35.2

Table 5 shows that AA prevalence for severe and moderately severe depression is the lowest and statistically significantly different from PI (1.5 vs. 4.8) and Non-AAPI (1.5 vs. 3.3). Filipinos were the most severely to moderately severely depressed (2.3%) among adults AA.

Substance Use (Alcohol)

At least 19.3% of adult residents in Hawaii who participated in the 2008 HBRFSS were alcohol drinkers. The extent of drinking was classified into three categories: non-drinker, binge drinker, and heavy drinker. The operational definitions of the three categories were explained in Chapter 3 under “Methods” on page 40. There were more binge drinkers (12.1%) and heavy and binge drinkers (5.7%) than heavy drinkers (1.5%).

Table 6 (Prevalence of Alcohol use by user type and by AA and PI, HBRFSS 2008) indicates the alcohol use of the AA and PI adults in 2008. It showed nearly 6% of adults in the state of Hawaii were heavy and binge drinkers with the PI’s more likely to belong to the category than AA’s (8.4 vs. 4.7). The prevalence of alcohol use was consistently higher among Hawaiians (heavy and binge drinking [7.1%] and binge drinking only [20.3%]) except under heavy drinking only category. Filipinos had the highest prevalence of heavy drinking only (2.3%) compared to Hawaiians (0.8%). Overall prevalence rates of alcohol drinkers in the state of Hawaii in AAPIs were highest among Hawaiians (28.2%) followed by Filipinos (20%).

Substance Use (Cigarette Smoking)

The extent of smoking was divided into three categories: nonsmoker, former smoker, and current smoker. Overall, nearly 41% of adult residents in the state of Hawaii who participated in the 2008 HBRFSS were cigarette smokers. However, only about 16% was current smokers at the time of the survey and the remaining 25% were former smokers (Table 7, Prevalence of Current and Former Smokers by AA and PI, HBRFSS 2008). The prevalence of current

smoking among the PI's was significantly higher than for the AA (22.0% compared to 13.9%). There was a slightly higher percentage of AA's than PI's who were former smokers (21.4% compared to 19.8%). Disaggregation of the AA group indicated that the percentage of Japanese who stopped smoking was significantly higher than any of the other Asian ethnic minorities.

Table 6. Prevalence of Alcohol use by user type and by AA and PI, HBRFSS 2008

	Heavy and binged drinker	95% CI		heavy drinker only	95% CI		binged drinker only	95% CI		Total
		Lower Limit	Upper Limit		Lower Limit	Upper Limit		Lower Limit	Upper Limit	
State	5.7	4.8	6.8	1.5	1.2	1.9	12.1	10.8	13.5	19.3
AA	4.7	3.6	6.2	1.3	0.8	1.9	9.5	7.9	11.5	15.5
Filipinos	6.1	3.7	10.0	2.3	1.2	4.2	11.6	8.2	16.0	20.0
Japanese	5.1	3.6	7.1	0.8	0.4	1.5	8.7	6.6	11.4	14.6
Chinese	1.4	0.6	3.4	0.5	0.2	1.6	7.2	4.3	11.8	9.1
Other Asians	2.3	0.4	11.2	2.3	0.6	7.9	11.9	6.0	22.0	16.5
PI	8.4	5.8	12.0	0.9	0.4	2.0	19.3	14.9	24.6	28.5
Hawaiians	7.1	4.7	10.5	0.8	0.3	2.0	20.3	15.4	26.2	28.2
Other PI	15.6	6.8	32.1	1.3	0.2	9.0	13.5	6.4	26.4	30.4

Table 6 shows the alcohol use of the AA and PI adults in 2008. It showed nearly 6% of adults in the state are heavy and binged drinkers with the PI's more likely to belong to the category than AA's (8.4% vs. 4.7%). Binged drinking prevalence is statistically significantly higher among PI than AA (19.3% vs. 9.5%). However, disaggregation of both groups indicates that the prevalence of binged drinking among Filipinos is not statistically different from the Hawaiians. Note, that there are only very few heavy alcohol drinkers (1.5%)

Table 7. Prevalence of Current and Former Smokers by AA and PI, HBRFSS 2008

	<i>Current smokers</i>	95% CI		<i>Former smokers</i>	95% CI		Total
		Lower Limit	Upper Limit		Lower Limit	Upper Limit	
State	15.7	14.3	17.1	24.9	23.5	26.4	40.6
AA	13.9	11.9	16.2	21.4	19.3	23.7	35.3
Filipinos	19.0	14.5	24.5	16.7	12.9	21.3	35.7
Japanese	12.5	10.2	15.2	25.8	22.9	29.0	38.3
Chinese	7.7	4.3	13.4	17.0	12.7	22.4	24.7
Other Asians	15.9	8.1	28.9	17.3	10.4	27.3	33.2
PI	22.0	18.1	26.4	19.8	16.5	23.6	41.8
Hawaiians	21.1	17.2	25.7	21.3	17.6	25.5	42.4
Other PI	26.9	15.5	42.5	11.3	6.0	20.3	38.2

Table 7 shows the percentage of adults who are current smokers or former smokers. Nearly 41% adults in the state have smoked. However, only about 16% are current smokers at the time of the survey and the remaining 26% are former smokers. The prevalence of current smoking among the PI's is statistically significantly higher than the AA (22.0% vs. 15.7%). There is slightly higher percentage of AA's than PI's who are former smokers (21.4% vs. 19.8%). Disaggregation of the AA group showed that the percentage of Japanese who stopped smoking is significantly higher than any of the Asian ethnic minorities.

