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Impact of Acculturation and Lifestyle Health Behaviors on  
Cardiovascular Health among Filipinos in California

by

Maria Lourdes Geronimo Bayog

DISSERTATION

Submitted in partial satisfaction of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Nursing

in the

GRADUATE DIVISION

of the

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## ABSTRACT

### Impact of Acculturation and Lifestyle Health Behaviors on Cardiovascular Health among Filipinos in California

Maria Lourdes Geronimo Bayog

Cardiovascular disease (CVD) and other chronic diseases are the leading causes of morbidity, disability, and preventable and premature death among all racial and ethnic groups in the United States (US). Health-promoting lifestyle behaviors can prevent disease. One in four persons in the US are immigrants or has a parent who is an immigrant, with Asian immigrants as the majority. Acculturation influences health behaviors and outcomes. Yet, immigrants' health, in particular Asian subgroups, have been studied sparsely. Filipinos are the second largest Asian American immigrant group. From the perspectives of Pender's Health Promotion Model and Berry's Model of Acculturation, the twofold purposes of this descriptive, correlational cross-sectional secondary research were to describe cardiometabolic and health behavior predictors associated with CVD and describe selected acculturation characteristics associated with major chronic diseases and lifestyle health behaviors in Filipino Americans.

The sample of 555 Filipino American adults responded to the 2011-12 California Health Interview Survey. Ideal cardiovascular health behaviors were low cigarette smoking, fast food and soda consumption. Physical inactivity, overweight/obesity and low fruit and vegetable intake were behaviors of poor and intermediate cardiovascular health. Logistic regression analyses indicated age, hypertension and diabetes were significantly associated with CVD, and hypertension was the single most risk of CVD. US-born Filipinos were significantly almost twice as likely to smoke cigarettes and drink soda and 1.4 times more likely to be overweight/obese,

but were significantly less likely to have hypertension, diabetes and heart disease compared to non-US born Filipinos. Proficiency in English was associated with less odds of having hypertension, and speaking English at home was associated with less odds of eating the recommended servings of fruits and vegetables.

Age-focused prevention interventions for blood pressure and glucose control, sedentary behavior, weight management and nutrition are critical to prevent CVD in Filipino Americans. Being born in the US and English proficiency or speaking English at home seem to be protective against chronic diseases although these acculturation characteristics were associated with increased likelihood of unhealthy lifestyle behaviors. Longitudinal, prospective multigenerational intervention studies, along with targeted public health policies and evidence-based practices based on acculturation level, are needed.

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## CHAPTER I

### INTRODUCTION

#### **Statement of the Problem**

Cardiovascular disease (CVD) is the leading cause of death worldwide and among all major ethnic and racial groups in the United States (US) (LaRosa & Brown, 2005). In addition to morbidity and mortality, CVD affects health, functioning, wellbeing, longevity and quality of life as well as has economic impacts on individuals, families and societies (Mozaffarian et al., 2015; Roth et al., 2015). Cardiovascular disease is preventable. More than 200,000 CVD-related deaths could be prevented through lifestyle health behavioral changes, such as controlling blood pressure, maintaining appropriate serum cholesterol and glucose levels, being physically active, maintaining a healthy weight, not using tobacco and making healthier food choices (Lloyd-Jones et al., 2010). By eliminating or reducing cardiometabolic risks and unhealthy lifestyle behaviors, six in 10 CVD deaths are preventable in persons younger than 65 years in the US (Tomaselli, Harty, Horton, & Schoeberl, 2011). Preventing CVD by addressing modifiable or controllable risks is a major objective of Healthy People 2020, the national prevention initiative to improve health, prevent disease and achieve health equity among Americans (US Department of Health and Human Services, 2016).

Given the influence that social determinants have on health, CVD varies based on gender, age, income, education, race and ethnicity, health behaviors, acculturation, among other factors, for different populations (LaRosa & Brown, 2005) and geographic locations (Roth et al., 2015). One in four persons in the US are immigrants or has a parent who is an immigrant, with Asian immigrants as the majority (Waters & Pineau, 2015). Acculturation influences health behaviors and health outcomes. Health data on Asian Americans are often combined into a single group of

Asian ancestry, disregarding the heterogeneity, disease risk variability and subgroup differences within this group. The three largest Asian American subgroups in descending order are Chinese, Filipino and Asian Indian. A majority of the sparse health data are on Chinese Americans. Filipino Americans are the second largest, permanent immigrant Asian group in the US (US Census Bureau, 2010) and rank third in the prevalence of high blood pressure, a risk for CVD, after African Americans and Native American Indians (Barnes et al., 2008). Among Asian Americans, Filipino Americans bear a disproportionate burden for specific CVD and associated risks (Abesamis et al., 2015), but clear patterns of this CVD burden and associated risks and how acculturation influences CVD burden and risks are unknown in this population, despite their vulnerability (Smith et al., 2005).

### **Purpose of the Study**

The purpose of the dissertation study was threefold: (a) conduct a systematic review in order to describe the Filipino American population's CVD risk according to the American Heart Association's seven metrics for ideal cardiovascular health (Lloyd-Jones et al., 2010) by disaggregating their information from other Asian groups and comparing the Filipino American population to Whites, non-Hispanic as a reference group; (b) describe the cardiometabolic and lifestyle health behavior predictors associated with CVD in the Filipino American population in California within the context of Pender's Health Promotion model (Pender, Murdaugh, & Parsons, 2011); and (c) describe selected acculturation characteristics associated with major chronic diseases and lifestyle health behaviors in California's Filipino American population from the perspective of Berry's Model of Acculturation (Berry, 1997, 2005).

## **Organization of the Dissertation Chapters**

Chapter II is a systematic review of the literature about the CVD risk of Filipino Americans, the second largest subgroup of Asian Americans. The review disaggregates the sparse, medium quality evidence of Filipinos' CVD risk from other Asian American groups and Whites, non-Hispanic as a reference group. In Chapter III, the cardiometabolic risks and lifestyle health behaviors of a noninstitutionalized, community probability sample of 555 Filipino American adults who answered cellular and landline phones in response to the 2011-2012 California Health Interview Survey (2014) are described. The influence of cardiometabolic risks and lifestyle health behaviors as predictors of CVD are also examined. Presented in Chapter IV is a description of selected acculturation characteristics associated with major chronic diseases and lifestyle health behaviors in the same sample of 555 Filipino American adults living in California. In Chapter V, a summary of the dissertation research findings, conclusions, limitations, implications for health and nursing, and recommendations for further research of Filipino Americans' risk for CVD and lifestyle health behaviors, taking into consideration acculturation and sociodemographic characteristics, are discussed. Following Chapter V is the appendix of the University of California Institutional Review Board (IRB) Self-Certification Form for research that these studies do not meet the definition of using human subjects and does not require Exempt Certification or IRB review.

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## CHAPTER II

### A SYSTEMATIC REVIEW OF IDEAL CARDIOVASCULAR HEALTH IN THE FILIPINO AMERICAN POPULATION

#### **Abstract**

**Objective:** The purpose was to review evidence of cardiovascular (CVD) risk of Filipino Americans, the second largest subgroup of Asian Americans, by disaggregating their information from other Asian groups and comparing them to Whites, non-Hispanic as a reference group.

**Method:** Within the American Heart Association's ideal cardiovascular health framework, guidelines of the Preferred Reporting Items for Systematic reviews and Meta-Analyses and the Cochrane Collaboration Review Group were used to synthesize and evaluate the literature.

**Results:** The sparse, medium quality evidence indicates CVD disparity exists. As compared to Whites, non-Hispanic and other Asian Americans, Filipino Americans were at higher risk for developing and dying from CVD, having clinical risks (hypertension, elevated cholesterol and diabetes) and engaging in unhealthy lifestyle behaviors (being sedentary and overweight). In addition, significant gender differences were noted and the dietary and nutrition literature was lacking in the Filipino American population.

**Conclusion:** Among Filipino Americans, CVD prevention efforts should focus on stroke, hypertension, diabetes, obesity and physical inactivity for women and heart disease prevention and smoking cessation for men. A focus on the dietary and nutrition patterns among Filipino Americans, taking into consideration sociocultural values and norms, gender role expectations, acculturation, immigration wave and generation order, is recommended for further research.

**Keywords:** systematic review, cardiovascular health, Filipino American, health behavior

## A Systematic Review of Ideal Cardiovascular Health in the Filipino American Population

One American is estimated to die from cardiovascular disease (CVD) every 40 seconds and experience a coronary event every 83 seconds in the United States (US) (Go et al., 2014). The prevalence of CVD is 11.4% and 31% for CVD mortality in the US (National Center for Health Statistics, 2015). The World Health Organization (WHO) (2015) reported 17.5 million deaths from CVD in 2012, 6.7 million from stroke and 7.4 million from coronary heart disease, making it the leading cause of death worldwide. The WHO (2015) cites poor diet, physical inactivity, tobacco use and harmful alcohol consumption as CVD risks, along with being overweight/obese and increased blood pressure, lipids and glucose levels. Globally, premature CVD would be reduced to 5.7 million if hypertension, tobacco use, diabetes and obesity were reduced, resulting in a 26% reduction for men and a 23% reduction for women (Roth et al., 2015a). The cost, 656 billion US dollars, associated with CVD is tremendous and is expected to increase to 987 billion dollars per year by 2025 (Mozaffarian et al., 2015). Furthermore, the burden of CVD is concerning not only for the individual, but also for the family, community and society in terms of health, life expectancy, quality of life and productivity.

Given the influence that social determinants have on health, CVD varies based on gender, age, income, education, race and ethnicity, health behaviors, among other factors, for different populations (LaRosa & Brown, 2005) and geographic locations (Roth et al., 2015a). Health data on Asian Americans are often combined into a single group of Asian ancestry, disregarding the heterogeneity, disease risk variability and subgroup differences within this group. The three largest Asian subgroups in descending order are Chinese, Filipino and Asian Indian. A majority of the sparse health data are on Chinese Americans. Filipino Americans are the second largest Asian group in the US (US Census Bureau, 2010) and rank third in the prevalence of high blood

pressure, a risk for CVD, after African Americans and Native American Indians (Barnes et al., 2008). Among Asian Americans, Filipino Americans bear a disproportionate burden for specific CVD and associated risks (Abesamis et al., 2015), but clear patterns of these risks as defined by the American Heart Association (Lloyd-Jones et al., 2010) are unknown in this population, despite their vulnerability (Smith et al., 2005). The purpose of this systematic review was to describe the Filipino Asian American population's CVD risk by disaggregating their information from other Asian groups and comparing the population to Whites, non-Hispanic as a reference group, using the American Heart Association's seven metrics for ideal cardiovascular health.

### **American Heart Association Life's Simple 7 Framework**

The American Heart Association defines ideal cardiovascular health as the absence of clinical cardiovascular disease (i.e., heart failure, stroke, coronary heart disease, etc.). To lower CVD risk, the AHA recommends adherence to seven cardiovascular health metrics: blood pressure less than 120/80 mm Hg, total cholesterol less than 200 mg/dl, fasting plasma glucose less than 100 mg/dL, body mass index less than 25 kg/m<sup>2</sup>, moderate-intensity physical activity for at least 150 minutes per week or vigorous-intensity physical activity for at least 75 minutes per week, proper nutrition, and not using tobacco (Lloyd-Jones et al., 2010). According to the American Heart Association, the three clinical indicators, high blood pressure, high total cholesterol, high fasting plasma glucose, are significant contributors to CVD. The four lifestyle health behaviors, physical activity, proper nutrition, cigarette smoking cessation and normal weight, are CVD risk reduction mechanisms.

### **Method**

Guidelines of the Preferred Reporting Items for Systematic reviews and Meta-Analyses (Moher et al., 2009) and the Cochrane Collaboration Review Group (Higgins et al., 2011) were

used to synthesize and evaluate systematically the literature to describe specifically the Filipino Asian American population's CVD risk by disaggregating their information from other Asian groups, using the American Heart Association's seven metrics for ideal cardiovascular health.

### **Search Strategy**

A literature search using the MEDLINE, CINAHL and Web of Science databases was conducted. References of included studies were also reviewed. The databases were searched for articles published in English between 2000 and 2014 with the following keywords: cardiovascular disease, Filipinos, Filipino Americans, randomized, heart disease, and coronary heart disease. The search yielded 125 records; 92 records that were duplicates, commentaries, scientific meeting notes, review articles, dissertations, editorials and opinions were excluded. The abstracts of the 33 records were screened based on the following inclusion criteria: quantitative design, conducted in the US, sample of adults (18 years and older) who were Filipino American, and addressed any of the seven American Heart Association's cardiovascular clinical health metrics (blood pressure, glucose and cholesterol) and lifestyle health behaviors (weight, diet, physical activity and tobacco use) in conjunction with CVD. Eighteen records were excluded: five studies were not conducted in the US, five studies were qualitative, and eight studies did not address CVD. Fifteen full-text articles were assessed for eligibility and 13 studies were included in the review; two articles were excluded because the studies did not address any of the American Heart Association's cardiovascular health metrics. An additional study was identified through a manual search of the references of the other articles, yielding a total of 14 studies included in the review (see Figure 2.1).

