

THREE STUDIES ON PSYCHOLOGICAL DISTRESS, HEALTH-RISK
BEHAVIORS, AND HEALTH CARE ACCESS AMONG CHINESE, FILIPINO, AND
ASIAN INDIAN AMERICAN SUBGROUPS

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Of the Requirements for the Degree
Doctor of Philosophy

By
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The undersigned, appointed by the dean of the Graduate School, have examined the dissertation entitled

THREE STUDIES ON PSYCHOLOGICAL DISTRESS, HEALTH-RISK
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ASIAN INDIAN AMERICAN SUBGROUPS

presented by Hari Krishna Poudel,

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DEDICATION

~ To my wife, Sabi, and our sweet, thoughtful children- Piyush and Prajna, for their unconditional support and love in my life.

~To my parents, thank you for supporting me throughout my journey, whichever path I follow to move on.

~To my mother, I lost during writing my Ph.D. dissertation.

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ABSTRACT

Asian Americans are the fastest-growing ethnic minority population in the United States. Among this group, Chinese-, Filipino-, and Asian Indian Americans are the most three largest Asian American subgroups. Yet, health-related research on the growing Asian American population at the subgroup level remains limited. To date, studies have focused on aggregating all Asians into a single category. The current study sought to examine psychological distress, cigarette smoking and alcohol consumption, and health care access among the three most populous subgroups of Asian Americans. In Study 1, we focus on psychological distress. In Study 2, we focus on current cigarette smoking and alcohol consumption. Finally, we focus on the usual source of health care among these three subgroups in Study 3. We use the pooled National Health Interview Survey (NHIS) data (2011-2015) for our statistical analyses. Participants are self-identified Asian American adults who completed the Sample Adult Component questionnaires of the survey. NHIS provides information on adults' psychological distress, current smoking and alcohol consumption, and health care access. We run a series of multivariate regression models to examine key factors associated with psychological distress, health-risk behaviors, and usual source of care. The results of this dissertation highlight the importance of disaggregated data analysis when examining factors related to psychological distress, current cigarette smoking and alcohol consumption, and having a

usual source of care. We showed that there were significant health disparities remain in psychological distress, health-risk behaviors, and usual source of care across Asian American subgroups. Marked differences in health outcomes indicate the underlying significance of different predictors and draw the attention of policymakers, researchers, and practitioners to address the existing health disparities. Once policymakers understand the disproportionate health outcomes, they have the opportunity to formulate policies and legislation that will more accurately represent the experiences of specific Asian American subgroups so that targeted public services can be more productive.

Chapter 1

INTRODUCTION

The Asian American population is diverse, and Asian Americans make up about 5.60% (about 22.2 million) of the United States population (U.S. Census Bureau, 2019). According to a Census Bureau report (2019), the U.S. Asian American population growth rate had the fastest growth rate of any major ethnic group during 2000 and 2015. A dramatic upward shift in the population having Asian origins came after the enactment of the 1965 amendments to the Immigration and Naturalization Act (Lee, 2015). The bill aimed to undo the national-origins quota, which gave preference to Northern and Western Europeans seeking to immigrate to the U.S. and started a family preference and skill-based immigration system. The early history of Asian Americans is a history of adaptation, resistance, and assimilation (National Academies of Sciences, Engineering, and Medicine [NASEM], 2017). In keeping with the increasing population growth trend, the Asian American population in the United States will likely rise further. The Asian share of the total U.S. population in 2014 was 5.40% and is projected to account for 9.30% of the total U.S. population in 2060 (Pew Research Center, 2017). Therefore, understanding the health and health outcomes of this rapidly growing population within the Asian American subgroups has emerged as an area of focus for our research. Nonetheless, studies on health and mortality among Asian American subgroups have not been extensively studied and documented (Li et al., 2018).

The following section provides a discussion on immigration history, socioeconomic status, and acculturation experience for the three largest Asian American subgroups separately: Chinese American, Asian Indian American, and Filipino American.

These subgroups have undergone some acculturation process upon their arrival in the U.S. As part of the broader Asian American community, these three subgroups share several political, social, and economic similarities in terms of how they relate to the larger non-Asian society. However, their cultural and socioeconomic characteristics and immigration experiences are specific to their community (Le, 2007).

Asian American Subgroups

Asian Americans are referred to as a group of individuals with Asian ancestry who share similar cultural worldviews and values (Tseng, 2009). They share everyday experiences despite the cultural, economic, and social diversity that exists within each subgroup. However, Asian Americans share common values and unity that created a pan-Asian American identity to raise the voice of the political needs of all Asians together. The general public and the U.S. government agencies also view all Asians as being pan-ethnic Asian American. Thus, our study adopted the U.S. Census Bureau's definition of Asian –“people having origins in any of the original people of the Far East, Southeast Asian, or the Indian subcontinent” (U.S. Census Bureau, 2019). Asian Americans represent people of Asian descent, including first- and subsequent-generation Asian immigrants to the United States. The Bureau reports that Chinese, Filipinos, and Asian Indians are the most populous Asian American subgroups. They have unique immigration histories, sociodemographic characteristics, and acculturation experiences. Yet, the following discussion highlights notable differences among three Asian American subgroups regarding current demographics, immigration history, socioeconomic status, and acculturation experiences.

Chinese Americans

Chinese Americans refer to the population who self-identifies as having Chinese ancestry, regardless of nativity, citizenship status, duration of stay in the U.S., immigration status in the United States (Le, 2007).

Current Demographics

The United States is home to five million Chinese Americans making them the largest Asian American subgroup in the United States (U.S. Census Bureau, 2019). The U.S. Census Bureau (2019) reported that the Chinese American population increased from 2.80 million in 2000 to 5.00 million in 2017. Regarding the immigration status of the Chinese Americans, a majority of them (63.00%) are foreign-born, and about 62.00% reported limited English proficiency compared to 50.00% of the total foreign-born population (Hooper & Batalova, 2015). Chinese Americans are less likely to be proficient in English than the overall U.S. foreign-born population. More interestingly, over half of the Chinese Americans resided in only two states California and New York (National Council of Asian Pacific Islander Physicians [NCAPIP], 2015).