Chronic Illness (Diabetes, Cardiovascular Disease and Asthma)

About one in five adults had a chronic illnesses (20.6%). These included cardiovascular related conditions (6.0%) such as stroke, heart attack or angina, diabetes (7.7%), or current asthma (9.8%). When the AA group prevalence was disaggregated, the percentage of Chinese with overall prevalence of chronic illness was the highest (22.9%) compared to the other AA subpopulation. Hawaiians had the highest prevalence of chronic illness (24.5%) in particular for CVD and current asthma compared to other subpopulation. Filipinos had the highest prevalence of diabetes among the AAPI subpopulation.

Table 8. Prevalence of Chronic Illness by AA and PI, HBRFSS 2008

	<i>With Chronic Illnes</i>	95% CI		<i>CVD</i>	95% CI		<i>Diabetes</i>	95% CI		<i>Current asthma</i>	95% CI	
		Lower Limit	Upper Limit		Lower Limit	Upper Limit		Lower Limit	Upper Limit		Lower Limit	Upper Limit
State	20.6	19.2	22.0	6.0	5.3	6.8	7.7	6.9	8.6	9.8	8.7	11.0
AA	20.8	18.7	23.1	5.3	4.4	6.4	9.4	8.1	10.9	8.5	7.0	10.4
Filipinos	21.3	17.2	26.1	4.8	3.2	7.1	11.3	8.5	14.8	8.2	5.4	12.2
Japanese	20.2	17.5	23.2	5.7	4.4	7.3	8.7	7.1	10.6	7.8	5.9	10.3
Chinese	22.9	17.9	28.8	6.0	3.6	9.8	10.3	7.1	14.8	10.5	7.0	15.4
Other Asians	17.3	9.2	30.3	2.2	0.8	5.8	3.4	1.4	8.0	11.7	4.8	26.1
PI	22.8	19.0	27.1	5.6	3.8	8.3	9.6	7.3	12.5	13.0	10.1	16.7
Hawaiians	24.5	20.4	29.2	5.9	4.0	8.6	9.9	7.4	13.0	14.9	11.5	19.1
Other PI	12.7	5.6	26.3	4.1	0.7	20.6	7.9	3.0	19.1	2.5	0.7	8.3

About one in five adults have chronic illness (20.6%). These chronic illness may be either cardiovascular related conditions (6.0%) such as stroke, heart attack or angina. It can also be diabetes (7.7%) or current asthma (9.8%).

Prevalence of Current Depression, Substance Use and Chronic Illness Between AA and PI Adults in Hawaii

The results of this study identified that there were statistically significant differences in the prevalence of current depression between AA and PI adults in the severe and moderately severe depression category (4.8% compared to 2.7%, $\chi^2(1, N = 3113), p < 0.05$). However, there were no significant differences between AA and PI adults in moderate or mild depression categories.

One in every five Hawaii adult residents in 2008 were alcohol drinkers. PI adults were nearly twice as likely to be alcohol drinkers compared to AA adults (28.5% vs 15.5%). However, when data were disaggregated into AAPI subpopulation, Filipinos had the highest prevalence of heavy drinking only (2.3%) compared to Hawaiians (0.8%), Japanese (0.8%) and Chinese (0.5%) adults (Table 6).

In 2008, more Hawaii residents were former smokers compared to those who were current smokers (24.9% vs 15.7%). Japanese adults had the highest prevalence rates of former smokers compared to other AAPI subpopulation. Hawaiians were the highest current smokers (21.1%). Almost one out of five Hawaiians were current smokers. There was a statistically significant difference in the prevalence of current smoking between AA and PI adults in Hawaii, $\chi^2(1, N=3113) = 4.49, p < 0.05$.

About one in every five adults in Hawaii had a chronic illness in 2008. There were no significant difference in prevalence of chronic illness between AA and PI. However in looking at the three selected chronic illness, Filipinos had the highest prevalence of diabetes (11.3%)

compared to Hawaiians (9.9%), Chinese (10.3%) and Japanese (8.7%). PI adults had significantly more cases of current asthma compared to AA adults (13% vs 8.5%). Hawaiians had the highest rate of current asthma (14.9%) compared to Chinese (10.5%), Filipinos (8.2%) and Japanese (7.8%). $\chi^2 (1, N = 3113, 3.28), p < 0.05$. (see Table 8).

Results of Exploratory Logistic Regression Analyses

Tables 9-10

Table 9. ANOVA for the adult population AAPI, AA and PI displaying all the model terms.