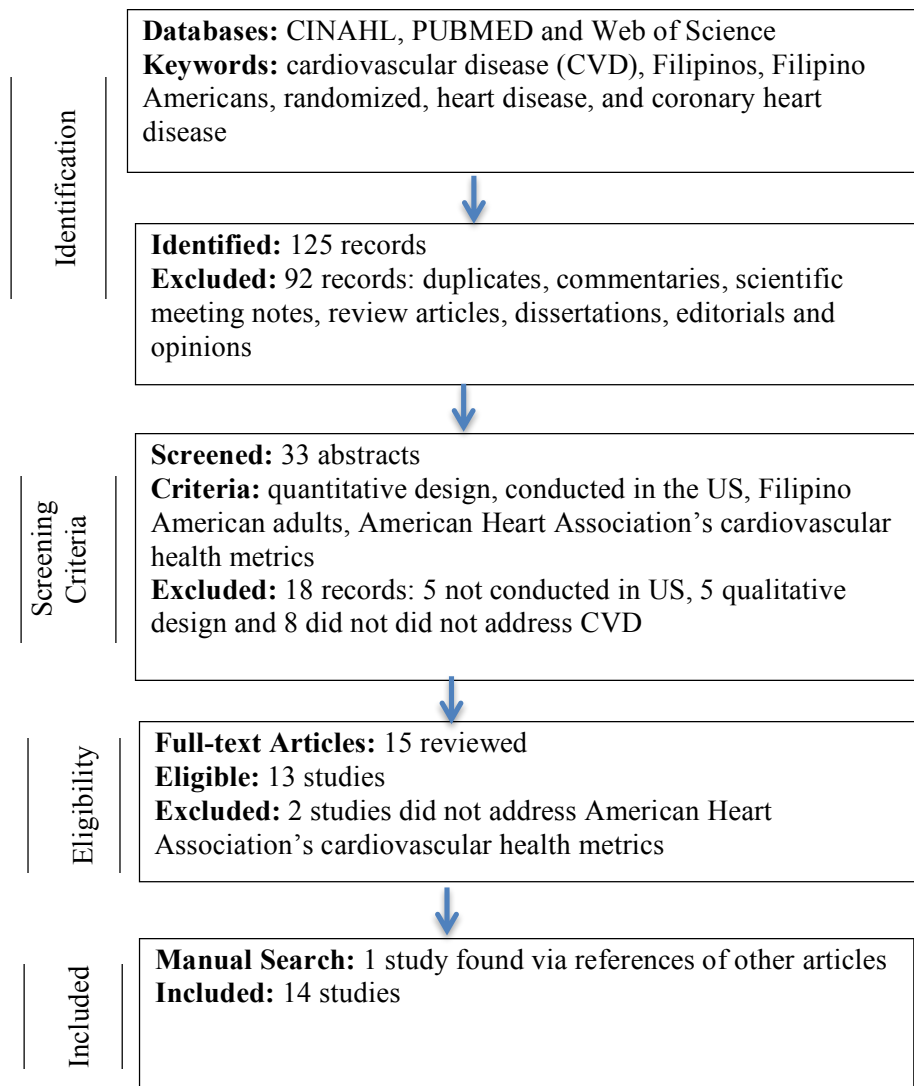


Figure 2.1. Selection of studies included in the review

### Methodological Rigor and Quality Assessment

Methodological rigor and quality of the 14 studies were assessed using a 10-point tool guided by the Cochrane Collaboration Review Group criteria (Higgins & Green, 2011). For each study, a point was given for a prospective design, probability sampling, sample size justification, more than one setting, response rate greater than 60%, reliable and valid instrument, measured versus self-report, theoretical underpinning, and appropriate statistical analysis (see Table 2.1). Each study was scored independently by three reviewers, and after consensus, was assigned a

score from 1 (low quality) to 10 (high quality). All but one study had a rating of 5 or higher.

Because of the scarce literature, a decision was made to include the study in the review (Araneta & Barrett-Connor, 2004).

Table 2.1

*Methodological Rigor and Quality Assessment Criteria*

Author (Year)	Prospective Design	Probability Sampling	Justified Sample Size	More than One Site	Greater than 60% Response Rate	Reliable Instrument	Valid Instrument	Measured versus Self-report	Theoretical Framework	Appropriate Analysis	Total Score (1 to 10)
Ancheta et al. (2012)	0	0	0	1	0	1	1	1	0	1	5
Ancheta et al. (2014)	0	0	0	1	0	1	1	1	0	1	5
Araneta et al. (2004)	0	0	0	0	0	1	1	1	0	1	4
Dalusung-Angosta (2013)	0	0	0	1	0	1	1	0	1	1	5
Holland et al. (2011)	0	0	0	1	0	1	1	1	0	1	5
Jose et al. (2014)	0	0	0	1	0	1	1	1	0	1	5
Klatsky et al. (2005)	0	0	0	1	0	1	1	1	0	1	5
Maxwell et al. (2002)	1	0	0	1	1	1	1	1	1	1	8
Ursua et al. (2013)	1	0	0	1	0	1	1	1	0	1	6
Ursua et al. (2014a)	1	0	0	1	0	1	1	1	1	1	7
Ursua et al. (2014b)	0	0	0	1	0	1	1	1	0	1	5
Wu et al. (2011)	0	0	0	1	0	1	1	1	0	1	5
Ye et al. (2009)	0	1	0	1	0	1	1	0	0	1	5
Zhao et al. (2014)	0	0	0	1	0	1	1	1	0	1	5

Note. 0 = no. 1 = yes. Total score can range from 1 (low quality) to 10 (high quality).

## Results

### Study Characteristics

Cardiovascular disease and risk in the Filipino American population literature is sparse.

Table 2.2 is a summary of the 14 studies included in the systematic review by sample, age of participants, comparison group, duration of the study, setting, and cardiovascular health metrics.

A majority of the studies were cross-sectional designs. One study was a randomized-controlled,

prospective study and two studies were non-randomized-controlled longitudinal designs. Study sample sizes ranged from 34 to more than 59,000. Three studies included only female participants. Consistent with the inclusion criteria, all of the studies included adults, 18 years and older. Three studies, however, were specific to the older population, 40 years and older. Six studies were conducted in California, three studies were conducted in New York and New Jersey, two studies were conducted in Florida, and one study was conducted in Michigan. Two studies were comprised of a US nationally-represented sample. All of the studies involved multiple sites except for one study. All of the studies used valid and reliable instruments and appropriate statistical tests for data analysis.

### **Cardiovascular Morbidity and Mortality**

The prevalence for CVD and cerebrovascular disease varied among Filipino Americans. The prevalence rate for CVD ranged from 4.7% for Filipino American women (Zhao et al., 2015) to 45% for Filipino American men (Klatsky & Tekawa, 2005). Filipino Americans were more likely to have coronary heart disease (men = 45%, women = 38%) as compared to White, non-Hispanic Americans (men = 37%, women = 32%) (Klatsky & Tekawa, 2005). Compared to White, non-Hispanic women, the relative risk for coronary heart disease was greater for Filipino American women (RR = 1.5, 95% CI [1.1, 2.0]) (Klatsky & Tekawa, 2005). As compared to White, non-Hispanic men and women, the odds ratio for coronary heart disease was higher for Filipino American men (OR = 1.47, 95% CI 1.05, 2.06]) and women (OR = 1.66, 95% CI [1.13, 2.43]) (Holland et al., 2011). Prevalence of stroke among Filipino Americans ranged from 1.8% for all adults (Holland et al., 2011) to 6% for women (Maxwell, Bastani, Vida, & Warda, 2002). As compared to White, non-Hispanic American women, Filipino American women had

significantly higher odds for stroke (OR = 2.02, 95% CI [1.22, 3.34]) and ischemic stroke (OR = 2.00, 95% CI [1.15, 3.47]) (Holland et al., 2011).

Table 2.2

*Summary Characteristics of Reviewed Studies*

Author (Year)	Sample	Age	Comparison Group	Study Duration	Setting	Cardiovascular Health Metrics
Ancheta et al. (2012)	60 women	18 and older	56 women in the Philippines	Not stated	Jacksonville, Florida and Philippines	Blood pressure, weight, height, waist circumference and serum cholesterol and fasting glucose
Ancheta et al. (2014)	49 women	40 and older	American: 36 Chinese 23 Vietnamese 39 Cambodian	Not stated	Jacksonville, Florida	Blood pressure, weight, height, waist circumference and serum cholesterol
Araneta & Barrett-Connor (2004)	181 women	55-78	196 White, non-Hispanic American women	1995-2002	San Diego, California	Blood pressure, weight, height, waist circumference, coronary artery calcium, serum proinsulin, C-peptide, cholesterol and fasting glucose, and health behaviors
Dalusung-Angosta (2013)	120 adults	35-75	None	May-July 2010	Las Vegas, Nevada	CVD risks
Holland et al. (2011)	2,261 adults	35 and older	American: 10,659 Chinese 1,126 Vietnamese 5,154 Asian Indians 1,598 Japanese 924 Korean 72,701 White, non-Hispanic	2007-2010	San Francisco Bay Area of Northern California	Age-adjusted prevalence rates for coronary heart disease, stroke and peripheral vascular disease per electronic health records
Jose et al. (2014)	28,573 women and 30,430 men	18 and older	American: 70,229 Chinese 20,144 Vietnamese 24,085 Asian Indians 49,094 Japanese 22,943 Korean 10,196,536 White, non-Hispanic	2003-2010	34 US states	Relative and standardized mortality ratios and proportional mortality ratios for CVD per death records



Author (Year)	Sample	Age	Comparison Group	Study Duration	Setting	Cardiovascular Health Metrics
Klatsky & Tekawa (2005)	4,232 adults	Age not reported	American: 6,050 Chinese 714 Asian Indians 1,707 Japanese 889 other Asians 72,019 White, non-Hispanic	1978-1996	Northern California	Health assessment and history exams and hospital admissions for CVD per health records
Maxwell et al. (2002)	487 women	40 and older	None	1998-2000	Los Angeles County, California	Exercise assessment tool and comorbidities
Ursua et al. (2013)	1,028 adults	18 and older	None	2006-2010	New York and New Jersey	Blood pressure, weight, height, waist circumference and CV profile blood tests
Ursua et al. (2014a)	994 adults	18 and older	None	2006-2010	New York and New Jersey	Blood pressure, weight, height, waist circumference and CV profile blood tests
Ursua et al. (2014b)	88 adults	25-75	None	2009-2010	New York and New Jersey	Blood pressure, weight and height and health behaviors
Wu et al. (2011)	34 adults	17-89	American: 259 Chinese 62 Vietnamese 33 Hmong	2004-2008	Michigan	Blood pressure, weight, height, CV profile blood tests and health behaviors
Ye et al. (2009)	633 adults	18 and older	American: 559 Chinese 534 Asian Indians 1,117 other Asians 74,424 White, non-Hispanic	2003-2005	US national sample	Health behaviors
Zhao et al. (2014)	4,183 women and 2,737 men	18 and older	American: 28,601 Chinese 3,316 Vietnamese 26,954 Asian Indians 3,799 Japanese 2485 Korean 126,574 White, non-Hispanic 7,013 Mexican 3,323 Black, non-Hispanic	2010-2012	Northern California	Blood pressure, weight, height and clinical characteristics per electronic health records

*Note.* US = United States of America. CVD = cardiovascular disease.

As compared to White, non-Hispanics, the proportionate mortality ratio (PMR), the ratio of percent cause of death from CVD, of Filipino Americans was higher (Jose et al., 2014). Filipino American women had a higher PMR for ischemic heart disease (.94) and hypertensive disease (1.50) as compared to White, non-Hispanic women (.92 and 1.10, respectively). Filipino American men, especially younger men (45 to 65 age group), had higher a PMR for diseases of the heart (1.08) and ischemic disease (1.15) as compared to White, non-Hispanic men (1.02 and 1.08, respectively) and at a younger age.

As compared to Whites, non-Hispanic, the PMR for all cerebrovascular diseases was higher for Filipino American men (1.44) and Filipino American women (1.78) as well as for ischemic stroke (women = 1.30, men = 1.06) and hemorrhagic stroke (women = 2.92, men = 2.64) (Jose et al., 2014). For White, non-Hispanic men, the PMR for all cerebrovascular diseases was .79, .76 for ischemic stroke, and .94 for hemorrhagic stroke. For White, non-Hispanic women, the PMR was 1.20 for all cerebrovascular diseases, 1.23 for ischemic stroke and 1.06 for hemorrhagic stroke. Among Asian men, the PMR for Filipino American men was the highest for all cerebrovascular disease (1.44) as compared to Asian Indian men (.89), Chinese men (1.29), Japanese men (1.28), Korean mean (1.10) and Vietnamese men (1.40).

### **Hypertension**

Prevalence of hypertension among Filipino Americans adults ranged from 23.9% in a national sample (Ye et al., 2009) to 64.7% for women in New York and New Jersey (Ursua et al., 2013). As compared to White, non-Hispanic Americans, Filipino Americans were more likely to have hypertension in a national sample (OR = 1.18, 95% CI [1.02, 1.44]) (Ye et al., 2009) and in a Northern California sample of Filipino American men (OR = 1.47, 99% CI [1.33, 1.63]) and women (OR = 1.46, 99% CI [1.34, 1.58]) (Zhao et al., 2015). Filipino American

women had significantly higher mean systolic (135 mm/Hg) and diastolic (79 mm/Hg) blood pressure as compared to White, non-Hispanic American women (systolic blood pressure: 128 mm Hg; diastolic blood pressure: 75 mm/Hg) (Araneta & Barrett-Connor, 2004).