Immigration History

Chinese immigration history has a two-part history in the United States. The first wave took place from the 1850s to the 1880s, which was composed mostly of laborers, skilled artisans, merchants, and fishermen (Moyers, 2003). The first wave Chinese took low-skilled jobs as manual laborers in the mining, construction, agriculture, manufacturing, or service industries. They were subjected to unequal pay and required to work the most dangerous jobs available, risking their lives daily for very little pay in return (Moyers, 2003). Some of them also worked as small-town merchants. During the

decades of the 1840s and the 1850s, Chinese immigrants were pushed to immigrate by forces in China like natural disasters, internal upheavals, and imperialistic aggressions and pulled to migrate by the discovery of gold in California and economic opportunities in the U.S. (Chin, 2017). The U.S. Congress passed the Chinese Exclusion Act in 1882, which suspended the entry of all Chinese laborers to the United States and barred Chinese residents from obtaining U.S. citizenship (Zeidel, 2006; Lee, 2015). Chinese immigrants were persecuted and harassed and could not find jobs, so they started the laundering business, a predominant occupation of the Chinese during the late nineteenth and early twentieth centuries in the United States (Ling, 2018). Such an anti-Chinese movement, underscored by the Chinese Exclusion Act, was compounded by the economic depression on the West Coast, contributing to the redistribution of Chinese immigrants (Chin, 2017). The second wave of Chinese immigrants arriving post-1965 is predominantly skilled (National Research Council on the Integration of Immigrants into American Society, 2016). In addition to these immigrants, Chinese students have become the principal source of international students enrolled in U.S. higher education (Hooper & Batalova, 2015). They also receive the second-largest number of employer-sponsored temporary visas, after Asian Indians, and approximately half of them have received legal permanent resident status.

Socioeconomic Status

Socioeconomic characteristics affect immigrant integration into the host society (NASEM, 2017). The enactment of the Immigration and Nationality Act of 1965 (also known as the Hart-Celler-Act) abolished the 1924 National Origins Formula (Lee, 2015). The Formula was based on the national origin of the individuals that contributed to

reuniting immigrant families and attracting skilled labor to the United States.

Additionally, the abolition of the national origins system did represent an increase in the opportunities for immigration from non-European countries, including China, the Philippines, and India. The two million Chinese legal immigrants from 1970 to 2013 represent a new chapter in American immigration history (NASEM, 2017).

The educational gap between immigrants and natives ended up slightly larger in 2012 than in 1970 among all ethnic minority groups (NASEM, 2017). For example, Chinese immigrants started from relatively lower average years of the educational level of 10.5 years and moved up to 13.9 years with an average increase of 3.4 years of schooling. Immigrants from the Philippines started from a relatively higher average year of the educational level of 13.9 years and moved up to 14.2 years with an average increase of 0.3 years of schooling. Indian immigrants started from the highest average year of the educational level of 15.8 years and moved up to 15.9 years with an average increase of 0.1 years of schooling. The majority of Chinese immigrants came to the U.S. with a higher education degree and technology skills. About 50.00% of Chinese adults have at least a bachelor's degree, and most of them have a graduate or professional degree (Pew Research Center, 2017). Compared to the overall foreign-and native-born populations in the U.S., Chinese Americans are more likely to be employed in a management position, but 19.00% of Chinese immigrants live in poverty, a rate similar to all immigrants but slightly higher than the 15.00% posted by the native-born population (Zong & Batalova, 2016). Furthermore, according to the analyses of 1970-2000 Decennial Census data and 2010-2012 American Community Survey Data, foreign-born

men have lagged slightly behind native-born before 2012; however, foreign-born men were more likely to be employed than native-born men after 2012 (NASEM, 2017).

Acculturation

Many Chinese Americans are living in the dilemma of dealing with bicultural identities by adapting mainstream cultural environmental and maintaining their original Chinese culture (Dong et al., 2012). During the process of acculturation in the nineteenth and twentieth century, Chinese immigrants selectively accepted the dominant American culture. The first wave of young male peasants received the mainstream U.S. culture while the second wave of Chinese immigrants is different from the immigrants during the Gold Rush days of the 1800s (Le, 2007). Most of the second wave of Chinese immigrants hold either Western culture or Eastern Asian cultural values.

Individuals' exposure to either compatible or contradictory cultural orientations is essential in shaping Chinese American cultural identities. Although the current American society emphasizes cultural pluralism, racism has been an important issue since the beginning of the immigration to the United States (Lee, 2015). During the eighteenth and nineteenth centuries, the context of the reception was not favorable to Chinese immigrants because they faced challenges involving prejudice, overt discrimination, and deliberate racism (Dong et al., 2012). Before the early twentieth century, the Chinese constituted the only Asian American subgroup who had encountered ethnic-specific exclusionary laws forbidding their immigration, land rights, and either marrying or education with whites (Hooper & Batalova, 2016). The Chinese Exclusion Act of 1882 targeted a specific ethnic group (i.e., Chinese American) for the first time in U.S. history, barring all immigration from China (Yang, 2018). The restriction on bringing over family

members to the U.S. had devastating effects such as chronic illness, despair, and depression among Chinese Americans. Additionally, Chinese immigrants were forbidden from owning land, intermarrying with Whites, owning homes, working in many occupations, getting an education, and they were forced to be isolated communities as a matter of survival (Le, 2007). However, the context of reception to the Chinese immigrants to the U.S. has changed over time (Dong et al., 2012). The majority of them have settled in gateway cities and major urban centers where they established communities known as Chinatowns (Ling, 2009). The highest number of Chinese Americans live in California (35%) and New York (16%). The establishment of Chinatowns exhibits the formation of Asian ethnic urban enclaves, and they are understood as a reflection of socioeconomic and cultural functions. Chinese could find employment, housing, and cultural comfort, virtually without interacting with the larger society (Ling, 2009). Additionally, Chinatowns allowed them to make a living among themselves and demonstrate their cultural solidarity in American society (Dong et al., 2012).

Asian Indian Americans

Asian Indian Americans refer to the population who self-identify as having Asian Indian ancestry regardless of nativity, citizenship status, duration of stay in the U.S., and immigration status (Le, 2007).

Current Demographics

The Asian Indian subgroup is the second-largest Asian American subgroup with a population of about four million (accounting for 20.00% of the national Asian Americans) in 2015 but was only limited to about two million in 2000 (U.S. Census

Bureau, 2019). The rapid population growth makes Asian Indian the second largest Asian subgroup in the U.S., surpassing the Filipino ethnic group in number after 2010.