Contrast	Degrees of Freedom	AAPI		AA		PI	
		Wald F	P-value Wald F	Wald F	P-value Wald F	Wald F	P-value Wald F
OVERALL MODEL	30	41.12	0	32.63	0	10.91	0
MODEL MINUS INTERCEPT	27	12.25	0	7.43	0	6.69	0
EXTENT OF ALCOHOL USE	3	0.46	0.71	0.05	0.98	1.28	0.27
SMOKING	2	6.19	*0.00	2.55	0.07	10.01	*0.00
CHRONIC ILLNESS	1	12.28	*0.00	2.15	0.14	16.68	*0.00
SEX	1	16.04	*0.00	6.5	*0.01	13.6	*0.00
LEVEL OF EDUCATION	3	3.69	*0.01	2.22	0.08	0.78	0.50
EMPLOYMENT	5	4.62	*0.00	2.97	*0.01	2.08	0.06
MARITAL STATUS	5	0.93	0.46	0.37	0.86	1.4	0.22
FREQUENCY OF EMOTIONAL SUPPORT	4	9.26	*0.00	5.32	*0.00	6.38	*0.00
LIFE SATISFACTION	1	82.6	*0.00	46.72	*0.00	49.08	*0.00
HEALTH CARE COVERAGE	1	5.89	*0.00	5.36	*0.02	0.01	0.93
AGE	1	17.04	*0.00	11.67	*0.00	5.6	*0.01

*Significant at p value < 0.05.

Shaded results indicate the change from significance for AAPI combined to non-significance when disaggregated.

Note: Multiple logistic regression applying the cumulative logit as link function. Variance Estimation Method: Taylor Series (WR); SE Method: Robust (Binder, 1983); Working Correlations: Independent; Link Function: Cumulative Logit; Response variable MARDEP: severe + mod sev=1, mod=2, mild=3, none=4 depression

Table 10. Adjusted Odds Ratio (AOR) for AAPI, AA only and PI only.

CURRENT DEPRESSION Independent Variables and Effects	AAPI			AA			PI		
	AOR	Lower 95% Limit	Upper 95% Limit	AOR	Lower 95% Limit	Upper 95% Limit	AOR	Lower 95% Limit	Upper 95% Limit
CURRENT DEPRESSION,									
Intercept 1:									
severe + moderately									
severe	0.01	0.01	0.02	0.01	0	0.02	0.01	0	0.05
Intercept 2: moderate	0.04	0.02	0.09	0.04	0.02	0.09	0.05	0.01	0.19
Intercept 3: mild	0.25	0.12	0.53	0.27	0.11	0.64	0.23	0.06	0.83
EXTENT of ALCOHOL USE									
Binged & heavy drinking	0.93	0.52	1.65	0.95	0.45	2.01	0.82	0.29	2.31
Heavy drinker only	1.69	0.68	4.23	1.16	0.38	3.53	6.78	0.88	52.09
Binged drinker only	1.01	0.64	1.59	0.92	0.49	1.73	1.13	0.57	2.23
Not a drinker	1	1	1	1	1	1	1	1	1
SMOKING									
Current	1.78	1.24	2.55	1.16	0.71	1.9	3.45	1.94	6.13
Former	1.47	1.06	2.02	1.57	1.06	2.32	1.06	0.6	1.86
Never	1	1	1	1	1	1	1	1	1
CHRONIC ILLNESS									
With chronic illness	1.65	1.25	2.18	1.31	0.91	1.89	2.61	1.65	4.13

	None	1	1	1	1	1	1	1	1	1
SEX	Male	1	1	1	1	1	1	1	1	1
	Female	1.9	1.39	2.61	1.67	1.13	2.47	2.81	1.62	4.86
LEVEL OF EDUCATION										
	lower than 12th grade	2.21	1.25	3.91	1.95	0.91	4.21	1.81	0.71	4.63
	12th grade/GED	1.57	1.13	2.18	1.47	0.99	2.18	1.56	0.8	3.04
	1-3 years college	1.42	1.01	2	1.52	1.03	2.23	1.2	0.61	2.36
	4 or more years college	1	1	1	1	1	1	1	1	1
EMPLOYMENT										
	Employed	1	1	1	1	1	1	1	1	1
	Out of work	1.09	0.63	1.88	1.1	0.56	2.16	1.4	0.63	3.1
	A Homemaker	1.21	0.75	1.96	1.69	0.97	2.95	0.64	0.27	1.5
	A Student	0.66	0.34	1.26	0.67	0.31	1.42	0.65	0.14	2.95
	Retired	0.8	0.51	1.24	0.87	0.53	1.43	0.56	0.23	1.39
	Unable to work	4.06	2.14	7.69	4.72	1.72	12.94	3.13	1.31	7.48
MARITAL STATUS										
	Married	1	1	1	1	1	1	1	1	1
	Divorced	0.81	0.51	1.28	0.89	0.53	1.51	0.64	0.25	1.64
	Widowed	1.27	0.76	2.1	1.07	0.58	1.97	1.82	0.71	4.67
	Separated	1.46	0.63	3.38	1.83	0.66	5.07	0.56	0.2	1.54
	Never married	0.8	0.54	1.18	1	0.63	1.58	0.56	0.29	1.08
	Live-in	0.65	0.3	1.45	1.26	0.42	3.79	0.37	0.12	1.16
FREQUENCY OF EMOTIONAL SUPPORT RECEIVED WHEN NEEDED										
	Always	1	1	1	1	1	1	1	1	1
	Usually	1.22	0.86	1.72	1.3	0.85	1.99	0.85	0.47	1.56
	Sometimes	2.44	1.71	3.47	2.01	1.3	3.1	3.61	1.92	6.79
	Rarely	3.39	1.98	5.8	3.7	1.96	7	3.07	1.05	9
	Never	1.2	0.73	1.96	1.44	0.82	2.52	0.84	0.32	2.24