### **Cholesterol**

There were no national data on elevated cholesterol prevalence for Filipino Americans. In certain US states, the prevalence of hypercholesterolemia ranged from 11.6% (Ursua et al., 2013) to 68.4% (Wu et al., 2011) for Filipino Americans. Among Asian Americans in Michigan, Filipinos (68.4%) and Chinese (64.4%) had significantly higher total cholesterol than Vietnamese (47.4%) and Hmong (39.3%) (Wu et al., 2011). In a southeastern US city, among Asian American women, 40 years and older, Filipinos had the highest level of mean triglycerides (173) compared to Vietnamese (166), Chinese (86) and Cambodians (161) (Ancheta et al., 2015). Filipino American women had significantly lower levels of high density lipoprotein cholesterol (53.6 mg/dL) and higher levels of triglycerides (155.3 mg/dL) and ratio of total cholesterol to high density lipoprotein cholesterol (4.3) as compared to White, non-Hispanic American women (65.8 mg/dL, 134 mg/dL and 3.5, respectively) (Araneta & Barrett-Connor, 2004).

### **Diabetes**

The prevalence of diabetes among Filipino Americans was 6.1% in a national sample (Ye et al., 2009) and 57% among Filipino American women living in a US southeastern city (Ancheta et al., 2012). Filipino American women with diabetes had a significantly higher prevalence of the metabolic syndrome (32.6%) as compared to White, non-Hispanic American women with diabetes (13.8%). Even for Filipino American women without diabetes, the prevalence of metabolic syndrome (24.6%) remained significantly higher than for White, non-Hispanic American women (9.2%) (Araneta & Barrett-Connor, 2004). Clinical biomarkers for

diabetes were worse for Filipino American women as compared to White, non-Hispanic women. Filipino American women had significantly lower levels of mean C-peptide (1.22 ng/mL) and higher levels of mean proinsulin (13.9 pmol/L) as compared to White, non-Hispanic American women (1.54 ng/mL and 10.5 pmol/L, respectively) (Araneta & Barrett-Connor, 2004).

### **Body Weight**

Overweight/obesity prevalence among Filipino Americans was 13.2% in a national sample (Ye et al., 2009), 10% in a New York and New Jersey sample (Ursua et al., 2013) and 67% in a Michigan sample (Wu et al., 2011). Among Asian Americans in the Michigan sample, Filipinos (66.7%) were more likely to be overweight compared to Chinese (39.5%), Hmong (42.1%) or Vietnamese (20%) (Wu et al., 2011). Abdominal obesity as measured by waist circumference was found to be 27.5% in Filipino Americans (Dalusung-Angosta, 2013). Among Asian American women, 40 years and older, the mean waist circumference for Filipinos was 38 inches as compared to 34 inches for Vietnamese, 35 inches for Chinese and 36 inches for Cambodians (Ancheta et al., 2015).

### **Physical Activity**

The prevalence of physical inactivity reported in cohort studies among Filipino Americans ranged from 20% (Ursua et al., 2013) to 66% (Dalusung-Angosta, 2013). In the Filipino Women's Study, only 15% of Filipino American women reported being physically active daily or more than three times a week (Maxwell et al., 2002). Among a US national sample, Filipinos (38%) were more sedentary than Whites, non-Hispanic (37%) and Chinese (33%) (Ye et al., 2009). Although levels of physical inactivity were similar between Filipino Americans and White, non-Hispanic Americans, Filipinos were less likely to meet physical activity requirements as compared to Whites, non-Hispanic (Ye et al., 2009).

## **Tobacco Use**

In a national US sample, Ye and colleagues (2009) found that Asian Americans (18.4%) were less likely to be current cigarette smokers as compared to White, non-Hispanic Americans (27.5%), and the current cigarette smoking prevalence for Filipino Americans was 17.7%. In other studies, the prevalence of current cigarette smoking varied from 0% for Filipino American women (Ancheta et al., 2015) to 39% for Filipino American men (Zhao et al., 2015).

## **Nutrition**

Literature meeting the eligibility criteria for the systematic review regarding diet and nutrition in Filipino Americans was not located. Qualitative studies, which were excluded from the review, found that the diet and nutrition consumption of Filipino Americans consisted of eating meals three to six times a day that include steamed rice as the staple and consumption that is high in fat, meat, baked goods and dairy (Dela Cruz et al., 2013; Johnson-Kozlow et al., 2011).

## **Discussion**

This systematic review aimed to describe specifically the Filipino American population's CVD risk by disaggregating their information from other Asian groups and comparing the population to Whites, non-Hispanic, using the American Heart Association's Life's Simple 7 framework for ideal cardiovascular health metrics. Among Filipino Americans, men were more likely to have CVD and comorbidities and engage in unhealthy lifestyle behaviors than were women (Zhao et al., 2015). This gender difference was also noted in CVD mortality. Filipino American men were more likely to die from all heart and ischemic heart diseases (Klatsky & Tekawa, 2005; Zhao et al., 2015) as compared to Filipino American women, who were more likely to die from heart failure, all cerebrovascular diseases and strokes (hemorrhagic and ischemic) (Jose et al., 2014).

As compared to Whites, non-Hispanic and other Asian Americans, review findings suggest Filipino Americans were at higher risk for developing and dying from certain CVD, having CVD-related clinical risks and comorbidities (hypertension, elevated cholesterol and diabetes) and engaging in unhealthy lifestyle behaviors (being overweight and sedentary). Tobacco use was the exception. Depending on the study, the prevalence of cigarette smoking was either lower or higher, but generally lower, for Filipino Americans, specifically among Filipino American women, as compared to Whites, non-Hispanic and other Asian Americans. Furthermore, cigarette smoking was higher among Filipino American men as compared to Filipino American women (Ancheta et al., 2015; Zhao et al., 2015). Reducing hypertension was found to have the most benefit in preventing premature CVD-related deaths (Roth et al., 2015b).

As indicated by the review findings, healthy lifestyle behaviors were found to be widely known risk reduction mechanisms for CVD and associated comorbidities and risks (Sprangers et al., 2004). A major gap in the literature for Filipino Americans was availability of quantitative data for diet and nutrition, which is a major criterion for the American Heart Association's definition of ideal cardiovascular health. Filipino Americans with poor dietary diversity are at risk for developing obesity and diabetes (Dela Cruz et al., 2013). Although there were less obese Filipino Americans than the US general population, more Filipino Americans were considered overweight compared to the US general population (Ursua et al., 2013; Ursua et al., 2014a; Ursua et al. 2014b; Wu et al., 2011). Ursua and colleagues (2013) found when using the Asian WHO guidelines for body mass index as compared to the US Centers for Disease Control and Prevention (CDC) guidelines for body mass index, 75% versus 67%, respectively, of Filipino Americans would be classified as overweight or obese. If the WHO's (2014) body mass index recommendations were followed to determine overweight/obesity in Asian populations, trigger

points for public health action would be lower than the current American body mass index recommendations from the CDC (2016).

The literature does not indicate the reasons for CVD disparities in Filipino Americans by gender, within the population, or between ethnic and racial groups. One study, however, found older age, being male, longer time in the US, geographic location, family history of hypertension, lower self-rated health, being overweight or obese, higher serum glucose, and paradoxically, increased physical activity were significantly associated with hypertension in Filipino Americans (Ursua et al., 2013). Disparity in CVD as found in this systematic review among Filipino Americans is difficult to explain because of the scarce availability of studies. In addition, acculturation and cultural beliefs, attitudes and norms were not examined in any of the studies. Sociocultural factors, such as social norms and values, gender role expectations, immigration wave and generational order, may be influential contributors to gender and ethnic/racial differences in CVD. For example, in the Philippines, the prevalence for hypertension, diabetes and tobacco use were higher for men than for women, who were more obese, findings similar to Filipino Americans (Dans et al., 2005; Sy et al., 2014).

### **Limitations**

The literature to choose from was sparse and studies included in the systematic review were medium quality evidence, of which only two studies comprised a nationally representative sample (Jose et al., 2014; Ye et al., 2009), limiting the generalization of the findings. A majority of the studies were non-experimental cross-sectional designs, conducted at one point in time, limiting the ability to observe changes in cardiovascular health metrics that may have contributed to the development of CVD over time. Although most studies included objective cardiovascular health measures, a majority of the health behavior data were self-reported by participants and

susceptible to recall bias and social desirability, which might explain the paradoxical finding of the positive association between having hypertension and being physically active in one study (Ursua et al., 2013).

### **Conclusions, Implications and Recommendations**

Within the Filipino American population, the second largest subgroup of Asian Americans who have been in the US since 1587 (Sanchez & Gaw, 2007), findings indicate CVD prevention efforts should focus on stroke, hypertension, diabetes, obesity and physical inactivity for Filipino American women and heart disease prevention and smoking cessation for Filipino American men. As compared to Whites, non-Hispanic and other Asian Americans, social determinants and health risks appear to contribute to some of the disparity in CVD among Filipino Americans. Systematically identifying, assessing, monitoring and tracking these social determinants and health risks may provide insight into the development and testing of tailored CVD prevention and risk reduction interventions specific to the Filipino American population.

Nationally, the American Heart Association Impact Goals for 2020 include a 20% improvement and a 20% reduction in CVD and stroke mortality for all Americans (Lloyd-Jones et al., 2010). Internationally, by the year 2025, the WHO's Global Action Plan (2013) calls for a reduction in relative risk of premature CVD mortality by 25%, of hypertension by 25%, of diabetes, obesity and physical inactivity by 10%, of sodium intake by 30%, and of current cigarette smokers by 30%. Literature was not found regarding diet and nutrition in the Filipino American population as defined by the American Heart Association's metrics for ideal cardiovascular health (Lloyd-Jones et al., 2010). A focus on the dietary and nutrition patterns among Filipino Americans, taking into consideration sociocultural values and norms, gender role



expectations, acculturation, immigration wave and generation order, is recommended for further research.

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CHAPTER III  
CARDIOMETABOLIC AND LIFESTYLE HEALTH BEHAVIOR PREDICTORS OF  
CARDIOVASCULAR DISEASE AMONG FILIPINOS IN CALIFORNIA

**Abstract**

**Background:** Cardiovascular disease (CVD) is the leading cause of death among all major racial and ethnic groups in the United States. Healthful lifestyle behaviors are cardioprotective factors, but have been under- and overestimated or not studied among Asian American subgroups.

**Objective:** The purpose of the study was to describe cardiometabolic and lifestyle health behavior predictors associated with CVD in the Filipino American population, the second largest immigrant Asian group in the United States.

**Method:** A secondary analysis of cardiometabolic, lifestyle health behavior and CVD variables in the 2011-2012 California Health Interview Survey data was examined for Filipino Americans ( $n = 555$ ).

**Results:** Ideal cardiovascular health behaviors were low tobacco use, fast food and soda intake. Physical inactivity, being overweight/obese and low fruit and vegetable intake were behaviors of poor and intermediate cardiovascular health. Logistic regression analyses indicated age, hypertension and diabetes were significantly associated with CVD, and hypertension was the single most risk of CVD.

**Conclusion:** Age-focused, primary and secondary prevention interventions for blood pressure and glucose control, sedentary behavior, weight management and healthful nutrition are critical to prevent CVD and promote cardiovascular health in the Filipino American population.

**Keywords:** Filipino American, cardiovascular disease, lifestyle health behavior, cardiometabolic

## Cardiometabolic and Lifestyle Health Behavior Predictors of Cardiovascular Disease among Filipinos in California

Cardiovascular disease (CVD) is the leading cause of death worldwide and among all major ethnic and racial groups in the United States (US) (LaRosa & Brown, 2005). In addition to morbidity and mortality, CVD affects health, functioning, wellbeing, longevity and quality of life as well as has economic impacts on individuals, families and societies (Mozaffarian et al., 2015; Roth et al., 2015). Cardiovascular disease is preventable. More than 200,000 CVD-related deaths could be prevented through lifestyle health behavioral changes, such as controlling blood pressure, maintaining appropriate serum cholesterol and glucose levels, being physically active, maintaining a healthy weight, not using tobacco and making healthier food choices (Lloyd-Jones et al., 2010). Healthful lifestyle behaviors are widely known as cardioprotective factors (Loprinzi, Branscum, Hanks, & Smit, 2016), taking into consideration the social determinants of health, such as age, gender, income, education, race/ethnicity, social and physical environments, among others (Marmot, 2005).

By eliminating or reducing cardiometabolic risks and unhealthy lifestyle behaviors, six in 10 CVD deaths are preventable in persons younger than 65 years in the US (Tomaselli, Harty, Horton, & Schoeberl, 2011). Preventing CVD by addressing modifiable or controllable risks is a major objective of Healthy People 2020, the national prevention initiative to improve health, prevent disease and achieve health equity among Americans (US Department of Health and Human Services [US DHHS], 2016a). Healthful lifestyle behaviors have been under- and overestimated or not studied among Asian American subgroups. For example, Ursua and colleagues (2013) found when using the World Health Organization (WHO) guidelines for body mass index (BMI) in Asian populations as compared to the US guidelines for BMI, 75% versus



67%, respectively, of Filipino Americans would be classified as overweight or obese (Centers for Disease Control and Prevention [CDC], 2016; WHO, 2014).