Regarding the immigration status of the Asian Indians, more than three fourths (78.00%) of them are foreign-born, and only 26.00% of them report limited English proficiency compared to 50.00% of the total foreign-born population (Zong & Batalova, 2015). Asian Indian Americans are more likely to be proficient in English than the Chinese foreign-born population. Unlike the Chinese, Asian Indians are more likely to settle in California, New Jersey, Texas, and Illinois (Pew Research Center, 2017). They make up the largest Asian American subgroups in 23 states, mostly in the South, Midwest, and Northeast regions (NCAPIP, 2015).

Immigration History

Among Asian subgroups, Asian Indians are the most recently arrived immigrants in the United States. The majority (62.00%) of Asian Indian immigrants arrived after 2000, and only 38.00% came to the United States before 2000 (Zong & Batalova, 2016). A small number of immigrants from India started to migrate around 1840, primarily as low-skilled farm laborers (Lee, 2015). However, the first large-scale immigration of Asian Indians into the U.S. took place after 1965. A new and vital piece of legislation was passed in 1965 that introduced temporary skilled worker programs and created employment-based permanent visas (Ling, 2009). Since then, Asian Indians have been using their high educational statuses as the specific channels to enter the United States.

Socioeconomic Status

Asian Indians have much higher educational status, job skills, and English proficiency than any other Asian ethnic group (Zong & Batalova, 2016). For example, in

2015, 77.00% of Asian Indian adults had a bachelor's degree or higher, compared to 29.00% of all immigrants and 31.00% of native-born adults. The higher educational status, in turn, gives them specific advantages in getting high-paying jobs faster than others with low educational statuses (Pew Research Centre, 2017). That is why Asian Indians are nearly twice as likely to be employed in management, business, science, and arts occupations compared to the overall foreign-and-native born populations. Asian Indian Americans who migrated were more likely to be highly skilled health and science professionals compared with Chinese Americans and Filipino Americans (Zong & Batalova, 2015). Notably, Asian Indians are fluent English speakers as English is one of India's official languages. This is related to the history of British colonialism, which may help them to adjust quickly to American culture (Tseng, 2009). However, elder Asian Indians who came into the United States as dependent family members had poor English proficiency compared to those who immigrated earlier in their lives. A large number of Asian Indians' immediate relatives (spouses, minor children, and parents) of naturalized Indians American citizens are entitled to entry into the U.S. as immigrants (Zong & Batalova, 2015).

Acculturation

The Asian Indian population is considerably heterogeneous in language and religion, but shows cultural similarities, especially reported attitudes to health-related aspects of life (Chandra et al., 2016). Asian Indians practice a variety of faiths. Their cultural influences are deeply rooted and continue to affect their health conditions, including mental outcomes (Nieuwsma et al., 2011; Roberts et al., 2016). The interpretations of symptoms and treatment of mental illnesses are based upon their

cultural beliefs, and the cultural beliefs may determine the causes and treatments of their mental health illness (Gupta, 2010). For instance, patients may try to recover diseases by using folk remedies, seek advice from friends and family, go to practitioners of complementary and alternative medicine, or seek professional help.

Through years of exposure to Western values, beliefs, and customs from their history of British colonization, Asian Indians may have the ability to operate effectively in both cultures by adopting Western traditions in the workplace and also maintaining family values and the religious ideologies of original cultures at home and in religious gatherings (Roberts et al., 2016). Asian Indians put great emphasis on their families, indicating a more exceptional ability for connection and affiliation to their cultures of origin (Choi & Thomas, 2009). Additionally, the individual family member is expected to sacrifice for the good of the family; therefore, Asian Indians are deeply involved in psychological concerns that individual experiences (Rastogi & Wadhwa, 2016). These values may enable Asian Indians to show strength and resilience for their better health and well-being.

On the other hand, Asian Indian Americans have a different minority identity development than other Asian Americans because they selectively acquire and maintain the values and practices of both cultures (Choi & Thomas, 2009). However, the model minority stereotype may have placed pressure on Asian Indians and gives a false picture of their health conditions, thus limiting prevention and treatment efforts for the illnesses experienced by this ethnic group. High levels of cultural identities are associated with decreased risk of mental illness among Asian immigrants (Leong et al., 2013).

Filipino Americans

Filipino Americans refer to the population who self-identify as having Filipino ancestry regardless of nativity, citizenship status, duration of stay in the U.S., and immigration status (Le, 2007). The term Filipino Americans refers to people of Filipino descent, including first- and subsequent-generation Filipino immigrants to the United States.

Current Demographics

Around a fifth (19.00%) of the Asian Americans are Filipinos- the third-largest after the Chinese Americans and Asian Indian Americans (U.S. Census Bureau, 2019). Additionally, the U.S. Census Bureau mentions that the Filipino population has grown from 2.30 million in 2000 to 3.80 million. Regarding the immigration status of the Filipino Americans, about 53.00% of them are foreign-born, and only approximately 30.00% of Filipino immigrants reported limited English proficiency, compared to 50.00% of the total foreign-born population (McNamara & Batalova, 2015). Filipino Americans are more likely to be proficient in English than the Chinese foreign-born population. Unlike Asian Indian Americans, the majority of Filipino Americans have settled in only two states, California (42%) and Hawaii (10%) (NCAPIP, 2015).

Immigration History

The Philippines is a former U.S. territory and continues to have ties with the U.S. Filipino Americans started to immigrate to the U.S. sometime between the middle of the 1700s and the 1830s. The largest share of Filipinos (59.00%) arrived before 2000, and this share is slightly higher than any other Asian immigrant that came in the U.S. (McNamara & Batalova, 2015). Filipino immigrants got legal status as residents of a U.S.

territory, and they mainly worked in agriculture. After World War II, many Filipino immigrants came into the U.S. as non-agricultural workers, including military, trader, and labor exchanges between the U.S. and the Philippines (Pew Research Center, 2017). Hence, Filipino Americans have a colonial history and, resulting cultural values, with a mixture of numerous influences, are most notably American, Spanish, and Chinese. Spanish and U.S. colonization for nearly 400 years brought changes in religion, education, politics, and ideology to the Philippines. Among these numerous influences, Filipinos have been infused uniquely with the political and cultural ideals of American culture which differentiates Filipinos from other Asian immigrants (dela Cruz et al., 2018).