LIFE SATISFACTION									
very satisfied/satisfied	1	1	1	1	1	1	1	1	1
dissatisfied/very dissatisfied	8.96	5.58	14.38	8.62	4.65	15.99	12.78	6.26	26.06
HEALTH CARE COVERAGE									
With health care	1	1	1	1	1	1	1	1	1
None	1.89	1.13	3.17	2.27	1.13	4.56	1.03	0.49	2.16
AGE IN YEARS	0.97	0.96	0.99	0.98	0.96	0.99	0.97	0.95	1

RQ3: Is there a relationship among individual characteristics (culture, age, sex, marital status, employment, educational level, support system, life satisfaction and healthcare access), current depression, substance use and chronic illness?

Pattern of Relationships between Current Depression, Substance use, Chronic illness and Individual Characteristics

Results of multiple logistic regression model cumulative logit to address this question and are presented in Table 9 with the significant findings of all model terms. The WALD F test was used to evaluate these effects. The overall multiple logistic regression had 30 degrees of freedom. The overall Wald F $p < 0.05$ of AAPI, AA, and PI were less than alpha level of 0.05 for the population under study. However, not all the terms had significant effect. For example, the AAPI, smoking chronic illness, sex, education completed, employment status, frequency of emotional support, life satisfaction, health care coverage and age had significant contributions to the model. However, disaggregation of AA and PI revealed that these independent variables differ in significance. For instance, smoking and chronic illness covariates did not contribute significantly to the regression model for the AA. Similarly employment status and health care coverage did not contribute to the PI's regression model. Education was a significant contributor of current depression for AAPI with $\rho < 0.05$.

When disaggregated to AA and PI, education was not a significant contributor. The extent of alcohol use was not found to be associated with current depression. Similarly, marital status did not have an effect on current depression.

A more detailed examination of the model regression results was conducted with the adjusted odds ratios (AOR). The AOR and 95% confidence limits for each regression coefficient in the model is in Table 10. After controlling for all the terms in the model, current smoking present an odds of 1.78 for depression with and 95% confidence limits of 1.24 – 2.55 in the AAPI. Similarly, former smoking also present a significant odds for depression (AOR=1.47, 95% CI=1.06 – 2.02). However, when AAPI was disaggregated to AA and PI, the current smoking AOR value was significant only for PI (AOR=3.45, 95%CI=1.93 – 6.13). On the other hand, for the AA, the odds for depression among current smoker was insignificant (AOR =1.16, 95%CI=0.71 – 1.9), but the odds for depression among former smoker was significant (AOR=1.57, 95%CI =1.06 – 2.32).

The effect of having a chronic illness was significant only for the PI (AOR=2.61, 95% CI =1.65 – 4.13). In other words, the PI's with chronic illnesses were more than twice as likely to have current depression as PI's without chronic illnesses. This was not the case for the AA's (AOR =1.31, 95% CI =0.91 – 1.89). The very high AOR for the PI gave a net effect of 1.65 AOR for the combine group AAPI with 95% CI of 1.25 - 2.18. As mentioned earlier, odds ratios are deemed statistically significant if 95% confidence interval for the related odds ration does not include the value 1.00 (Tabanick & Fidell, 2007). Since the 95% CI for AA include the value 1.00, it means that there is no significant difference in the likelihood of current depression between AA with chronic illness and those without. However, when AAPI were combined as group, the results indicate that AAPI with chronic illness were 2.18 times more likely to have current depression compared to AAPI without chronic illness.

Number of years of education completed did not result in significant contribution to AA and PI as a separate group; but for the combined group AAPI its contribution to the model was significant. For the AAPI, the AOR value diminished towards 1 as the level of education completed increases. This means AAPI adults with lower level of education completed were more likely to have current depression than AAPI adults with four or more years of college education. For the separate AA and PI group, the same pattern emerged but the 95% CI for every level included the value 1, with the AA's 95% CI lower limits closer to 1 than the PI's (For example: 1-3 years college: AOR 1.52, 1.03-2.23 for AA compared to AOR 1.20, 0.61-2.36 for PI) (see Table 10).

Employment status was significantly associated with current depression. However, when AAPI was disaggregated to AA and PI, employment status was significant only in the AA group and not in the PI group. Looking in detail at the odds ratio, the AOR for current depression was four times more likely for AAPI who are unable to work than AAPI who are employed (AOR=4.06, 95% CI =2.14 – 7.69). This result holds for the AA and PI group.

Similar to education level completed, marital status did not contribute significantly to the model for all groups, AAPI, AA and PI. Although not significant, the AORs for current depression for widowed in the combined AAPI as well as the AA and PI were above one (1.27, 1.07, and 1.82 respectively). The absence of significance may be attributed to the small sample size for these categories.