Data and strategies to improve the health of and reduce disparities among Asian Americans are national goals (Palaniappan et al., 2010). Disentangling the subgroups, however, can be challenging because Asian Americans are usually categorized as a homogenous group instead of as a heterogeneous cluster of people who are born in the US or originate from 28 Asian countries (Smith et al., 2005). According to the US Census Bureau (2010), California has the largest Asian population among the 50 states. The projected number of Asian Americans by 2050 is 40.6 million, comprising 9% of the US population. Among Asian Americans, Filipinos are the second largest Asian population in the US, with the majority of Filipinos living in Hawaii, New York and California. Understanding health risks which contribute to CVD in Filipino Americans is important, especially for conscious and systematic targeting of prevention efforts. The purpose of the study was to describe the cardiometabolic and lifestyle health behavior predictors associated with CVD in the Filipino American population.

### **Pender's Health Promotion Model**

Pender's Health Promotion Model (Pender, Murdaugh, & Parsons, 2011) posits an individual's past experiences and behaviors and biological, sociocultural, and psychological characteristics (e.g., gender, age, education, income, race/ethnicity, etc.) will influence a person's actions to engage in and maintain positive behavioral changes (e.g., being physically active, proper nutrition, controlling blood pressure, etc.) for better health (e.g., preventing CVD). According to Pender's Health Promotion Model, a person's decision to engage in healthful lifestyle behaviors are motivated and influenced by behavior-specific cognition and affect and situational influences, which predict a person's commitment to the plan action for behavioral

change. Behavior-specific cognition and affect are determined by the person's perceptions that he or she will benefit from the action, has self-efficacy or self-confidence to change behavior, can overcome barriers to changing behavior, change will affect activity, and feels supported by interpersonal networks (family, peers, and/or healthcare providers). In this secondary analysis study, the presumption was that Filipinos' cardiometabolic and lifestyle health behaviors have been shaped by personal experiences as well as the norms, values and beliefs of the Filipino culture, which may have or not contributed to the development of CVD.

## **Method**

### **Study Design**

The study was a non-experimental, descriptive cross-sectional research design that involved a secondary analysis of cardiometabolic and lifestyle health behavior variables as predictors of CVD using 2011-2012 California Health Interview Survey (CHIS) data. The Institutional Review Board of the University of California, San Francisco reviewed and granted the study self-certification and exempt status.

### **Data Collection Procedure**

The CHIS is a population-based telephone survey that is representative of non-institutionalized persons of all age groups in California (CHIS, 2014). First collected in 2001, and beginning with CHIS 2011-2012, CHIS is now conducted continuously during a two-year period. The CHIS 2011-2012 data collection occurred between June 2011 and January 2013 by way of random digit dialing of 80% landline and 20% cellular phone numbers. Landline phone numbers included all 58 counties in California using a simple random or systematic sampling strategy. There were 28 cellular phone sampling strata. Interviews were conducted with computer-assisted telephone methodology and were considered complete when at least 80% of

the survey was answered. Data from the adult sample (aged 18 to 85 years) of the CHIS 2011-2012 were analyzed for this study. Of the 42,935 adults, 555 self-identified as Filipino Americans.

### **Variables and Measures**

Cardiometabolic and lifestyle health behavior variables selected for analysis were those that best matched associated CVD risks as identified by the American Heart Association: blood pressure, cholesterol, glucose, physical activity, weight, tobacco use and nutrition (Lloyd et al., 2010). Proxy variables for all of the cardiovascular health indicators except for cholesterol were available for analysis in the 2011-2012 CHIS data. The self-reported cardiometabolic and lifestyle health behavior risks were used to categorize the sample into three categories of cardiovascular health: poor, intermediate, or ideal. The outcome variable was CVD. The predictor variables were hypertension, diabetes, physical activity, BMI, tobacco use and nutrition. Covariates were sociodemographic characteristics.

**Hypertension.** Hypertension was assessed by the question, “Has a doctor ever told you that you have high blood pressure?” Response options were *yes*, *no*, or *borderline hypertension*. The response, *yes*, was categorized as poor cardiovascular health, the *borderline hypertension* response as intermediate cardiovascular health, and the *no* response as ideal cardiovascular health.

**Diabetes.** Diabetes was assessed by the question, “(Other than during pregnancy) has a doctor ever told you that you have diabetes or sugar diabetes?” Response options were *yes*, *no*, or *borderline diabetes*. The response, *yes*, was categorized as poor cardiovascular health, the *borderline diabetes* response as intermediate cardiovascular health, and the *no* response as ideal cardiovascular health.

**Physical activity.** Physical activity was assessed by calculating the number of times walked for leisure in the past week (for at least 10 minutes) multiplied by the average length of time walked (in minutes) to yield the average length of time (in minutes) walked per week. Walking 0 minutes per week was categorized as poor cardiovascular health, 1 to 149 minutes per week as intermediate cardiovascular health, and 150 or more minutes per week as ideal cardiovascular health using the US DHHS (2016b) guidelines for physical activity.

**Body mass index.** Body adiposity was assessed by calculating BMI from height and weight. Using the BMI guidelines for US adults (CDC, 2016), a BMI of 30.0 and above (obese) was categorized as poor cardiovascular health, 25.0 to 29.9 (overweight) as intermediate cardiovascular health, and 18.5 to 24.9 (normal) as ideal cardiovascular health.

**Tobacco use.** Tobacco use was assessed by asking, “Are you a *current smoker*, *never smoked*, or *quit smoking*.” The response, *current smoker*, was categorized as poor cardiovascular health and the *quit smoking* and *never smoked* responses as ideal cardiovascular health. There was no classification for intermediate cardiovascular health.

**Nutrition.** Nutrition was assessed by three components: servings per week of fruits and vegetables, ounces per week of soda and servings per week of fast food in the past 7 days. Based on the dietary guidelines for Americans (US DHHS, 2016c), recommended fruit and vegetable consumption was defined as 35 or more servings per week, 36 or less ounces per week for soda consumption and two or less servings per week for fast food consumption. Met nutritional recommendations were classified as ideal cardiovascular health and unmet nutritional recommendations were classified as poor cardiovascular health. There was no classification for intermediate cardiovascular health.

**Sociodemographics.** Sociodemographic variables included in the study were gender (male or female), age (years), marital status (married, living with partner, widowed/separated/divorced, or never married), education (less than high school, high school, some college, or college), employment (employed, unemployed, or retired), housing (own or rent/other), municipality (metropolitan or non-metropolitan), household annual income (dollars), health insurance (yes or no), and perceived health (good or not good).

**Cardiovascular disease.** Cardiovascular disease was assessed by the question, “Has a doctor ever told you that you have any kind of heart disease?” Response options were *yes* or *no*.

### **Data Analysis**

Data were analyzed using the Statistical Package for Social Sciences for Windows version 23 (IBM, 2015). Descriptive statistics were computed to describe and categorize cardiometabolic and lifestyle health behavior variables as poor, intermediate or ideal cardiovascular health. Univariate logistic regression analyses were computed to test the association of predictors and covariates with CVD. Predictors were hypertension (yes/borderline or no), diabetes (yes/borderline or no), current tobacco use (yes or no/quit), physical activity (less than 150 or 150 or more minutes per week), BMI (normal, overweight or obese), fruit and vegetable intake (less than 35 or 35 or more servings per week), soda intake (less than 4 or 4 or more servings per week) and fast food consumption (less than 3 or 3 or more servings per week). The reference group for BMI was normal. The covariates were gender (male or female) and age (continuous). The outcome variable was CVD (yes or no). Chi-square analyses were used for categorical variables and *t*-test analyses were used for continuous variables to determine differences between sets of variables. Multiple logistic regression analysis was computed to examine the effect of statistically significant univariate logistic regression predictors (age,

hypertension and diabetes) and gender on the probability of having CVD. Odds ratios and confidence intervals are reported. Statistical significance was set at the  $p \leq .05$  alpha level, two-tailed.

### Sample

The sociodemographic profile of the sample of 555 Filipinos living in California is presented in Table 3.1. The sample ranged in age from 18 to 85 years with a mean age of 47.79 years and was comprised of 57.3% females and 42.7% males who lived in a metropolitan area (97.8%). A majority of the sample were homeowners (57.5%), married (52.8%), educated above high school (79.3%), employed (56.8%), had health insurance (90.1%), and rated health as good or better (84%). Household annual income ranged from \$0 to \$300,000 with a mean annual income of \$75,744 ( $Md = \$60,000$ ).

Table 3.1

*Sociodemographic Profile of the Filipino American Population in California (n = 555)*

Characteristic	<i>n</i>	%
Age (years): $M = 47.79$ ( $SD = 18.26$ )		
Household Annual Income: $M = \$75,744$ ( $SD = \$58,049$ )		
Gender		
Female	318	57.3
Male	237	42.7
Municipality		
Metropolitan	543	97.8
Non-metropolitan	12	2.2
Marital Status		

Characteristic	<i>n</i>	%
Married	293	52.8
Living with partner	20	3.6
Widowed/separated/divorced	97	17.5
Never married	145	26.1
Education		
College	290	52.1
Some college	150	25.9
High school	100	18.0
Lower than high school	21	3.8
Housing		
Own	319	57.5
Rent/other	227	40.9
Employment		
Employed	315	56.8
Unemployed	57	10.3
Retired	183	33.0
Health Insurance		
Yes	500	90.1
No	55	9.9
Perceived Health		
Good	466	84.0
Not good	89	16.0

## Results

### Cardiometabolic Risks and Lifestyle Health Behaviors

Ranging from 90 to 320 pounds, the mean weight was 151.88 pounds ( $SD = 35.99$ ,  $Md = 147$ ). Body mass index ranged from 15 to 55  $kg/m^2$ . The mean BMI was 26.19 ( $SD = 4.84$ ,  $Md = 25.33$ ). Dietary fruits and vegetables ranged from 0 to 69 servings per week with a mean serving per week of 15.96 ( $SD = 11.44$ ,  $Md = 21$ ). Fast food consumption ranged from 0 to 20 servings per week with a mean of 1.62 servings per week ( $SD = 2.09$ ,  $Md = 0$ ). Intake of soda ranged from 0 to 42 servings per week with a mean of 1.76 servings per week ( $SD = 4.15$ ,  $Md = 0$ ).

See Table 3.2 for the cardiovascular health profile of the sample. In terms of ideal cardiovascular health, 61.1% of the sample did not have hypertension/borderline hypertension, 83.4% did not have diabetes/borderline diabetes, 87.6% did not smoke, 86.8% drank 36 or less ounces of soda per week, and 78.2% ate two or less servings per week of fast food. Areas for improvement in cardiovascular health were noted among respondents: 83.3% did not engage in physical activity for the recommended 150 or more minutes per week, 54.3% were overweight/obese, and 90.1% did not eat the recommended 35 or more servings per week of fruits and vegetables.

Table 3.2

*Cardiovascular Health Profile of the Filipino American Population in California (n = 555)*

Indicator	Cardiovascular Health					
	Poor		Intermediate		Ideal	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Hypertension	Hypertension		Pre-hypertension		No Hypertension	
	199	35.9	17	3.1	339	61.1



Indicator	Cardiovascular Health					
	Poor		Intermediate		Ideal	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Diabetes	Diabetes		Pre-diabetes		No Diabetes	
	69	12.4	23	4.1	463	83.4
Tobacco Use	Current Smoker			Non-smoker/Quit		
	69	12.4			486	87.6
Physical Activity (Minutes/Week)	0 Minutes		1-149 Minutes		≥ 150 Minutes	
	177	31.9	285	51.4	93	16.8
Body Mass Index	Obese		Overweight		Normal	
	97	17.5	204	36.8	254	45.8
Nutrition						
Fruits/vegetables						
(≥ 35 servings/week)	501	90.3			54	9.7
Soda (≤ 36 ounces/week)	73	13.2			482	86.8
Fast food (≤ 2 servings/week)	121	21.8			434	78.2

### Predictors of Cardiovascular Disease

The prevalence of CVD was 7.4% ( $n = 41$ ). Univariate logistic regression analyses indicated that CVD was significantly associated with age, hypertension and diabetes (see Table 3.3). Filipinos who were older were significantly more likely to have CVD (OR = 1.036, 95% CI [1.016, 1.056],  $p < .0001$ ) than those who were younger  $t(49.613) = -4.385$ ,  $p < .0001$ . For every one year a person was older, he or she was 1.036 more likely to have CVD; that is, for every

increase of 10 years in age, the respondent was 1.4 times more likely to have CVD. Filipinos who had hypertension were 4.8 times more likely to have CVD (95% CI [2.36, 9.82],  $p < .0001$ ) as compared to Filipinos who did not have hypertension ( $\chi^2(1, N = 555) = 21.85, p < .0001$ ). Filipinos who had diabetes were 3.3 times more likely to have CVD (95% CI [1.66, 6.46],  $p = .001$ ) as compared to Filipinos who did not have diabetes ( $\chi^2(1, N = 555) = 12.82, p = .001$ ). Multivariate logistic regression analysis indicated that only hypertension was a significant predictor of CVD, controlling for the effects of age, gender and diabetes (see Table 3.4). Filipinos who had hypertension were 3.1 times more likely to have CVD (OR = 3.077, 95% CI [1.376, 6.883],  $p = .006$ ) as compared to those without hypertension.