Socioeconomic Status

The one million Filipino legal immigrants from 1970 to 2013 represent a new chapter in American immigration history (NASEM, 2017). Unlike other Asian immigrants, the majority of Filipinos come to the United States with the ability to speak, read, and write English and represent relatively homogenous professional backgrounds. English is an official language of the Philippines; therefore, Filipino immigrants are more proficient in English than the overall foreign-born population (McNamara & Batalova, 2015). In 2016, about 15.00% of the Filipino immigrants spoke no English at home versus 16.00% of all immigrants. The proficiency in English-speaking skills might have more significant cultural and institutional similarities to the U.S., making adjustments easier for Filipino immigrants than most other Asian American subgroups (Tseng, 2009).

Many Filipinos are in contact with U.S. ideas in their home country, and they are proficient with English (Gee et al., 2019). English skills facilitate a smoother transition to

the U.S. post-migration. Additionally, from 1902 to 1920, the U.S. government-sponsored a program that brought young men and women to the country for their higher education at American institutions. Altogether, Filipino immigrants may have enjoyed privileges from the U.S. government, which other immigrants did not have (Le, 2007). For instance, in 2016, 50.00% of the Filipinos had a bachelor's degree, versus 30.00% for all immigrants in the U.S. About 54.00% of Filipino Americans are employed in service, sales and office, and production occupations, indicating overrepresentation in the service sector and underrepresentation in managerial positions (Zong & Batalova, 2016).

Acculturation

Filipino Americans have struggled to create a unique and visible social identity within the United States (McNamara & Batalova, 2015). Due to hundreds of years of colonization in the Philippines by the U.S. and their more recent status as a minority within a minority, the Filipino subgroup is caught in a continually expanding and increasingly complex cultural identity crisis (Cunanan et al., 2006; Eisen, 2019). According to Cunanan and colleagues (2006), Filipinos have low ethnic pride in Hawaii, where 10.00% of the state population are Filipinos. Participants reported riskier of being Filipinos in Hawaii despite some social network advantage.

Despite a unique colonial and long historical relationship with the United States, Filipinos continue to be regarded as the forgotten Asian Americans (Cordova, 1983) or the invisible minorities (Cimmarusti, 1996). Additionally, the colonial mentality, a specific form of internalized oppression, can potentially explain the high rates of mental health problems among Filipino Americans (David & Okazaki, 2006). Filipino immigrants are often overshadowed by the majority of Asian ethnic groups, such as

Chinese and Japanese. Hence, Filipinos are marginalized by the dominant majority group and are further marginalized within the Asian American minority (Cunanan et al., 2006). This notion of marginalization faced by Filipinos may have a substantially inhibiting effect on their psychological wellbeing (David & Okazaki, 2006). Filipinos in the United States are often situated in racialized social systems that malign Filipino culture and identity (Eisen, 2019). The inter-generational conflicts and breakdown in traditional Filipino culture tend to have happened among second-generation Filipinos (Cunanan et al., 2006). Among Asians, Filipinos were the most negatively affected by the experiences of racism which appears to be positively correlated with the internalization of ethnic or cultural inferiority (Le, 2007).

Similarities and Differences among Three Asian American Subgroups

The largest three Asian American subgroups in the United States are Chinese-, Filipino-, and Asian Indian Americans. As a single group, Asian Americans remarkably share some similarities and some differences in the history of adaptation, resistance, determinants of health, and acculturation. Asian Americans differ across different social characteristics. Based on social characteristics, gender attitudes seem different across Asian ethnic groups. Chinese and Asian Indian ancestries are patrilineal, which emphasizes the lower status of women as a cultural norm. In contrast to the Chinese and Asian Indian cultural system, women have the same legal rights to inherit, see, and own property as men in the Philippines. Furthermore, laws in the Philippines reflect egalitarian rather than patrilineal values. The Filipino American gender attitude tends to be more similar to those of the host society. The construct of family values might have different meanings and dimensions among Asian Americans. Hence, the distinct family

value and cultural system may influence differences in health outcomes among Asian Americans. In addition to the cultural system, immigration history can affect individuals' health (Tran et al., 2013). Hence, cultural meanings and social practices immigrants bring with them from their home countries as well as structural, economic, and cultural forces in their new environments are complex and dynamic that shape immigrants' lives (Foner, 1997).

Many Asian Americans have brought high skills and high educational statuses. Their human capital resources have become the pulling factor to the United States for the majority of Asian Americans. However, we see a difference in their socioeconomic statuses among Asian immigrants (Yang, 2010). For instance, the post-1965 Asian Indian immigrants were overall the most educated group; especially, they had the most significant percentage of graduate degrees. Filipino immigrants were also highly educated than Chinese immigrants. However, Chinese immigrants displayed a polarized pattern of having a college or higher degree and without having a high school diploma. Therefore, post-1965 Asian immigrants should not be understood as bimodal distribution. According to NASEM (2017), compared to the native-born, recently arrived immigrants continue to be overrepresented among the high and low categories of educational attainment.

Marked variation of occupational quality across major Asian immigrant groups is evident (Zong & Batalova, 2016). Furthermore, the disproportionate share of foreign-born workers in both the highest- and lowest-skilled occupations may contribute to occupational segregation between foreign-born workers and native-born workers (NASEM, 2017). For example, post-1965 Chinese tend to have a relatively lower

occupational status than their respective pre-1965 counterparts. However, post-1965 Filipino immigrants were over-represented in both the professional and non-professional (such as services and manual laborer) jobs in comparison to their pre-1965 counterparts. Post-1965 Asian Indian immigrants cannot compete with their pre-1965 counterparts (Pew Research Center, 2017). In short, post-1965 Asian immigrants are overall more educated and skilled than Asian immigrants who came before 1965 into the U.S.; however, pre-1965 Asian immigrants have advantages in occupational attainment (Gong, 2006). Yang (2010) found that a bifurcation economy among Asian Americans: higher and increasing economic conditions of the Asian Americans, on the one hand, and lower and decreasing economic conditions on the other.

Similarly, a marked variation of wages between men and women is evident (NASEM, 2017). According to NASEM (2017), female immigrants experience a slow growth rate in their wages than do male immigrants. Years of education explain much of the wage difference for immigrant women compared with native-born women. The literature on economic attainment suggests that Asian Americans have a lower return of education on income compared with Whites (Chang & Chan, 2016). Therefore, recent Asian immigrants may experience an earning disadvantage despite comparable education levels due to foreign educational credentials, limited U.S. work experience, and limited English-language abilities.