Frequency of emotional support received when needed was significantly associated with current depression. The AORs' for the categories 'sometimes' and 'rarely' were all above one

and the 95% CI did not include the value one for the combined AAPI and separated as AA and PI. AAPI adults who rarely received emotional support when needed were more than three times more likely to have current depression than those who always received emotional support. Even those who sometimes received emotional support when needed were more than twice likely to have current depression than those who always received emotional support. On the other hand, the 'never' category frequency of emotional support AOR was insignificant, meaning the adult who never received emotional support when needed has similar odds for depression as those who always received emotional support.

Life satisfaction was strongly associated with current depression. The AOR for AAPI adults who were dissatisfied or very dissatisfied with life was nearly 9 (AOR=8.96, 95% CI =5.58 – 14.38) relative to those who were satisfied to very satisfied with life. The odds for current depression among dissatisfied to very dissatisfied adults were higher for the PIs' than the AAs' (12.78 vs. 8.62) but not statistically significantly higher.

Health care coverage was strongly associated with the model for AAPI. However, when separated as AA and PI, health care coverage was significantly associated with depression in the AA group (AOR = 2.27, 95% CI =1.13 – 4.56) but not in the PI group (AOR=1.03, 95% CI= 0.49 to 2.16). The odds for current depression were more than twice for AAs' without health care coverage compared to AAs' who have health care coverage. For the PI group, the presence or absence of health care coverage had no significant effect on their depression state.

Age did not relate to the cause of any disease or illness. However, age was an important risk marker. Overall, for the AAPI, the odds for current depression decreased as age advances

(AOR=0.97, 95% CI=0.96 – 0.99). A similar statement can be said for the AA group. However, the PI group results showed non-significant or weak contribution due to age (AOR=0.97, 95% CI=0.95 – 1.0). The age WALD F p-value for the PI group indicate significance of 0.018. The seeming contradiction may be attributed to small cell sample size (Note: This was evident when the 2006 and 2008 HBRFSS data were combined and the same regression model was applied).

DISCUSSION

Despite the fact that AAPI population continues to be one of the fastest growing populations in the United States, AAPI health and mental health concerns have historically been a low priority. Debilitating stereotypes, such as the “model minority” myth continue to limit identification of key health and mental health challenges and social programs for this community. AAPI are often treated as one large undifferentiated group. The aggregate information indicate that AAPI’s, as a group, are doing well. This practice ignores the diversity within the AAPI population and masks the very real challenges that some AAPI subgroups face; using aggregate information makes identifying actual differences in health and mental health of these subgroups impossible.

The results of this research study demonstrate the importance of data disaggregation. The prevalence of current depression that was classified as severe and moderately severe depression was higher in PI adults (4.8%) compared to AA adults (1.5%). Using the same data and with presentation of disaggregated data by AAPI subpopulation, Hawaiians/Part-Hawaiians have the highest prevalence of severely to moderately severe depression among the AAPI subpopulation at 4.8%. This information is vital in focusing on the specific subpopulation for timely and appropriate healthcare interventions.

Epstein and his colleagues found that heavy alcohol use and smoking are associated with current depression in California (Epstein, Induni & Wilson, 2009). In their results, the association between depression and smoking and between depression and heavy drinking persisted even after controlling for confounding variables and examining interactions for

smoking and alcohol use. Unlike Epstein study, this current research using the 2008 HBRFSS did not show significant association of alcohol use and current depression even after controlling for the independent variables considered ($p = 0.91$) among AAPI adults and subpopulations. The lack of association for alcohol use and current depression may be attributed to under reporting of alcohol use or under coverage of population that traditionally are more likely to use alcohol such as the young adults. It may also be that alcohol was not the substance of choice since it may not be economical compared to cigarette smoking.

Similarly, using the PHQ-8 questions in the 2006 Florida BRFSS to arrive at estimate of current depression, Fan and her colleagues (Fan et al., 2009) also found that people in Florida during calendar year 2006 who were depressed were often current smokers than were people without depression. The AAPI population was not specifically identified but combined with non-hispanic, American Indian/Alaska Native and multiracial groups.

Pratt and Brody (2010) analyzed the prevalence of depression and smoking in the U.S. household population aged 20 and over during calendar years 2005 to 2008. The results revealed persons with depression had higher rates of cardiovascular disease and diabetes and more risk behaviors for these diseases, such as smoking, poor diet, or lack of exercise, than person without depression. Adults with depression were more likely to be current smokers than those without depression.

In comparison, the result of this study also identified that smoking and chronic illness such as cardiovascular disease, and diabetes showed significant relationships with current depression among AAPI. In addition, this study has disaggregated data within and between AAPI

subpopulation. After controlling for all the terms in the model for the Hawaii study (which is this study), AAPIs in 2008 who were both current smokers and former smokers had significant odds for having current depression relative to never smokers. However, when AAPI was disaggregated into AA and PI, current smoking was significant only for PIs while former smoking was significant only for AAs. This means that PIs who were current smokers in 2008 were more likely to have current depression compared to those who were former smokers and did not smoke. On the other hand, former AA smokers were more likely to have current depression compared to AAs who were current smokers or AAs who never smoked. AAs were more likely depressed when they stopped smoking while PIs who were smoking in 2008 were more likely depressed compared to PIs who were former smokers.