Table 3.3

*Univariate Logistic Regression for the Association between Cardiovascular Disease (CVD) and Health Risks, Gender and Age among Filipinos in California (n = 555)*

Predictor	No CVD	CVD	$\chi^2$ or $t$	OR	95% CI
	(n = 41)	(n = 514)			
	%	%			
Hypertension			21.85**	4.809**	2.355, 9.820
No (n = 339)	63.8	26.8			
Yes (n = 216)	36.2	73.2			
Diabetes			12.82*	3.274*	1.659, 6.464
No (n = 463)	85.0	63.4			
Yes (n = 92)	15.0	36.6			
Tobacco Use			.197	1.227	.496, 3.034

Predictor	No CVD	CVD	$\chi^2$ or <i>t</i>	OR	95% CI
	( <i>n</i> = 41)	( <i>n</i> = 514)			
	%	%			
No ( <i>n</i> = 486)	87.7	85.4			
Yes ( <i>n</i> = 69)	12.3	14.6			
Physical Activity			.660	.672	2.57, 1.762
≥ 150 minutes/week ( <i>n</i> = 93)	17.1	12.2			
< 150 minutes/week ( <i>n</i> = 462)	82.9	87.8			
Body Mass Index			1.551		
Normal ( <i>n</i> = 254)	45.9	43.9		Reference	
Overweight ( <i>n</i> = 204)	37.2	31.7		.664	.295, 1.493
Obese ( <i>n</i> = 97)	16.9	24.4		.592	.250, 1.403
Fruit and Vegetable Intake			.000	1.003	.343, 2.931
≥ 35 servings/week ( <i>n</i> = 54)	9.7	9.8			
< 35 servings/week ( <i>n</i> = 501)	90.3	90.2			
Soda Intake			.036	.911	.345, 2.402
< 4 servings/week ( <i>n</i> = 482)	86.8	87.8			
≥ 4 servings/week ( <i>n</i> = 73)	13.2	12.2			
Fast Food Intake			.174	1.171	.557, 2.462
< 3 servings/week ( <i>n</i> = 434)	78.4	75.6			
≥ 3 servings/week ( <i>n</i> = 121)	21.6	24.4			
Gender			.026	.949	.500, 1.801
Male ( <i>n</i> = 237)	63.8	43.9			

Predictor	No CVD	CVD	$\chi^2$ or $t$	OR	95% CI
	( $n = 41$ )	( $n = 514$ )			
	%	%			
Female ( $n = 318$ )	57.4	56.1			
Age (years)	$M = 46.98$ $SD = 18.25$	$M = 58.00$ $SD = 15.25$	-4.385**	1.036**	1.016, 1.056

\*  $p = .001$ . \*\*  $p < .0001$ .

Table 3.4

*Multivariate Logistic Regression of Cardiovascular Disease Assessed in Hypertension, Diabetes, Gender and Age among Filipinos in California ( $n = 555$ )*

Predictor	Adjusted Odds Ratio	95% Confidence Interval	$p$
Age	1.018	.995, 1.042	.12
Gender	.909	.462, 1.788	.78
Hypertension	3.077	1.376, 6.883	.006
Diabetes	1,806	.866, 3.766	.12

## Discussion

Cardiovascular risks were prevalent and associated with CVD in the relatively healthy Filipino American population in California. Filipinos are the second largest Asian American group after Chinese Americans (US Census Bureau, 2010). The literature indicates that as compared to other Asian Americans and Whites, non-Hispanic, Filipinos bear a disproportionate burden for specific CVD and associated cardiometabolic and lifestyle health behavior risks

(Abesamis, Fruh, Hall, Lemley, & Zlomke, 2015). Along with having hypertension and diabetes as cardiometabolic risks, unhealthy lifestyle behaviors among the study sample were being physically inactive, being overweight/obese and inadequate consumption of fruits and vegetables in the study sample. In the US general adult population, less than three percent of Americans were found to be physically active, ate a healthy diet, did not use tobacco and had the recommended body fat percentage (Loprinzi et al., 2016).

As compared to 12.4% of the study sample who had diabetes, the proportion of diabetes among Filipino Americans reported in other studies was higher at 16% in Northern California (Zhao et al., 2015) and 25% in a Las Vegas, Nevada (Dalusung-Angosta, 2013). In contrast to the study sample, other studies reported a lower percentage of diabetes in Filipino Americans: 6% in a national sample (Ye, Rust, Baltrus, & Daniels, 2009) and 12% in Michigan (Wu, Hsieh, Wang, & Oakley, 2011). The prevalence of diabetes in the US general population is 9.7% (Behavioral Risk Factor Surveillance Survey [BRFSS], 2015), 4.6% in the Philippines (Morales et al., 2008), and 9% globally (WHO, 2016a).

Almost 36% of the study sample had hypertension. In a sample of Asian Americans in Michigan, the hypertension prevalence was of 30% for Filipinos (Wu et al., 2011), 23.9% among Filipino Americans nationally (Ye et al., 2009) and much higher in Filipino Americans in Las Vegas, Nevada (50%) (Dalusung-Angosta, 2013), New York/New Jersey (53%) (Ursua et al., 2013), and Northern California (56.5%) (Zhao et al., 2015). The prevalence of hypertension in the US general population is 31.4% (BRFSS, 2015), 33.3% in the Philippines (Morales et al., 2008), and 40% globally (WHO, 2016b). Along with African Americans, Filipino Americans in a Northern California sample were found to have significantly higher odds of hypertension as

compared to Whites, non-Hispanic, with Filipino men having the highest prevalence of hypertension (Zhao et al., 2015).

Eighty-three percent of the study sample did not meet weekly physical activity requirements. In other studies of Filipinos in the US, the proportion of those who were physically inactive as compared to the study sample was lower: 38.2% nationally (Ye et al., 2009), 56.4% in Michigan (Wu et al., 2011), 59% in New York/New Jersey (Ursua et al., 2013), and 65.8% in Las Vegas, Nevada (Dalusung-Angosta, 2013). The prevalence of physical inactivity in the US general population is 49% (BRFSS, 2015) and 23% globally (WHO, 2016c). There was no physical activity or sedentary behavior data available about Filipinos in the Philippines.

In the study sample, 36.8% of participants were overweight and 17.5% of participants were obese. The proportion of Filipino Americans reported to be overweight and obese varied in the literature: 38.1% and 19.2%, respectively, in Northern California (Zhao et al., 2015), 41.6% and 10%, respectively, in New York/New Jersey (Ursua et al., 2013), and 66.7% in Michigan (Wu et al., 2011). Among Filipinos in Las Vegas, Nevada, 27.5% were obese (Dalusung-Angosta, 2013) and among a nationally representative sample, 13.2% of Filipino Americans were obese (Ye et al., 2009). As a comparison, the prevalence of being overweight and obese in the US general population is 35.4% and 29.4%, respectively (BRFSS, 2015) and 39% and 13%, respectively, globally (WHO, 2015b). Overweight data in the Philippines were not available; however, 26.1% of Filipinos were reported as obese in the Philippines (Morales et al., 2008).

Ninety percent of participants did not eat the recommended 35 or more servings per week of fruits and vegetables. Studies in the literature were not found about the dietary fruit and vegetable consumption for Filipino Americans, Filipinos in the Philippines, or for the global population. In a study among Chinese adults, there was a one-third reduced risk of CVD for

those who ate fresh fruits regularly as compared to those who did not or rarely ate fresh fruits (Du et al., 2016). Almost 77% of Americans do not meet the public health recommendations for fruit and vegetable intake (BRFSS, 2015).

The somewhat positive, healthful lifestyle behaviors among the study sample included 12% who did not smoke cigarettes, 87% who drank less than 36 ounces per week of soda and 78% who ate two or less servings per week of fast food. In other studies of Filipino Americans, the prevalence of cigarette smoking was higher at 16% in Northern California (Zhao et al., 2015) and 18% nationally (Ye et al., 2009), but lower at 3% in Michigan (Wu et al., 2011) and 10% in Las Vegas, Nevada (Dalusung-Angosta, 2013). The prevalence of cigarette smoking is 19% in the US general population (BRFSS, 2015), 34.8% in the Philippines (Morales et al., 2008), and 21% globally (WHO, 2016d). No US or global data were found for soda and fast food intake.

In the literature, CVD prevalence among Filipino Americans was lower than the study sample (7.4%) and ranged from 5.1% (Holland, Wong, Lauderdale & Palaniappan, 2011) to 6.4% (Zhao et al., 2014). Compared to Whites, non-Hispanic, Filipino Americans had higher odds of having coronary heart disease and stroke (Holland et al., 2011). Although less than one-fifth of the sample had CVD, among those who had CVD, hypertension was a unique predictor of CVD, taking into consideration age, gender and having diabetes. Being older and having hypertension and diabetes were significantly associated with having CVD in the study sample; however, having hypertension increased the odds of having CVD threefold. Gender differences in CVD did not exist among the study sample, nor did other social determinants of health such as education, income, partner status, health insurance, and employment. Ursua and colleagues (2013, 2014a) found that older age, being male, living between 6 to 15 years in the US, being

from New Jersey, having higher glucose, family history of hypertension, fair/poor health status, and being overweight/obese, were significantly associated with having hypertension.

### **Limitations**

A major limitation of the CHIS 2011-2012 data was persons who were excluded from the probability sampling, which included people without a landline or cellular phone, homeless individuals, and persons living in group quarters and other types of residence such as single room only occupancies. These excluded individuals are typically among the poorest, which creates sampling bias and limits generalization of the findings. Respondents of household surveys are more likely to be employed, married and have higher incomes (Fowlers, 2009). Nonresponse bias is also a limitation of telephone surveys. Limitations using existing data include inability to differentiate errors from coding, interviewing or keypunching errors because the original data are unavailable. Data were self-reported and no objective clinical measurements were collected.

### **Conclusions, Implications and Recommendations**

Among Filipinos living in California, lifestyle health behaviors that need more attention are physical activity, weight control and eating more servings of fruits and vegetables, for which the sample did not meet the public health recommendations. Having hypertension was the single most cardiometabolic risk for having CVD in this sample; other significant risks were having diabetes and older age. Given the study findings and existing literature, awareness and treatment of hypertension in the Filipino American population should be paramount interventions. As compared to 20 years ago, the age of first heart attack has lowered from 64 years to 60 years and obesity is indicated in 40% of severe heart attacks in the US (Kapadia & Fonarow, 2016), indicating early intervention is critical. Implications for practice are age-focused, primary and secondary prevention interventions for blood pressure and glucose control, sedentary behavior,



weight management and healthful nutrition, taking into consideration acculturation. Prospective controlled trials are recommended for further research to examine changes in cardiovascular health over time. A policy recommendation is that stress and psychological health be included in public health guidelines for cardiovascular health since studies have shown that these factors raises CVD risk (Buckley, Soo Hoo, Fethney, Shaw, Hanson, & Tofler, 2015; Tawakol & Becker, 2016).

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## CHAPTER IV

### ACCULTURATION CHARACTERISTICS ASSOCIATED WITH CHRONIC DISEASES AND HEALTH BEHAVIORS AMONG FILIPINOS IN CALIFORNIA

#### **Abstract**

**Background:** Cardiovascular disease, diabetes, cancer and are the leading causes of avoidable and premature death globally and in the United States. The risks associated can be explained by health behaviors and clinical risks. Acculturation influences health outcomes.

**Objective:** The purpose of the study was to describe and compare acculturation characteristics associated with major chronic diseases and health behaviors in California's Filipino American population. Filipinos are the second largest, permanent immigrant Asian group in the United States (US).

**Method:** A secondary analysis of the 2011-2012 California Health Interview Survey data of Filipino Americans ( $n = 555$ ) was analyzed for clinical risks, health behaviors, and three proxy variables for acculturation. Descriptive statistics, chi-square analyses, and univariate logistic regression analyses were computed to describe, compare, and determine association of acculturation to chronic disease and health behaviors.

**Results:** US-born Filipino Americans had significantly lower proportion of hypertension, diabetes, and heart disease compared to those not born in the US. Filipino Americans who were proficient in English were less likely to have hypertension as compared to those who were not English-proficient. Among Filipino Americans not born in the US, positive health behaviors included not smoking cigarettes, having normal weight, and consuming the recommended 36 ounces or less of soda per week, compared to US-born Filipino Americans. More Filipino Americans who spoke another language at home that was not English ate the recommended 35 or

more servings per week of fruits and vegetables than those who spoke English/English and another language.

**Conclusions:** There are differences between chronic disease prevalence and healthy lifestyle behaviors of Filipino Americans in California with different acculturation characteristics.

Additional research such as culturally appropriate interventions for chronic diseases is needed for the Filipino American population. Policies and prevention programs regarding smoking and soda intake should be implemented. Healthcare providers and nurses should discuss a healthy diet, weight management, physical activity and chronic disease prevention in this population.

Generational studies of Filipino Americans must also be done to see if there are other differences in health within the group, through the different generations.

**Keywords:** Filipino American, chronic diseases, health behaviors, acculturation



## Acculturation Characteristics Associated with Chronic Diseases and Health Behaviors among Filipinos in California

Diabetes, cancer and cardiovascular disease are the leading causes of avoidable and premature deaths in the United States (US) (Eyre et al., 2004) and globally (WHO, 2015). The risks associated with the leading causes of death in the US can be explained by clinical risks (e.g., hypertension and high serum cholesterol and glucose levels) and health behaviors such as tobacco use, being overweight or obese, physical inactivity, and alcohol abuse (Danaei et al., 2009). There is strong evidence that being overweight or obese increases the risk of 11 cancers, (AICR, 2016). The US spends more money per person on health than any other country (CDC, 2009). Yet, our lives are shorter by nearly 4 years than expected, based on health expenditures (RWJF, 2008). The number of chronic disease in the US is rising. In 2005, 46% of Americans had a chronic disease, and by the year 2025, the projected percentage is 50% (CPAT, n.d.). In the US, seven in 10 deaths are caused by chronic conditions and 75% of health spending is for treating chronic conditions (RWJF, 2013). Although cancer is the leading cause of death among Asian Americans, disaggregated data reveal that the leading cause of death among Filipino Americans is heart disease (Hastings et al., 2015).