Additionally, diversity in immigration histories and acculturation experience characterizes educational and occupational attainment across the Asian American population. Despite human capital attainment by Asian Americans, cultural acceptance remains elusive (Rastogi & Wadhwa, 2006). Individuals may experience feelings of

isolation, fear, and confusion of not being accepted by the dominant society or disconnect from one's heritage culture, which, in turn, may lead to acculturation difficulties and adjustment to the mainstream society.

Put together, historical, cultural, and linguistic differences can explain ethnic differences in health status (Thanh et al., 2013). Previous research that has extensively focused on the study of various health outcomes of Asian Americans has mostly considered all Asians into a single category hiding socioeconomic and immigration experiences among them. However, until recently, the impact of disaggregated Asian Americans on health conditions received less attention than the aggregated Asian Americans. With so much focus in the literature on the aggregated Asians' health conditions, disaggregated Asians' health conditions are overlooked by researchers and in policy debates. It is the need to consider the unique historical and social circumstances of different cultural groups rather than grouping them under one homogenizing label (Cunanan et al., 2006). The homogenizing label may overlook the potential needs of different Asian communities at risk. Thus, this manuscript stratifies Asians into different subgroups. Among different subgroups, we consider the three most populous subgroups of Asian Americans, including Chinese-, Filipino-, and Asian Indian Americans. This study is organized into three different studies: Study (1) assesses psychological distress using social determinants of health framework. Study 2 examines cigarette smoking and alcohol consumption behaviors. Finally, study 3 assesses health care access using Andersen's behavioral framework.

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Chapter 2

EXAMINING NONSPECIFIC PSYCHOLOGICAL DISTRESS AMONG CHINESE, FILIPINO, AND ASIAN INDIAN AMERICAN SUBGROUPS: SOCIAL DETERMINANTS OF HEALTH APPROACH

Over 12.00% of Asian Americans reported mental illness within the past year (Substance Abuse and Mental Health Services Administration [SAMHSA], 2019). When comparing Asian Americans to other racial/ethnic groups, government data consistently shows Asian Americans have the lowest levels of psychological distress (Centers for Disease Control and Prevention [CDC], 2017; National Institute of Mental Health [NIMH], 2018). In 2016, while 18.30 % of all U.S. adults aged 18 or older had any mental illness, the prevalence of any mental illness was the lowest in the Asian American population (12.10%). Similarly, 4.20 % of all U.S. adults had a severe mental illness, but the prevalence of severe mental illness was the lowest among the Asian American population (1.60%) (NIMH, 2018) with a few exceptions.

The mental health problem has become pervasive and persistent across Asian American subgroups (Choi et al., 2020; Kim & Zane, 2016; Park et al., 2018). In a longitudinal study examining mental health among young Asian Americans, Choi and colleagues (2020) found that the overall mental health problems increased over the four years of the study period. Additionally, they also found group-specific factors associated with psychological distress, ethnicity, gender, socioeconomic status, and nativity status. Considering Asian Americans' heterogeneity on these factors, these factors may have

direct or indirect effects on their health, including psychological distress (Antecol & Bedard, 2006; Prus, 2011). Yet, the rapidly increasing Asian American population in the United States warrants future studies that can examine the group-specific study at the national level. Asian American groups have diverse socioeconomic resources, demographic characteristics, and acculturation factors that may differently influence psychological distress. It is necessary to examine relationships among these factors in different Asian American subgroups aimed at reducing disparity in psychological distress.

The introduction section provides detailed psychological distress and its use in mental health literature. The chapter also gives a broad picture of the model minority stereotype followed by Asian culture and mental health that may directly or indirectly affect psychological distress. Then, the introduction section discussed the important determinants of psychological distress. We used the social determinants of health as a conceptual framework to guide our study. Based on this framework, several research hypotheses were generated and tested to provide answers to the research questions.

Psychological Distress

Psychological distress is a mental health problem, and distress is often used as an indicator of functional impairment (Drapeau et al., 2012). Along the same line of thought, distress is the degree of emotional suffering or mental upset caused by a specific symptom, such as nervousness, hopelessness, restlessness, depression, fatigue, or feelings of worthlessness and symptoms of distress are subjective perceptions of individuals (Drapeau et al., 2012). Similar to these symptoms of mental health conditions, psychological distress is common in the general population, and it is found as a

psychological phenomenon in nursing, medical, psychological, and social science literature. Measuring psychological distress can provide valuable insights into the burden of mental illness in different populations, and we can use such information to recommend public health programs and public health policy, particularly for an in-depth follow-up clinical interview to ascertain the presence of state mental disorder (Cornelius et al., 2013).

The Kessler Psychological Distress Scale is the most commonly used short scale to screen for common psychiatric disorders or (Cairney et al., 2007; Cornelius et al., 2013; Kessler et al., 2002, 2003). Kessler 6 (K6) and Kessler 10 (K10) are reliable and valid scales to identify people who are likely to meet the Diagnostic and Statistical Manual, Fourth Edition (DSM-IV) (Cornelius et al., 2013). Both scales perform screening for the identification of subclinical cases in the past 30 days. Although the performance of two instruments (K6 and K10) is similar, the K6 is more attractive for use as a screening instrument because of the lower response burden (Cairney et al., 2007). Similarly, Furukawa et al. (2003) have shown the K6 to be more robust than the K10 to subsample variation. The brevity of the K6 scale makes it preferable to the other screening instruments as a screen for depression. Altogether, the K6 scale is increasingly used in population-based mental health research and has been validated in multiple settings (Cairney et al., 2007; Cornelius et al., 2013; Kessler et al., 2002, 2003).

A standardized psychological distress scale, the Kessler 6-Item Psychological Distress Scale, which was developed in 1992, is used to differentiate between people with moderate and severe mental health conditions (Kessler et al., 2002, 2003). The K6 Scale was first used in the 1997 U.S. National Health Interview Survey (NHIS) to assess the

negative feelings of individuals 30 days before the interview and has been used since (Lynn et al., 2019). In NHIS, the Kessler (K6) Scale addresses specific items, including nervousness, hopelessness, restlessness, feelings of depression, feelings that everything is an effort, and worthlessness (Kang et al. 2015; Kessler et al. 2010). This survey instrument has consistently measured the same phenomenon of psychological distress in a variety of populations, including Asian Americans (Kim & Zane, 2016; Paek et al., 2019; Park et al., 2018; Prochaska et al., 2012).