These differences may be attributed to cultural differences or to the inherent characteristics of the sample and sample size. Recall that quitting smoking is associated with increasing age and that AAs in this study were older than the PIs and far outnumber the PIs by a ratio of nearly 3 to 1 (Science Daily, 2007). The results suggest that experience of smoking may be a risk factor for depression or vice versa. This finding is peculiar to this study since recent study using PHQ-8 only examined current smokers with the combine former and never smoked as one referent group in the logistic analysis and in the bivariate analysis.

Fan and her colleagues (Fan et al., 2009) also found that people in Florida during calendar year 2006 who were depressed were more often current smokers than were people without depression. In addition, Fan et al., found that current depression was independently associated

with socio demographic variables (being a woman, young, previously married or never married, or unemployed or unable to work). This current study also found that sex was associated with current depression, with Hawaii AAPI women being nearly twice as likely to have current depression compared to AAPI men.

Marital status can be viewed as an economic proxy or social support variable. Compared to the Florida study, this Hawaii study did not show marital status as having a significant relationship to the prevalence of current depression. A more direct question relevant to social support is the frequency of emotional support. In this study it was found that the frequency of emotional support received when needed was significantly associated with current depression in general. However, when analyzed by subcategories: always, usually, sometimes, rarely and never, those who never received the emotional support when needed were less likely to be depressed compared to those who sometimes or rarely received the support. Perhaps those who never received the emotional support when needed were not anticipating any support and not receiving the support did not matter. However, those who sometimes or rarely receive the support were approximately three and a half times more likely to be depressed compared to those who always receive the emotional support when needed (Table 10).

A similar study corroborated the association between social support and depression (Chi & Chou, 2001). A representative community sample of 1106 Chinese people in Hong Kong was included in the study. Significant bivariate relationships were found between depression and all dimensions of social support including social network size, network composition, social contact frequency, satisfaction of social support, instrumental/emotional support, and helping others.

The authors found that social support from family and satisfaction with support is a more important predictor of depression levels than other objective measures of network relationships.

Social economic status may be measured by level of education completed, employment status and health care access. For the current study, the level of education completed showed a significant relationship with current depression for the combined AAPI but did not have a significant contribution to AA and PI as a separate group. Similar to the Florida results, the inability to work exhibited a very strong association with current depression among AAPI adults as shown with AOR of 4.06 and was also significantly associated in the subgroups AA and PI relative to those who were employed. It appears that depression is present when one is unable to work. Alternatively, depression in itself may be the cause of being unable to work.

Unfortunately, the nature of the BRFSS data as a cross-sectional survey and the correlational nature of the analysis does not lend itself in demonstrating causality. Health care access and utilization was strongly associated with the model for AAPI. However, when separated into AA and PI groups, health care was significantly associated with depression in AA but not in PI group. Kanazawa (Kanazawa et al., 2007) and her colleagues had similar findings during their study of European Americans (EA), Japanese Americans (JA) and Hawaiian Americans (HA). The authors found no significant differences in the healthcare utilization between depressed EA and HA but depressed JA still reported less mental health care usage than EA and HA.

Age was analyzed as nominal data in the Fan et al study. According to their findings, current depression was most common in people aged 50 to 59 years (13.5%) and least common among people aged 60 or older (5.6%). In contrast to Fan et al.,'s (2009) study, looked at age as a

continuous variable. Similar to their findings, the prevalence of current depression declined with advanced age after controlling for other independent variables included in the study. However, the pattern was not as clear when AAPI was disaggregated into AA and PI. Age effect was strongly associated in the AA subgroup but not so in the PI subgroup. This may be due to the small sample size for individual subpopulation given that the AA to PI sample size had approximate ratio of 3 to 1 as mentioned earlier.

A variable that was not found in any previous study but included in this study is life satisfaction. A review of the literature indicated that individuals with emotional or mental health problems are likely to be dissatisfied with life (Goldberg et al., 2007; Jackson et al., 2007; Lee, 2007; Mancuso et al., 2000). The results of this study confirm that belief. However, it can also be assumed that the presence of chronic illness along with being unable to work may be contributory factors for being dissatisfied with life. All of these factors were found to have significant association to current depression.

Caution must be observed in interpreting these results. Because of the small sample sizes of some subgroups (other AA = 97; other PI = 76), estimates of ORs by different levels of the independent variables may be unstable. This is best exemplified by the age variable where age is strongly associated with AA both in the AOR and Wald F p-value. However, in the PI, age indicated significant contribution indicated by the Wald F p-value but insignificant result for the AOR. Furthermore, because this is a cross-sectional survey, these results do not indicate whether smoking and drinking cause depression or whether depression causes people to smoke and drink. The results from this study demonstrate relationships, not causality between the

variables: current depression, substance use, chronic illness and AAPI ancestry as illustrated with straight lines on Diagram A (page 27).