Health-promoting lifestyle behaviors are protective factors to prevent disease in all racial and ethnic populations. Yet, clinical and lifestyle risks associated with health have been studied scarcely among Asian American subgroups. Behind African Americans and Native Americans, Filipino Americans rank third in the prevalence rate of hypertension (Barnes, Adams, & Powell-Griner, 2008). And Filipino Americans have the highest prevalence and incidence rates of diabetes compared to all other ethnic groups, including African Americans (Karter et al., 2012).

Filipinos are the fourth largest permanent immigrant group in the US (after Mexicans, Chinese, and Asian Indians) and the majority of Filipino Americans live in California (45%),

Hawaii, and New York (Louie, 2001; McNamara & Batalova, 2015). Immigration of Filipinos in the US was first documented in Morro Bay in 1587 and the 1965 Immigration Act (PL-89-236) began one of the largest waves of migration from the Philippines to the US (Sanchez & Gaw, 2007; Takaki, 1989, p. 419-421). Now, there are 3.6 million people who claim Filipino ancestry in the US and approximately 1.8 million are US-born (Migration Policy Institute, 2014; US Census Bureau, 2015). Filipino Americans remain an invisible minority, even with the increase in numbers in the population, as seen in the limited healthcare studies.

It is known that social determinants, such as age, race/ethnicity, income, education, acculturation, among others, influence health (Marmot, 2015; Solar & Irwin, 2010). Acculturation influences health outcomes (Salant & Lauderdale, 2003) such as a positive correlation between being overweight/obese and acculturation, that there was a transition in nutrition towards an obesogenic diet and higher BMI (Delavari, Sonderlund, Swinburn, Mellor & Renzaho, 2013). Among Filipino Americans, US-born children and adults acculturate to two contrasting cultures—the US culture emphasizes autonomy and individuality, while the Philippine culture emphasizes harmonious relationships and collectivism (Nadal, 2011). In research, higher acculturation was associated with negative reports of health, physical disabilities, hypertension, depression, cognitive disabilities of Filipino Americans; among Filipino American women, higher acculturation was associated with increased smoking and use of mammography (Ea, 2015). There is not much known about acculturation characteristics associated with chronic diseases (heart disease, high blood pressure, and diabetes) and health behaviors which mitigate the risk for chronic conditions among Filipino Americans.

### **Purpose of the Study**

The purpose of the study is two-fold: (a) to describe and compare acculturation characteristics and health behaviors of Filipino American adults who are US-born and not born in the US, and (b) to identify the acculturation characteristics associated with the chronic diseases (high blood pressure, diabetes and heart disease) and health behaviors in California's Filipino American population.

### **Acculturation Framework**

The theory of acculturation using both Berry's (1997, 2005) and Serafica's (2011) definitions, were used to guide the research questions. Berry (2005) defines acculturation within a psychological and sociocultural context. It is a "dual process of cultural and psychological change that takes place as a result of contact between two or more cultural groups and their individual members (p. 698)." It is a long-term process that occurs over years, generations, or even centuries and has longstanding effects even after the initial contact between the cultures. The levels in which acculturation happens can be at the individual or group level, and change is usually induced at a greater level in one group over the other group (Berry, 1997). Acculturation at the group level is applicable to Filipino Americans regarding health. When changes due to acculturation happen at the group level, they can be biological changes in the group (e.g., new diseases or different food), economic changes (e.g., new employment or loss of status), social changes (e.g., new friendships and relationships), physical changes (e.g., moving to urban locations), or cultural changes (e.g., dress, language shifts, changes in values, or religion) (Berry, 1997).

Serafica's (2011) concept analysis of acculturation in relation to the lifestyle choices within a health context of Filipino immigrants in the US described four attributes of acculturation

among Filipino immigrants: (a) interactions between the two cultures of the Philippines and the US, (b) exposure to a culture different from one's own culture that involves the English language, (c) process of maintaining some of one's original culture (values, practices, and beliefs) while changing to those of the original culture, and (d) adapting to the U.S. mainstream society within one's sociocultural context. Serafica (2011) describes the important consequences which happen after acculturation: changes in lifestyle choices, risks for unhealthy behaviors, and economic advancement.

## **Method**

### **Study Design**

The study was a descriptive, comparative cross-sectional non-experimental design that involved a secondary analysis of major chronic disease and health behavior variables by acculturation characteristics using 2011-2012 California Health Interview Survey (CHIS) data. The Institutional Review Board of the University of California, San Francisco reviewed and granted the study self-certification and exempt status.

### **Data Collection Procedure**

Self-reported data from the adult sample (aged 18 to 85 years) of the CHIS 2011-2012 were analyzed for this study. Of the 42,935 adults, 555 self-identified as Filipino Americans. The CHIS is a population-based telephone survey that is representative of non-institutionalized persons of all age groups in California (CHIS, 2014). First collected in 2001, and beginning with CHIS 2011-2012, CHIS is now conducted continuously during a two-year period. The CHIS 2011-2012 data collection occurred between June 2011 and January 2013 by way of random digit dialing of 80% landline and 20% cellular phone numbers. Landline phone numbers included all 58 counties in California using a simple random or systematic sampling strategy.

There were 28 cellular phone sampling strata. Interviews were conducted with computer-assisted telephone methodology and were considered complete when at least 80% of the survey was answered.

### **Variables and Measures**

Major chronic diseases (hypertension, diabetes and heart disease) and commonly known health behaviors (physical activity, body mass index, tobacco use and nutrition) associated with these diseases in the United States were selected for analysis in the 2011-2012 CHIS data. Three proxy variables for acculturation (born in the US, language spoken at home and English proficiency), along with standard sociodemographic variables, were also selected for analysis.

**Chronic diseases.** Hypertension was assessed by the question, “Has a doctor ever told you that you have high blood pressure?” Response options were *yes*, *no*, or *borderline hypertension*. The *yes* and *borderline hypertension* responses were combined. Diabetes was assessed by the question, “(Other than during pregnancy) has a doctor ever told you that you have diabetes or sugar diabetes?” Response options were *yes*, *no*, or *borderline*. The *yes* and *borderline* responses were combined. Heart disease was assessed by the question, “Has a doctor ever told you that you have any kind of heart disease?” Response options were *yes* or *no*.

**Health behaviors.** Tobacco use was assessed by asking, “Are you a *current smoker*, *never smoked regularly*, or *quit smoking*.” The *never smoked* and *quit smoking* responses were combined.

Physical activity was assessed by calculating the number of times walked for leisure in the past week (for at least 10 minutes) multiplied by the average length of time walked (in minutes) to yield the average length of time (in minutes) walked per week. Walking less than 150 minutes per week was categorized as does not meet the public health requirements for

physical activity and 150 or more minutes per week as meets public health requirements for physical activity (US DHHS, 2016a).

Body mass index (BMI), an indicator of body adiposity, was calculated from height and weight. Using the BMI guidelines for U.S. adults (CDC, 2016), a BMI below 25 was categorized as normal weight, a BMI of 25 and above was categorized as overweight, and a BMI of 30 and above was categorized as obese.

Nutrition was assessed by three components: servings per week of fruits and vegetables, ounces per week of soda and servings per week of fast food in the past 7 days. Based on the dietary guidelines for Americans (US DHHS, 2016b), recommended dietary fruit and vegetable was defined as 35 or more servings per week, 36 or less ounces per week for soda consumption and two or less servings per week for fast food consumption. Fruits and vegetables, soda intake, and fast food intake were categorized as *meeting* or *not meeting* the recommended requirements.

**Acculturation.** The proxy variables for acculturation of *born in the US*, *English proficiency* and *language spoken at home* were used. An individual was asked “In what country were you born?” This variable was converted to “born in the US” or “born outside of the US.” “What languages do you speak at home?” determined whether a person spoke only another language at home or English/English and another language. English proficiency was measured when a person reported that they spoke another language other than English at home. CHIS asked the question, “Since you speak a language other than English at home, we are interested in your own opinion of how well you speak English. Would you say you speak English...very well, well, not well, or not at all?” English proficiency was categorized in three categories: *English only*, *very well/well*, and *not well/not at all*. Those who spoke *English only* and *very well/well* were combined.

**Sociodemographics.** Sociodemographic variables included in the analyses were gender (male or female), age (years), marital status (married, living with partner, widowed/separated/divorced, or never married), education (less than high school, high school, some college, or college), employment (employed, unemployed, or retired), housing (own or rent/other), municipality (metropolitan or non-metropolitan), household annual income (dollars), and health insurance (yes or no).

### **Data Analysis**

Data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows version 23 (IBM, 2015). Descriptive statistics (frequencies and percentages) were computed on all independent and dependent variables: mean and standard deviations were calculated on interval data. Sociodemographic characteristics (age, household annual income, gender, municipality, marital status, education, housing, employment and health insurance) were sorted by place of birth: US-born or not born in the US. Chi-square analyses were computed to compare chronic diseases (hypertension, diabetes and heart disease) and positive health behaviors (not smoking, physically active, normal weight and met public health recommendations for fruit, vegetable, soda and fast food consumption) by acculturation characteristics (born in the US, English proficiency and language spoken at home). T-tests were used to determine the difference between place of birth group's age and annual income. Univariate logistic regression analyses were computed to determine the association of acculturation characteristics to chronic diseases and health behaviors. Frequencies, percentages, odds ratios and confidence intervals are reported. The  $p \leq .05$  alpha level, two-tailed determined statistical significance.

## Results

### Sample Characteristics

See Table 4.1 for the sociodemographic profile of the sample of 555 Filipino Americans living in California. Among Filipino Americans who were not born in the US, the sample was comprised of 144 (39%) males and 225 (61%) females with a mean age of 47.8 years ( $SD = 18.3$ ). The median household annual income was \$60,000. Almost all Filipino Americans in California lived in a metropolitan area (98%). A majority of Filipino Americans not born in the US were married (61%), had a college degree (68%), were homeowners (58%), employed (55%), and had health insurance (91%). US-born Filipino Americans had a similar sociodemographic profile as Filipino Americans not born in the US, except for age, gender, marital status, education and income.

Statistical differences in age, gender, marital status, education and income existed between Filipino Americans not born in the US and US-born (see Table 4.1). Although both US-born and Filipino Americans not born in the US ranged in age from 18 to 85 years, US-born Filipino Americans were significantly younger in years ( $M = 36.2$ ,  $SD = 16.1$ ) than Filipino Americans not born in the US ( $M = 53.7$ ,  $SD = 16.4$ ) ( $t(553) = -11.93$ ,  $p < .0005$ ). The majority of Filipino Americans not born in the US were women (61%) as compared to 50% of US-born Filipino Americans who were women ( $\chi^2(1, N = 555) = 6.089$ ,  $p = .014$ ). The proportion of married US-born Filipino Americans (37%) was significantly lower than married Filipino Americans not born in the US (61%) ( $\chi^2(3, N = 555) = 74.998$ ,  $p < .0005$ ). Filipino Americans not born in the US were significantly more educated as compared to US-born Filipino Americans ( $\chi^2(3, N = 555) = 52.521$ ,  $p < .0005$ ). Sixty-eight percent of Filipino Americans not born in the US held a college degree versus 42% of US-born Filipino Americans. The mean annual



household income for US-born Filipino Americans ( $M = \$82,517$ ,  $SD = \$60,081$ ) was significantly higher than the mean annual household income for Filipino Americans not born in the US ( $M = \$72,329$ ,  $SD = \$56,775$ ) ( $t(553) = 1.957$ ,  $p = .05$ ).

Table 4.1

*Sociodemographic Profile of the Filipino American Population in California by Place of Birth*

( $n = 555$ )

Characteristic	Born in United States ( $n = 186$ )		Not Born in United States ( $n = 369$ )	
	<i>n</i>	%	<i>n</i>	%
Age (years)**	$M = 36.16$ ( $SD = 16.1$ )		$M = 53.65$ ( $SD = 16.4$ )	
Annual Income (dollars)*	$M = \$82,517$ ( $SD = \$60,081$ )		$M = \$72,329$ ( $SD = \$56,775$ )	
Gender*				
Male	93	50.0	144	39.0
Female	93	50.0	225	61.0
Municipality				
Metropolitan	181	97.3	362	98.1
Non-metropolitan	5	2.7	7	1.9
Marital Status**				
Married	69	37.1	224	60.7
Living with partner	13	7.0	7	1.9
Widowed/separated/divorced	18	9.7	79	21.4
Never married	86	46.2	59	16.0

Characteristic	Born in United States ( <i>n</i> = 186)		Not Born in United States ( <i>n</i> = 369)	
	<i>n</i>	%	<i>n</i>	%
<b>Education**</b>				
College degree	78	41.9	250	67.8
Some college	41	22.0	65	17.6
High school	62	33.3	38	10.3
Lower than high school	5	2.7	16	4.3
<b>Housing</b>				
Own	108	58.4	211	58.4
Rent/other	77	41.6	150	41.6
<b>Employment</b>				
Employed	111	59.7	204	55.3
Unemployed	75	40.3	165	44.7
<b>Health Insurance</b>				
Yes	165	88.7	335	90.8
No	21	11.3	34	9.2

\*  $p < .05$ . \*\*  $p < .0005$ .