Model Minority Stereotype

Research on Asian group variation in the association between the socioeconomic condition and mental health becomes especially important in light of the model minority stereotype. Asian Americans have been historically stereotypically portrayed as being a model minority, which describes that all Asians have better health and wealth (Zhang, 2010). Wong et al. (1998, p. 99) explain, “Stereotypes are impressions that members of one group have about members of another group.” The perceived notions of the stereotype are natural intellectual aptitude, strong family and community support, and a propensity for hard work and diligence (Cunanan et al., 2006). As a result of the model minority label, Asians may experience a backlash in terms of critical social service support (Cunanan et al., 2006). It has impeded Asian Americans from receiving adequate social services and support and has caused some Asian Americans to experience anxiety and psychological distress (Sue, 2012).

The historical portrayal as a “Model minority stereotype” presumes that all Asians have a higher median income and education levels than non-Hispanic whites (Zhang, 2010). From this stereotype lens, all Asians tend to have high, medium-income, and high

educational status due to their hard work and cultural practices (Yook, 2013). This stereotype conceals the socioeconomic status of poor Asians who are poorly educated, underemployed, and trapped in low paying nonprofessional jobs (Becerra et al., 2013). However, some Asian Americans occupy a unique position about this discourse of Asian American success. Despite the model minority stereotype, Asian socioeconomic status shows a bimodal distribution across ethnic subgroups obscuring true diversity and complexity among them. Thus, not all Asians have equal social status, and there are significant ethnic differentials of poverty within the Asian category (Rastogi & Wadhwa, 2016; Takei & Sakamoto, 2011). For instance, Rastogi and Wadhwa (2016) found large within-group disparities in income. The same study found that some Asian Indian families might fall at either end of the SES continuum. Additionally, the expectations of living up to the model minority myth put them at risk for mental health consequences (; Chung & Epstein, 2014; Wong & Mikes, 2014). Therefore, the model minority stereotype label may mask the needs and ignore various risk factors that Asian Americans confront (Cunanan et al., 2006).

In the case of Asian Americans, stereotypes associated with them are, at times, positive. However, such positive Asian stereotypes are related to higher levels of psychological distress (Gupta et al., 2011). In a study examining the relationship between positive Asian stereotype and psychological distress among Asian Americans including Chinese, Filipino, and Asian Indian Americans, Gupta and colleagues (2011) found that Asian Americans who reported positive Asian stereotypes or who lived in the model minority myth experience adverse effects of Asian stereotypes that extend beyond intelligence and cognitive domains.

Furthermore, many researchers (Chou & Feagin, 2015; Wong & Halgin, 2006) have discredited the myth of the model minority because Asians are more likely to live in poverty when compared to non-Hispanic whites (U.S. Census Bureau, 2017) and even vary greatly if they are disaggregated into ethnic groups. According to the Pew Research Center (2017), the poverty rate among Burmese Americans reached 35.00% whereas the rate was only 7.50% among Asian Indian Americans. Poverty rates also differ by the generational status of Asian Americans; the poverty rate among foreign-born noncitizens is estimated to be twice the rate of Asian Americans who are either naturalized citizens or the US-born (Larsen, 2004). Thus, the low-achieving Asian Americans may experience distress as a result of their efforts to live up to the standards of the model-minority stereotypes (Lee, 1994).

Given that many non-Asian and Asian Americans alike believe the model minority stereotype of Asian Americans, the different levels of poverty, education, and income – along with the different subgroups comprising the Asian American population – are not acknowledged. The resulting variations in health outcomes to fit in with this assumed norm may remain unrecognized as the model minority stereotype may perpetuate the false assumption that race is not relevant to the general health statuses of Asian Americans in the United States (Alvarez et al., 2006). There are a significant amount of studies attempting to oust the merits of the model minority thesis due to the variance in poverty rates (Chou & Feagin, 2015; Gomez et al., 2004; Wong & Halgin, 2006), but few studies have disaggregated Asian Americans by ethnic subgroups. Therefore, more considerable research attention is needed to understand the impact of

race/ethnicity that can help in predicting variations of psychological distress on subpopulation by country of origin (Alvarez et al., 2006).

Putting all this together, endorsing the Asian model minority stereotype can lead to negative psychological distress in two different ways. First, stereotypes can put pressure on those Asian Americans who do not feel that they are meeting the expectations associated with the model minority myth. Second, Asian Americans internalize the group's stereotypes, and the degree of internalization of stereotypes is linked to ethnic identity development. The differential treatment by others in their group can lead to being dissatisfied with their identity, which may have negative health consequences. Finally, contrary to the privileged status implied by the model minority stereotype, Alvarez and colleagues (2006) found 98.00% of the participants (Chinese and Filipino Americans living in California) reported at least one encounter with a racial microaggression in the past year. However, we should be cautious in generalizing this finding, which focused only on Chinese and Filipino Americans. For example, the experiences of Asian Indian Americans may be different from those of the participants.

Asian Culture and Mental Health

Asian Americans place great value on their traditional cultural value system, and Asian culture affects the diagnosis and treatment of mental disorders (Kramer et al., 2002). Therefore, it is worthwhile for our research to conceptualize how Asian culture is relevant to the study of psychological distress among Asian ethnic groups. Culture may have different effects on the levels of distress since there are differences regarding cultural beliefs, gendered-norms, and immigration experiences across Asian ethnic groups.

The Chinese health belief system is guided by Confucianism, which leads Chinese people to believe that mental illness is caused by a lack of harmony of emotions (Kramer et al., 2002). The philosophy of Confucianism, a collectivist tradition that is fundamentally distinct from that of the American individualistic culture, stresses respect for authority, filial piety, justice, fidelity, and family harmony (Yoo et al., 2014). It appears that Chinese culture discourages open displays of emotions as they do not maintain social and familial harmony. That is why mentally-ill patients may not be willing to disclose or to discuss their psychological states. So, mental illness is stigmatizing; and such deep-rooted stigma may further deteriorate their psychological well-being. On the other hand, many Chinese often try traditional herbs and acupuncture to get rid of mental disorders (Zhu, 2018). In the United States, traditional Chinese cultural beliefs on mental health and its treatment practice can severely conflict with ideals that emphasize on openly disclosing psychological state and on Western treatment practice (Kramer et al., 2002). Hence, the Chinese stigmatization of mental health may underestimate the prevalence of psychological distress (Au, 2017).