In summary, this study found significant differences in prevalence of current depression, substance use and chronic illness between AA and PI adults in Hawaii during calendar year 2008. Most of the results were similar to other studies in literature. Exploration of available variables from 2008 HBFRSS survey may enhance the contribution of the results of this study for future nursing practice and research.

Limitations

This research study is limited in that the BRFSS data is from a cross-sectional survey, thus, no causation or cause effect can be concluded, only association between variables. Data were collected from non-institutionalized adult residents with landline telephones. Thus, the information deduced from BRFSS may not be generalized to the homeless, people who use cell phones exclusively, or those residing in institutions such as residential treatment centers, jails, shelters, and hospitals, where mental disorders are more prevalent. The HBRFSS implemented cell-phone surveys in 2009 to supplement the regular landline survey. In addition, the prevalence estimate may be underestimated because not all the randomly selected adult respondents were able to participate due to language barrier (non-English speaking), absence during the interviewing period, had health problems during the interviewing period; and certain population groups are small and may not have been sampled, or an insufficient number participated to achieve a stable estimate. The information from this survey was self-reported in a telephone survey. The bias caused by inaccurate recall or self-denial could not be assessed.

Implications for Practice and Research

The result of this descriptive correlational cross-sectional study could serve as a guide for development of culturally sensitive interventions that will effectively improve assessment of early signs of depression in Asian American and Pacific Islander population with chronic illness and substance use. Patterns of relationships between current depression, substance use, chronic illness and individual characteristics from this study showed significant differences between AA and PI subpopulation. This study described disaggregated information used to identify the specific subpopulation with high prevalence of current depression, substance use and chronic illness and identified the challenges that some AAPI subgroups face. Better understanding of cultural differences with respect to the concept of depression, beliefs and practices among AAPIs may contribute to the development of a standard process in the assessment of early signs of depression for this population.

Sha and her colleagues (2007) developed a Chicago Chinatown Community Health Survey as a model for gathering local level data in Asian Communities and beyond. The population level data about AAPIs particularly Asian subgroups were limited. To gather such disaggregated data about an Asian subgroup in Chicago, community members and stakeholders developed the first ever community based Chicago Chinatown Community Health Survey. The survey was administered face-to-face in Mandarin, Cantonese, or English. Perhaps a similar initiative can be developed to improve our data in the State of Hawaii can be developed in the future, if this has not been initiated.

There is a need for improved data collection of information and knowledge as healthcare professionals shared common understanding and awareness on significant sub-cultural differences among AAPI (Kagawa-Singer & Ong, 2005). It is imperative that sufficient sample size be gathered if data is to be disaggregated. Given the cost associated with data collection and large sample size, an alternative solution is to combine years of data such as three years of data collected in the same manner. Aggregating AAPIs together without detailed breakdowns not only hides the diversity of the population but also prevents severely disadvantaged AAPI groups from getting the attention and resources needed to address their medical and mental health problems. Findings from this study may encourage researchers to address current studies and revisit previous studies, consider disaggregating their statistical data to reflect the true diversity of AAPI population and appropriately identify the needs of disadvantaged subgroups.

Hawaii has limited community resources for mentally ill patients with chronic co-morbidities such as diabetes, heart disease and respiratory conditions. Long term self-management of these co-morbidities is not possible when it involves mental illnesses that were not properly and timely addressed such as depression. The cost for medical and mental health care will continue to increase as we have increasing and unidentified prevalence of depression in individuals with physical chronic illness and substance use.

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APPENDIX A

2008 Hawaii BRFSS Survey Questions Relevant to the Analysis

Section 1: Health Status

1.1 Would you say that in general your health is---

Please read:

- 1 Excellent
- 2 Very Good
- 3 Good
- 4 Fair

Or

- 5 Poor

Do not read:

- 7 Don't know / Not sure
- 9 refused

Section 3: Health Care Access

3.1 Do you have any kind of health care coverage, including health insurance, Prepaid plans such as HMOs, or government plans such as Medicare?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

3.2 Was there a time in the past 12 months when you needed to see a doctor but could not because of cost?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

Section 5: Diabetes

5.1 Have you ever been told by a doctor that you have diabetes?

If “Yes” and respondent is female, ask: “Was this only when you were pregnant?”

If responded says pre-diabetes or borderline diabetes, use response code 4.

- 1 Yes
- 2 Yes, but female told only during pregnancy
- 3 No
- 4 No, pre-diabetes or borderline diabetes
- 7 Don't know / Not sure
- 9 Refused

Section 8: Cardiovascular Disease Prevalence

Now I would like to ask you some questions about cardiovascular disease.

Has a doctor, nurse, or other health professionals EVER told you that you had any of the following? For each, tell me “Yes”, “No”, or you're “Not sure.”