### **Acculturation Characteristics of Sample Not Born in the US and US-Born in Chronic Diseases and Healthful Behaviors**

Tables 4.2 and 4.3 show comparisons of the acculturation characteristics of Filipino Americans who are US-born and those not born in the US. US-born Filipino Americans compared to those not born in the US had a significantly lower proportion of hypertension ( $\chi^2(1,$

$N = 555$ ) = 18.10,  $p < .0005$ ), diabetes ( $\chi^2(1, N = 555) = 16.57, p < .0005$ ) and heart disease ( $\chi^2(1, N = 555) = 5.37, p < .05$ ). As compared to US-born Filipino Americans, a higher proportion of Filipino Americans not born in the US did not smoke cigarettes ( $\chi^2(1, N = 555) = 5.85, p = .02$ ), had normal weight ( $\chi^2(1, N = 555) = 4.03, p = .05$ ), and consumed the recommended 36 or less ounces per week for soda ( $\chi^2(1, N = 555) = 5.16, p = .03$ ). Filipino Americans who lacked English proficiency reported more hypertension as compared to those who reported proficiency in English ( $\chi^2(1, N = 555) = 4.62, p = .05$ ). More Filipino Americans who spoke another language at home that was not English, ate the recommended 35 or more servings per week of fruits and vegetables than Filipino Americans who spoke English only/English and another language at home ( $\chi^2(1, N = 555) = 6.97, p = .02$ ).

Languages used at home surfaced no significant difference in chronic diseases. Those who spoke English only or English plus another language and those who spoke a language other than English at showed no difference in experiencing hypertension, diabetes, or heart disease.

Similarly, there were no differences between those who were US-born or not born in the US, in engaging in physical activity, in consuming fruits and vegetables, and in the amount of eating fast food. Likewise, those who are proficient or not proficient in the English language showed no difference in their performance of all six healthful behaviors. Finally, except for the intake of fruits and vegetables, the language used at home indicated no difference in the remaining five healthful behaviors.

### **Acculturation Characteristics Associated with Chronic Diseases and Healthful Behaviors**

Tables 4.4 and 4.5 depicts the acculturation characteristics associated with chronic diseases and health behaviors in the Filipino American sample ( $n = 555$ ). US-born Filipino Americans were less likely to have hypertension (OR = .428, 95% CI [.288, .636],  $p < .0005$ ),

less likely to have diabetes (OR = .304, 95% CI [.167, .553],  $p < .0005$ ) and less likely to have heart disease (OR = .385, 95% CI [.167, .887],  $p = .03$ ) as compared to Filipino Americans not born in the US. Filipino Americans who were proficient in English were less likely to have hypertension as compared to Filipino Americans who were not English-proficient (OR = .421, 95% CI [.187, .947],  $p = .04$ ).

When compared to Filipino Americans not born in the US, US-born Filipino Americans were more likely to be current cigarette smokers (OR = 1.865, 95% CI [1.119, 3.106],  $p = .02$ ), were more likely to be overweight/obese (OR = 1.441, 95% CI [1.008, 2.061],  $p = .05$ ), and were more likely to drink more than the recommended 36 or less ounces per week of soda (OR = 1.774, 95% CI [1.077, 2.923],  $p = .02$ ).

Filipino Americans who spoke English or English and another language at home were less likely to eat the recommended 35 or more servings per week of fruits and vegetables as compared to Filipino Americans who spoke another language at home that was not English (OR = .386, 95% CI [.186, .800],  $p = .01$ ).

Table 4.2

*Comparison of Chronic Diseases by Acculturation Characteristics among Filipino Americans in California (n = 555)*

Acculturation Characteristic	Have Chronic Disease		
	Hypertension $\chi^2$ n (%)	Diabetes $\chi^2$ n (%)	Heart Disease $\chi^2$ n (%)
Born in the US	18.10**	16.57**	5.37*
Yes (n = 186)	44 (23.7)	14 (7.5)	7 (3.8)
No (n = 369)	155 (42.0)	78 (21.1)	34 (9.2)
English Proficiency	4.62*	2.47	.014
Yes (n = 530)	185 (34.9)	85 (16.0)	39 (7.4)
No (n = 25)	14 (56.0)	7 (28.0)	2 (8.0)

Have Chronic Disease			
Acculturation Characteristic	Hypertension	Diabetes	Heart Disease
	$\chi^2$ n (%)	$\chi^2$ n (%)	$\chi^2$ n (%)
Language at Home	.737	1.06	1.326
English (n = 499)	176 (35.3)	80 (16.0)	39 (7.8)
Other language (n = 56)	23 (41.1)	12 (21.4)	2 (3.6)

\*  $p < .05$ . \*\*  $p < .0005$ .

Table 4.3

*Comparison of Healthful Behaviors by Acculturation Characteristics among Filipino Americans in California (n = 555)*

Healthful Behavior						
Acculturation Characteristic	No Tobacco	Physically Active	Normal Weight	Fruit & Vegetable	Minimal Soda	Minimal Fast Food
	$\chi^2$ n (%)	$\chi^2$ n (%)	$\chi^2$ n (%)	$\chi^2$ n (%)	$\chi^2$ n (%)	$\chi^2$ n (%)
Born in the US	5.85*	1.97	4.03*	2.39	5.16*	1.41
Yes (n = 186)						
No (n = 369)	154 (82.8)	37 (19.9)	74 (39.8)	13 (7.0)	153 (82.3)	140 (75.3)
	332 (90.0)	56 (15.2)	180 (48.8)	41 (11.1)	329 (89.2)	294 (79.7)
English Proficiency	.004	.425	.033	3.14	.030	2.93
Yes (n = 530)	464 (87.5)	90 (17.0)	243 (45.8)	49 (9.2)	460 (86.8)	411 (77.5)
No (n = 25)	22 (88.0)	3 (12.0)	11 (44.0)	5 (20.0)	22 (88.0)	23 (92.0)
Language at Home	.702	3.03	.450	6.97*	1.97	2.06
English (n = 499)	435 (87.2)	79 (15.8)	226 (45.3)	43 (8.6)	430 (86.2)	386 (77.4)
Other Language (n = 56)	51 (91.1)	14 (25.0)	28 (50.0)	11 (19.6)	52 (92.9)	48 (85.7)

\*  $p < .05$ . \*\*  $p < .0005$ .

Table 4.4

*Univariate Logistic Regression for Acculturation Characteristics Associated with Chronic Diseases in the Filipino American Population in California (n = 555)*

Acculturation Characteristic Reference Group	Chronic Disease		
	Hypertension	Diabetes	Heart Disease
	OR 95% CI	OR 95% CI	OR 95% CI
Born in the United States	.428** .288, .636	.304** .167, .553	.385* .167, .887
Proficient in English	.421* .187, .947	.491 .199, 1.212	.913 .208, 4.018
English spoken at home	.782 .445, 1.373	.700 .354, 1.384	2.289 .538, 9.746

\*  $p < .05$ . \*\*  $p < .0005$ .

Table 4.5

*Univariate Logistic Regression for Acculturation Characteristics Associated with Health Behaviors in the Filipino American Population in California (n = 555)*

Acculturation Characteristic Reference Group	Health Behavior Reference Group					
	Use Tobacco	Physically Inactive	Overweight/ Obese	Fruit & Vegetable	Drink Soda	Eat Fast Food
	OR 95% CI	OR 95% CI	OR 95% CI	OR 95% CI	OR 95% CI	OR 95% CI
Born in the United States	1.865* 1.119, 3.106	1.388 .877, 2.196	1.441* 1.008, 2.061	.601 .314, 1.152	1.774* 1.077, 2.923	1.288 .847, 1.958
Proficient in English	1.043 .304, 3.581	1.500 .440, 5.119	.928 .414, 2.082	.407 .146, 1.134	1.116 .325, 3.826	3.330 .774, 14.327
English spoken at home	1.501 .577, 3.901	.564 .294, 1.082	1.208 .695, 2.099	.386* .186, .800	2.086 .731, 5.951	1.756 .807, 3.821

\*  $p < .05$ . \*\*  $p < .0005$ .

## Discussion

This study aimed to describe and compare the acculturation characteristics and healthful behaviors of adult Filipino Americans who were US-born and not born in the US, and (b) to identify the acculturation characteristics associated with the chronic diseases of high blood pressure, diabetes, and heart disease and healthful behaviors in Filipino Americans in California. Filipino Americans not born in the US had higher proportions and were more likely to have hypertension, diabetes and heart disease compared to US-born Filipino Americans. Those who were not proficient in English were more likely to have hypertension. US-born Filipino Americans were more likely to smoke, be overweight/obese, and drank more soda. Those who did not speak English at home were more likely eat the recommended servings of fruits and vegetables per week.

### **Chronic Diseases and Healthful Behaviors of Filipino Americans Who Were US-Born and Not Born in the US**

**Chronic Disease.** The study revealed that US-born Filipino Americans had significantly lower proportions of hypertension, diabetes, and heart disease compared to Filipino Americans not born in the U.S. Place of birth and Filipino ethnicity has been associated with chronic diseases in studies with Filipino Americans. A study in Hawaii reported that Filipino Americans had the highest rates of hypertension compared to several Asian groups, Hawaiians, and white, non-Hispanic (Juarez, Davis, Brady, & Chung, 2012).

Filipinos were 1.5 times more likely to have diabetes compared to white, non-Hispanic. When body mass index (BMI) was added, Filipino Americans still had 1.65 odds of having diabetes than white, non-Hispanic—at the same BMI, they may be more susceptible to diabetes (Choi, Chow, Chung & Wong, 2011). Karter et al. (2013) reported that when adjusting for age,

sex, income, systolic blood pressure, and BMI, Filipino Americans have 3.22 relative risk for diabetes compared to white, non-Hispanic. Filipino American men had seven times the odds and there were 2.4 times odds for Filipino American women to have diabetes compared to Caucasian men and women (Choi, Liu, Palaniappan, Wang & Wong, 2013). Araneta & Barrett-Connor (2005) reported that Filipino American women with normal weight, visceral adipose tissue, and normal waist size had significantly higher prevalence of diabetes compared with white or African American women. And after adjusting for age, exercise, college education, alcohol intake and visceral adipose tissue, Filipino American women were 7.5 times more likely to have diabetes than white women and 2.3 times more likely than African American women.

Filipino Americans were more likely to have coronary heart disease as compared to White, non-Hispanic Americans. And compared to WNH women, the relative risk for coronary heart disease was greater for Filipino American women (Klatsky & Tekawa 2005). As compared to White, non-Hispanic men and women, the odds ratio for coronary heart disease was higher for Filipino American men (Holland et al., 2011).

**Health Behaviors.** On the whole, Filipino Americans who were not born in the US tended to engage in healthful behaviors compared to those US-born. Filipino Americans not born in the US showed less tobacco use, have normal weight, and drank minimal amounts of soda.

Several studies supported the finding that US-born Filipino Americans had higher BMI than those born in the Philippines (Gomez et al., 2004; Krueger, Coleman-Minahan, & Rooks, 2014; Novotny et al., 2012; Novotny, Williams, Vinoya, Oshiro, & Vogt, 2009). In Hawaii, where at baseline of the study, acculturation (measured by educational level, country of birth,



age at immigration, and whether or not the birth country uses English as the national language) was positively associated with sweetened drinks (Novotny et al., 2012)

### **Acculturation Characteristics Associated with Chronic Diseases and Healthful Behaviors**

Univariate logistic regression showed that place of birth—being US-born or not born in the US emerged as the leading factor associated with chronic diseases and healthful behaviors in Filipino Americans. Specifically, Filipino Americans not born in the US more likely to have diabetes, heart disease, and hypertension, compared to those who were US-born. This was similar to a study in Houston, Texas, which reported that Filipino American men and women who had diabetes were older, had higher BMI, had a family history of diabetes, and low acculturation level (which was scored based on English proficiency, generation level, food preference) (Cuasay, Lee, Orlander, Steffen-Batey & Hanis, 2001).

In qualitative studies of Filipino Americans, causes of hypertension mentioned by participants were: high-fat diet in the US (Belza et al., 2004), heredity, fatty foods, drinking alcohol, stress (NHLBI, 2003), difficulty modifying Filipino dietary practices which is high in salt and fat, lack of exercise (from driving instead of walking or having too much familial responsibility), and smoking (Dela Cruz & Galang, 2008).

Similarly, place of birth was associated with engagement in healthful behaviors. US-born Filipino Americans tended to smoke tobacco, suffer from overweight or obesity, and drink more soda. Smoking as an acceptable health behavior for Filipino Americans have been reported due to smoking before age 18 (Gomez et al, 2004), smoking considered as socially acceptable and as a stress reliever (NHLBI, 2003). In a qualitative study of Filipino American men in Los Angeles (Maxwell et al., 2007), it was reiterated that smoking in their teens and smoking was a part of the Filipino culture. Reasons for smoking were: as a way to look mature and responsible, pass the

time, show social status, pleasure and imitate others. The high rates of smoking were blamed on the strong tobacco industry in the Philippines. Having friends who were smokers, having positive smoking beliefs (e.g. smoking can help people when they are lonely, bored, stressed, depressed or cold), and having a perceived high risk of smoking disease (which was a paradox) were predictors of smoking (Maxwell et al., 2007).