Like the Chinese described above, and the Asian Indian Americans, described below, Filipino Americans also adhere to traditional family values, which put a strong emphasis on the centrality of family. Despite their more robust focus on family, Filipino Americans have a stronger intergenerational cultural conflict (Choi et al., 2020). The conflict arises due to the everyday confrontation of maintaining two cultures, i.e., the American culture and the Philippine culture (dela Cruz et al., 2018). The contrasting cultures may further deteriorate individuals' mental health over time. It is also essential to

understand that most Filipinos are more highly acculturated than Chinese and Asian Indians in mainstream culture (Choi et al., 2020).

Hindu philosophy guides the Asian Indian cultural system, and it profoundly adheres to stigmatized beliefs about mental illness (Chandra et al., 2016; Gupta, 2010; Inman et al., 2015; Nieuwsma et al., 2011). Mental illness is more about ethical matters, and most people hold negative views towards persons experiencing mental illness. The pressure to conceal mental illness results from perceived public stigma such as loneliness, shame, and hopelessness, which could lead to psychological distress (Oexle et al., 2019). However, Asian Indians' cultural beliefs and behavior are neither uniform nor universal because Asian Indians are tremendously heterogeneous in their spoken languages, dialects, and practice almost all the religions of the world (Chandra et al., 2016). Furthermore, more Asian immigrants change their cultural beliefs after contact with the U.S. culture as integration and assimilation into the American culture occurs (Nieuwsma et al., 2011). More specifically, recent immigrants have different values than those who came a generation ago (Inman et al., 2015). Asian Indians' mental health literature discussed in this section demonstrates that individuals who selectively acquire elements of both cultures are less likely to have stress. In contrast, those individuals who oppose mainstream American culture to maintain their heritage culture are more likely to have stress. All immigrant families may go through the cultural transitions and experience the generational gap in their traditional values and norms (Choi et al., 2020). Since our study sample consists of the majority of foreign-born individuals, we expect that they face intergenerational cultural conflict, which may be more salient. Supporting this, Choi and

colleagues (2020) found intergenerational cultural conflict as a significant contribution to explaining variations in psychological distress.

Determinants of Psychological Distress

A variety of social determinants of health have been theoretically and empirically linked to psychological distress to varying degrees. The following identifies and describes in further detail these determinants and their impact on psychological distress.

Economic Stability

Economic stability-related determinants are poverty, employment, and food security. These determinants are key indicators of the pace and extent to which immigrants integrate into the United States National Academies of Sciences, Engineering, and Medicine [NASEM, 2017]. According to the World Health Organization (WHO, 2008), poverty determines an individual's structural position within a society, which, in turn, influences health outcomes, including psychological distress. Economic factors influence multiple health outcomes, such as mortality. The importance of economic factors in health studies makes it necessary to examine the association between economic factors and psychological distress among Asian Americans, whose mental health is understudied.

Evidence is inconsistent regarding the association between economic factors and psychological distress among Asian Americans. Some researchers find that economic factors do not affect psychological distress (Breslau et al., 2006; Gavin et al., 2010), whereas others find a significant association between the two (Appel et al., 2011; Lorant et al., 2003; Shen & Takeuchi, 2001). A study of Chinese Americans that examined the

role of acculturation on psychological distress, Shen and Takeuchi (2001) found that Chinese Americans who had higher SES tended to express less severe depressive symptoms ($\beta = -.09, p < .05$), but the magnitude was not strong. On the other hand, higher SES, when mediated by several factors, including a better support system, had a stronger relationship to the reduced depressive symptom severity. The same study showed that the Chinese Americans with higher SES were more likely to perceive more social support from friends, family, and spouse, which, in turn, led to less stress ($\beta = -.31, p < .01$). Another study that examined social determinants of health using 1935-2016 NHIS temporal data found that adults with an annual family income $< \$35,000$ were 5.4 times more likely to experience serious psychological distress than those with annual family incomes of $\$100,000$ or more. Therefore, higher socioeconomic statuses may serve as protective factors for Asian immigrants to cope better in a new society. The protective effect may help in reducing risks for individuals for depression. However, the relationship contributes to lowering psychological distress only through indirect pathways (Shen & Takeuchi, 2001).

A recent report based on the 2014 National Survey on Drug and Use and Health mentions that the rate of psychological distress increases with individuals with low SES backgrounds (SAMHSA, 2019). Similarly, a meta-analysis found that low socioeconomic individuals had significantly higher odds of adverse mental health outcomes compared to their higher-income level counterparts (Lorant et al., 2003). The potential explanation for higher odds of adverse mental health is due to increased vulnerability among lower-income individuals, consequently placing those individuals at risk for meeting basic needs (Derose et al., 2007). Those vulnerable immigrants generally have lower rates of

health insurance, and they also use fewer health care services (Braveman et al., 2010). For instance, although Filipino Americans have the second-highest median family income and the lowest poverty rate among Asian Americans, they differ from other Asian Americans in having higher incidence rates of depression (Appel et al., 2011).

Employment status is one of the determinants of economic factors. Asian Americans are often able to secure professional jobs and thereby increase their employment prospects (Pew Research Center, 2017), and the being employed status is associated with better self-rated physical health among Asian Americans (Assari & Kumar, 2018; Leong et al., 2013). In other words, being currently employed may serve as a protective factor against adverse health outcomes in unfavorable circumstances. In contrast, unemployed individuals may experience problems meeting basic needs, potentially placing them at risk for mental illness (Gallo et al., 2009).

Another factor contributing to psychological distress is food security status. It is a crucial component of the economic factor that describes the essential ability to purchase food with nutritional value for oneself or one's family (USDA, 2019). People living in food-insecure households are more likely to face a host of health problems including poorer general health and a higher risk of being psychologically depressed (Arenas et al., 2019). Research has shown a strong relationship between food insecurity and psychological distress (Becerra et al., 2018; Carter et al., 2011). Becerra and colleagues (2018), using data from the California Health Interview Survey to assess the prevalence of food insecurity among Asian American subgroups, found that a wide variation of prevalence and burden of food insecurity among disaggregated Asian American populations. Additionally, the authors found a significant relationship between the

prevalence of food insecurity and low acculturation for the Chinese subgroup. More specifically, being foreign-born was related to being food insecure among Chinese and Filipino subgroups when compared to their U.S.-born counterparts.