8.1 (Ever told) you had a heart attack, also called a myocardial infarctions?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

8.2 (Ever told) you had angina or coronary heart disease?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

8.3 (Ever told) you had a stroke?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

Section 9: Asthma

9.1 Have you ever been told by a doctor, nurse, or other health professional that you had asthma?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

9.2 Do you still have asthma?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

Section 11: Tobacco Use

11.1 Have you smoked at least 100 cigarettes in your entire life?

NOTE: 5 packs = 100 cigarettes

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 8 Refused

11.2 Do you now smoke cigarettes every day, some days, or not at all?

- 1 Every day
- 2 Some days
- 3 Not at all
- 7 Don't know / Not sure
- 8 Refused

Section 12: Demographics

12.1 What is your age?

- Code age in years
- 0 7 Don't know / Not sure
- 0 9 Refused

12.2 Are you Hispanic or Latino?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 9 Refused

12.5 Are you...?

Please read:

- 1 Married
- 2 Divorced
- 3 Widowed
- 4 Separated
- 5 Never married

Or

- 6 A member of an unmarried couple

Do not read:

- 9 Refused

12.6 What is the highest grade or year of school you completed?

Read only if necessary:

- 1 Never attended school or only attended kindergarten
- 2 Grades 1 through 8 (Elementary)
- 3 Grades 9 through 11 (Some high school)
- 4 Grade 12 or GED (High school graduate)
- 5 College 1 year to 3 years (Some college or technical school)
- 6 College 4 years or more (College graduate)

Do not read:

- 9 Refused

12.7 Are you currently...?

Please read:

- 1 Employed for wages
- 2 Self-employed
- 3 Out of work for more than 1 year
- 4 Out of work for less than 1 year

- 5 A Homemaker
- 6 A Student
- 7 Retired

Or

- 8 Unable to work

Do not read:

- 9 Refused

12.8 Indicate sex of respondent. Ask only if necessary.

- 1 Male
- 2 Female [If respondent is 45 years old or older, go to next Section]

Section 13: Alcohol Consumption

13.1 During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?

- 1 Yes
- 2 No
- 7 Don't know / Not sure
- 8 Refused

13.2 During the past 30 days, how many days per week or per month did you Have at least one drink of any alcoholic beverage?

- 1 ___ Days per week
- 2 ___ Days in past 30 days
- 8 8 8 No drinks in past 30 days [Go to next section]
- 7 7 7 Don't know / Not sure
- 9 9 9 Refused

13.3 One drink is equivalent to a 12-ounce beer, a 5-ounce glass of wine, or a Drink with one shot of liquor. During the past 30 days, on the days when you drank, about how many drinks did you drink on the average?

— — Number of drinks
7 7 Don't know / Not sure
9 9 Refused

13.4 Considering all types of alcoholic beverages, how many times during the past 30 days did you have X [CATI X = 5 for men, X = 4 for women] or more drinks on an occasion?

— — Number of times
8 8 None
7 7 Don't know / Not sure
9 9 Refused

13.5 During the past 30 days, what is the largest number of drinks you had on any occasion?

— — Number of drinks
7 7 Don't know / Not sure
9 9 Refused

Section 19: Emotional Support and Life Satisfaction

The next two questions are about emotional support and your satisfaction with life.

19.1 How often do you get the social and emotional support you need?

INTERVIEW NOTE: If asked, say “please include support from any source”.

Please read:

1 Always
2 Usually
3 Sometimes
4 Rarely
5 Never

Do not read:

7 Don't know / Not sure
9 Refused

19.2 In general, how satisfied are you with your life?

Please read:

- 1 Very satisfied
- 2 Satisfied
- 3 Dissatisfied
- 4 Very dissatisfied

Do not read:

- 7 Don't know / Not sure
- 9 Refused

SAQ4. Which one of these groups would you say represents your ethnicity? You can mention up to six.

Please read

- 1 Caucasian (includes European, German, Irish, Italian, English)
- 2 Hawaiian
- 3 Chinese
- 4 Filipino
- 5 Japanese
- 6 Korean
- 7 Samoan
- 8 Black
- 9 American Indian / Alaska Native / Eskimo / Inuit
- 10 Vietnamese
- 11 Asian Indian
- 12 Portuguese
- 13 Guamanian / Chamorro
- 14 Puerto Rican
- 15 Mexican
- 16 Tongan
- 17 Laotian
- 18 Cambodian
- 19 Malaysian
- 20 Fijian
- 21 Micronesian
- 22 Other Asian (specify)
- 23 Other (specify)

Do not read

- 24 Don't know / Not sure
- 25 Refuse

26 No additional choices

SAQ5. Ask only if more than one answer in SAQ4. Which one of these groups would you say best represents your ethnicity?

Please read

- 1 Caucasian (includes European, German, Irish, Italian, English)
- 2 Hawaiian
- 3 Chinese
- 4 Filipino
- 5 Japanese
- 6 Korean
- 7 Samoan
- 8 Black
- 9 American Indian / Alaska Native / Eskimo / Inuit
- 10 Vietnamese
- 11 Asian Indian
- 12 Portuguese
- 13 Guamanian / Chamorro
- 14 Puerto Rican
- 15 Mexican
- 16 Tongan
- 17 Laotian
- 18 Cambodian
- 19 Malaysian
- 20 Fijan
- 21 Micronesian
- 22 Other Asian (specify)
- 23 Other (specify)

Do not read

- 24 Don't know / Not sure
- 25 Refuse
- 26 No additional choices