Studies have reported that English as the language spoken at home was associated with smoking. An et al. (2008) reported that only speaking English at home was associated with higher current smoking prevalence among Filipino Americans. Filipino Americans in Northern California who preferred a foreign language were less likely to smoke than their English-speaking counterparts, but English use with friends was a protective variable against smoking among Filipino men (Maxwell, Garcia, & Berman, 2007).

Contradicting findings regarding smoking and acculturation were also reported. Filipino American men who were less acculturated (those who described themselves as “more Filipino than American” and spoke English “not well at all”) were more likely to be smokers (Maxwell et al., 2007). And higher generational status and English language at home was associated with less current smoking and increased quit rate in a study among several Asian ethnicities which included Filipino Americans (An et al., 2008).

Higher BMI and obesity among Filipino Americans were positively associated with the acculturation variables of longer length of stay in the US, a higher percent of life living in the US, and speaking English at home (Nguyen, Smith, Reynolds, & Freshman, 2015). There were gender differences between BMI and acculturation variables among Filipino Americans. More acculturated (as measured by born in the US, language spoken, years living in the US) women had lower BMI than more acculturated men (Novotny et al., 2009). And third generation Filipino

American men had a higher mean BMI than first generation and older age at immigration was associated with larger increases in BMI (Oakkar et al., 2015).

The lack of proficiency in English surfaced as an acculturation characteristic linked with experiencing hypertension. There was no other supporting research for this finding. However, having less English proficiency may be associated with a person not being born in the US, therefore a higher likelihood to being diagnosed with hypertension.

Finally, the use of English as the language at home emerged as an acculturation characteristic related to the inadequate intake of fruits and vegetables. In a study by Serafica, Lane, & Ceria-Ulep (2013), eating more fruits and vegetables was related to eating more Filipino traditional foods. This was the opposite in Hawaii, where at baseline of the study, acculturation (measured by educational level, country of birth, age at immigration, and whether or not the birth country uses English as the national language) was positively associated with fruit consumption (Novotny et al., 2012).

### **Limitations**

This study has several limitations. First, a major limitation of this study was the CHIS 2011-2012 exclusion in the probability sampling of people without a landline or cellular phone, homeless individuals and persons living in group quarters and other types of residence such as single room only occupancies. These excluded individuals are typically among the poorest, which creates sampling bias and limits generalization of the findings. Respondents of household surveys are more likely to be employed, married and have higher incomes (Fowler, 2009). Second, nonresponse bias is also a limitation of telephone surveys. Third, limitations using existing data include inability to differentiate errors from coding, interviewing or keypunching errors because the original data are unavailable. Fourth, data were self-reported and not directly

measured, therefore a recall bias may have occurred and there were no means to validate answers of respondents (e.g. anthropometric measures, disease diagnoses). Fifth, the acculturation questions in CHIS were limited, so proxies for acculturation—place of birth, language spoken at home, and English proficiency, were used in this study, instead of a validated ethnic-specific acculturation scale such as A Short Acculturation Scale for Filipinos (Dela Cruz, Padilla, & Agustin, 2000).

### **Conclusions, Implications and Recommendations**

Acculturation had both positive and negative associations with chronic disease and health behaviors among Filipino Americans in California. US-born Filipino Americans had a significantly lower proportion of hypertension, diabetes, and heart disease compared to those not born in the US. Filipino Americans who were proficient in English were less likely to have hypertension than those not proficient in English. Among Filipino Americans not born in the US, positive health behaviors included not smoking cigarettes, having normal weight, and consuming less soda. More Filipino Americans who spoke another language at home that was not English ate the recommended servings of fruits and vegetables.

Improvement can be made among the health behaviors of all Filipino Americans, especially for US-born Filipino Americans, who were more likely to be current cigarette smokers, to be overweight or obese, and were more likely to drink soda. Filipino Americans who spoke English only or English and another language at home were also less likely to eat fruits and vegetables.

Additional research such as intervention studies for chronic disease prevention is needed for the Filipino American population. Policies and prevention programs regarding smoking and soda intake can be implemented to encourage tobacco prevention/cessation and decreasing soda/

sweetened beverage intake. Healthcare providers and nurses who give care to Filipino Americans should discuss a healthy diet, weight management, physical activity and chronic disease prevention/management. This is in line with the US Surgeon General's National Prevention Strategy (2011) whose vision is to "improve the health and quality of life for individuals, families, populations, and communities by moving the nation from a focus on sickness and disease to one based on prevention and wellness." And the priorities which include but are not limited to "tobacco-free living, active living, and healthy eating."

Generational studies of Filipino Americans must also be done to see if there are other differences in health within the population. Filipino Americans of different generations maintain, relinquish, and adapt elements of both their native-Philippine and immigrant-American cultures in food intake, dietary changes, physical activity and other health practices. These all affect their health and wellness and must be understood so that future educational and prevention interventions can be created in a culturally-appropriate manner.

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## CHAPTER V

### DISCUSSION

#### **Summary**

The focus of CHAPTER II and CHAPTER III was on cardiovascular disease and Filipino Americans. In the systematic review (CHAPTER II), results suggested that Filipino Americans are at high risk for developing cardiovascular disease, including coronary artery disease and stroke, dying from CVD, and for having hypertension, elevated cholesterol, type 2 diabetes mellitus, being overweight/obesity, physical inactive, having poor nutrition, and smoking, as compared to White, non-Hispanic and other Asian Americans in general and by gender.

Among Filipino Americans, men typically had more cardiovascular disease, hypertension, type 2 diabetes mellitus, and elevated cholesterol, smoked, and were overweight/obese as compared to women. Filipino American men had higher mortality due to all heart diseases and ischemic heart disease as compared to Filipino American women. Filipino women had higher mortality due to heart failure, all cerebrovascular disease, hemorrhagic and ischemic strokes as compared to Filipino American men.

Elevated blood pressure rates were similar between Filipino Americans and the US general population. Filipino Americans had a higher prevalence of metabolic syndrome and type two diabetes mellitus as compared to White, non-Hispanic Americans and other Asian Americans. Although there were less obese Filipino Americans than the US general population, more Filipino Americans were considered overweight compared to the US general population. Levels of physical inactivity were similar between Filipino Americans and White, non-Hispanic Americans, although Filipino Americans were less likely than WNH to meet physical activity



requirements. Tobacco use was lower among Filipino Americans as compared to WNH; however, there was a gender difference. Tobacco use among Filipino American men was higher than men in the US general population and White, non-Hispanic Americans.

In CHAPTER III, cardiovascular risks were prevalent and associated with CVD in the relatively healthy Filipino American population in California. The prevalence of CVD was 7.4%. Along with having hypertension and diabetes as cardiometabolic risks, unhealthy lifestyle behaviors prevalent among Filipinos in California were physical inactivity, being overweight/obese and inadequate consumption of fruits and vegetables. 83.3% did not engage in physical activity for the recommended 150 or more minutes per week, 54.3% were overweight/obese, and 90.1% did not eat the recommended 35 or more servings per week of fruits and vegetables. Univariate logistic regression analyses indicated that CVD was significantly associated with age, hypertension and diabetes. For every increase of 10 years in age among Filipinos in California, the respondent was 1.4 times more likely to have CVD. Filipinos who had hypertension were 4.8 times more likely to have CVD as compared to Filipinos who did not have hypertension. Filipinos who had diabetes were 3.3 times more likely to have CVD as compared to Filipinos who did not have diabetes. Multivariate logistic regression analysis indicated that only hypertension was a significant predictor of CVD, controlling for the effects of age, gender, born in US, and diabetes. Filipinos who had hypertension were 3.1 times more likely to have CVD than Filipinos without hypertension.

In CHAPTER IV, the differences in chronic diseases and health behaviors by acculturation characteristics were noted in the sample of Filipino Americans living in California. US- born Filipino Americans as compared to those not born in the US had a significantly lower proportion of hypertension, diabetes, and heart disease. Filipino Americans not born in the US

were 57% more likely to have hypertension, almost 70% more likely to have diabetes and almost 62% more likely to have heart disease as compared to US-born Filipino Americans. Filipino Americans who lacked English proficiency reported more hypertension as compared to those who reported proficiency in English. Filipino Americans who were proficient in English were 58% less likely to have hypertension as compared to those who were not English-proficient.

Health behaviors also significantly differed among acculturation characteristics of Filipino Americans in California. Compared to US-born Filipino Americans, a higher proportion of those not born in the US did not smoke cigarettes, had normal weight, and consumed the recommended 36 ounces or less per week of soda. As compared to Filipino Americans not born in the US, US-born Filipino Americans were almost twice as likely to be current cigarette smokers, were 1.4 times more likely to be overweight/obese, and were 1.8 times more likely to drink more than the recommended 36 or fewer ounces per week of soda.

More Filipino Americans, who spoke another language at home that was not English, ate the recommended 35 or more servings per week of fruits and vegetables than those who spoke English only/English and another language at home. Filipino Americans who spoke English or English and another language at home were 61% less likely to eat the recommended 35 or more servings per week of fruits and vegetables as compared to those who spoke another language at home that was not English.

### **Limitations**

Limitations of the systematic review are the scarcity of the studies, with mostly cross-sectional, non-experimental studies. The quality of the evidence was medium, and the findings were not generalizable, since only two studies were from a nationally-representative sample. Data from the studies were mostly self-reported and could be susceptible to social desirability

and recall bias. In CHAPTER III and CHAPTER IV, the limitations of the studies include sampling in the California Health Interview Survey (CHIS) 2011-2012. Persons without a landline or cellular phone, those living in group quarters or other types of residences, and homeless persons were excluded from the survey—possibly creating a sample bias. Secondary analysis limitations also include the inability to see the original data. Errors during the interview, data input, and coding cannot be obtained. Data from participants were self-reported, with no health measures validated. Acculturation measures were limited to the three variables available from CHIS 2011-2012.

### **Implications for Health and Nursing**

Implications for nursing practice should include care of Filipino Americans which are age-focused, primary and secondary prevention interventions for hypertension and diabetes, prevention of sedentary behavior and encouragement of physical activity, education on weight management and healthful nutrition, all taking into consideration acculturation characteristics of the individual.

Stress and psychological health should also be included in public health guidelines for cardiovascular health. Systematic monitoring of national CVD prevalence, lipid and cholesterol levels, dietary intake patterns, physical activity patterns, hypertension prevention and control, weight and diabetes management, other chronic diseases, and smoking cessation is needed for the Filipino American population. Policies and prevention programs regarding smoking and soda intake can be implemented to encourage tobacco prevention/quitting and decreasing soda and sweetened beverage intake.

## **Recommendations for Future Research**

Future research should include a focus on Filipino Americans' cardiovascular health and lifestyle health behaviors. Prospective studies are recommended for further research to examine changes in cardiovascular health of the population over time. Previous studies have primarily included Filipino Americans not born in the US. Generational studies of Filipino Americans must be done to see if there are other differences in health within the population. Filipino Americans of different generations maintain, relinquish, and adapt elements of both their native-Philippine and immigrant-American cultures in food intake, dietary changes, and practices. These all affect their health and wellness and must be understood so that future educational and prevention interventions can be created in a culturally-appropriate manner.

**University of California, San Francisco (UCSF)  
Committee on Human Research (CHR)**

**Self-Certification for Determining Whether Human Subjects Are Involved In Research  
When Obtaining Coded Private Information (Data) and/or Biological Specimens**

**Instructions:**

1. If you need documentation for funding agencies, administrators, or collaborators, this self-certification form is provided for your use. Copies of this should be maintained in the PIs research files. Do **not** submit a copy of the form to the CHR.
2. If the following condition is met for your research, the use of coded private information (data) and/or biological specimens does not meet the definition of a *human subject* and does not require Exempt Certification or IRB review. The [Determining Whether Human Subjects Are Involved in Research Decision Tree](#) will help you make this determination.
3. More background information and CHR written guidance can be found at <http://www.research.ucsf.edu/chr/Guide/chrExemptApp.asp>
4. If you have questions on how to use this form contact the CHR at (415) 476-1814 or e mail: [chr@ucsf.edu](mailto:chr@ucsf.edu).

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<b>Study/Grant Title/Award No.:</b>		
Impact of Acculturation and Lifestyle Health Behaviors on Cardiovascular Health among Filipinos in California		
<b>Condition that must be met for the coded private information (data) or biological specimens:</b>		
<ol style="list-style-type: none"> <li>1. The research is not regulated by the Food and Drug Administration (FDA). <u>AND</u></li> <li>2. One or more of the following apply. Check all that apply: <ul style="list-style-type: none"> <li><input checked="" type="checkbox"/> a. The key to decipher the code is destroyed before the researcher begins.</li> <li><input type="checkbox"/> b. PI and holder of the key enter into an agreement prohibiting the release of the key under any circumstances.</li> <li><input type="checkbox"/> c. There are IRB-approved written policies for the repository or data management that prohibit the release of the key.</li> <li><input type="checkbox"/> d. There are other legal requirements prohibiting the release of the key under any circumstances.</li> </ul> </li> </ol>		
<b>Principal Investigator's Certification:</b>		
I certify that the information provided in this application is complete and correct.		
<u>Catherine M. Waters</u> <b>Principal Investigators Signature</b>		September 1, 2015 <b>Date</b>

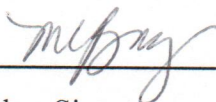
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