Neighborhood and Built Environment

The region of residence in the U.S. is an essential determinant of the wellbeing of people that can correlate with psychological distress (Alegria et al., 2004; Huynh et al., 2014). The underlying mechanism associated with this contextual variable influences the strength and meaning of identification with the ethnic and national groups (Huynh et al., 2014). Therefore, the context to which people are willing to help each other and can be trusted may reflect individuals' social networks within the neighborhood (de Cruz et al., 2018). For example, Filipinos are more concentrated in Southern California, which may provide additional opportunities for creating and establishing family networks and other social group relationships (de Cruz et al., 2018). Such social relationships can serve as precursors of reinforcing the feeling of belonging and affiliation. An individual member who lives in the same national-origin ethnic neighborhood may perceive a high level of social cohesion, and this social cohesion may be positively associated with lower psychological distress. However, higher county-level foreign-born densities were associated with the worse mental health status of individuals (Choi et al., 2016). Previous literature provides the mixed result of the effect of the region of residence on psychological distress among Asian Americans. The perceived health problems may depend on the density of Asians living in a particular area. For example, Chinese in San Francisco appear to have greater social support than Chinese Americans in Honolulu.

Similarly, Filipino Americans in Honolulu seem to have greater social support than Filipino Americans in San Francisco (Gee et al., 2006).

The region of residence in the U.S. is broadly classified into four regions in the NHIS dataset following the U.S. Census Bureau's (2019) classification: Northeast, Midwest/North Central, South, and West. Asian Americans are mostly concentrated on the West Coast region. Asian Americans tend to settle in urban areas and are focused in the West (47.00%). The concentration of the Asian American population in the West reflects historical immigration patterns (Pew Research Center, 2017). Asian Americans are least likely to live in the Midwest; only 11.00% of adults do. Additionally, Asian Americans living in the Midwest are more likely to have fewer ethnic resources in their environment compared with those living on the West Coast (Huynh et al., 2014). The Northeast and South each are home to about 20.00% of Asian Americans.

Regional differences reflect ethnic-specific concentration (Pew Research Center, 2017). For example, about 66.00% of Filipino Americans live in the West. Similarly, Chinese Americans are more likely to live in the West than in any other region. However, the majority of the Asian Indian American population is spread out across the United States and this is more than any other racial/ethnic group. These regional differences have different risks of mortality rates such as higher risks of cardiovascular disease mortality rates in the Southeastern region of the United States (Singh et al., 2017).

Education

While literature points to a fairly consistent pattern of the relationship of educational status and psychological distress (Ajrouch et al., 2010; Assari & Kumar, 2018; Chang & Moon, 2016; Ro et al., 2016; Zhang & Hong, 2013), some studies find

that the association between education and psychological distress is not related (Gavin et al., 2010), and some studies find that education moderates the discrimination-psychological distress association (Zhang & Hong, 2013).

Furthermore, the relationship between educational status and psychological distress may also be complicated (Braveman et al., 2010) or ethnic-specific (Xu, 2011). Lower educational status was associated with a higher prevalence of psychological distress (Chang & Moon, 2016; Xu, 2011). Education is a resource in itself and it helps people generate other resources such as income and employment (Chang & Moon, 2016; Ross & Mirowsky, 2006). Knowledge and skills attained through education might enable people to obtain better quality and more secure jobs in safe work environments to provide access to a range of opportunities to enhance income, and to increase a broader range of social networks that provide instrumental and emotional support. Additionally, years of education represent the accumulated knowledge, skills, and behaviors that can help people succeed more generally and may prove useful in pursuing fundamental ends, including emotional well-being (Ross & Mirowsky, 2006). Emotional well-being increases with the level of education as a result of the greater sense of control supporting the idea of the positive impact of educational attainment in reducing psychological distress.

The similar health-protective effect of higher educational status is noticed in other ethnic minorities in the United States (Xu, 2011). Xu (2011) found that education was strongly associated with distress among Cubans with college degrees producing the most significant protection from mental illness. In contrast, Puerto Ricans and Mexicans did not have the health benefit of higher educational status. Considering the different types of

associations between educational status and psychological distress, it is vital to examine its impact on psychological distress in Asian Americans- a highly educated ethnic minority population in the United States.

On the contrary, educational status may become a stress risk factor for Asian immigrants (Ai et al., 2015; Yoshihama et al., 2012; Zhang & Hong, 2013). Using data from the National Latino and Asian American Study, Zhang and Hong (2013) examined whether education moderates the association between perceived everyday discrimination and psychological distress. The authors found that the detrimental effect of discrimination is stronger for Asian Americans with college or more level of education than for Asian Americans with less than college levels of education. The same study highlights the significant unique role of education in improving the understanding of Asian Americans' mental health. The same study showed that the foreign-educated Asian Americans with higher levels of education were affected most negatively by discrimination compared to less educated Asians. Hence, the place of education and educational attainment jointly affect everyday discrimination and mental health association (Zhang & Hong, 2013). Along the same vein, Yoshihama and colleagues (2012) found that discrimination varied by educational level. The same study reported that Asian Indians who had a graduate degree were more likely to have experienced discrimination than those with less than a bachelor's degree. Additionally, they did not find gender differences in perceived reasons for experiencing discrimination.

As pointed out by the Pew Research Center (2017), about 51.00% of Asian Americans have a bachelor's degree or more, but only 30.00% of all Americans have a similar degree. Approximately 87.10% of the Asian Americans aged 25 and older have at

least a high school diploma or equivalent in 2015, which exactly matched the percentage of the total U.S. population who had at least the same educational status (U. S. Census Bureau, 2017). One of the potential explanations for higher education is related to Asian culture. Even low achieving Asians work hard, believing their culture in which education is the key to a secure future (Lee, 1994). Despite this, there is a wide variation of educational achievement by the Asian origin group. For example, 72.00% of Asian Indian Americans hold a bachelor's degree or higher as compared to Chinese Americans at 51.60%, Filipino Americans at 42.00%, and Bhutanese Americans at only 9.00% (Pew Research Center (2017)).

Health and Health Care System

Previous studies provide strong evidence that the lack of health insurance is responsible for increasing health burden to individuals (Chang et al., 2015; Clough et al., 2015), and the lack of insurance can be a common barrier to health care access among low-income racial and ethnic minorities (Spencer et al., 2010). There is a low amount of health insurance coverage among immigrants compared with their U.S-born counterparts (Abe-Kim et al., 2007; Derose et al., 2009) may contribute to the use of informal mental health service use among Asian Americans.

Another social determinant that comes under the domain of health and health care is access to health care. Improving access to care helps bridge health care and public health as there are longstanding disparities faced by racial/ethnic minority populations in the United States (Artiga & Hinton, 2019). Previous studies showed that health care access is an important factor that influences the health and well-being of immigrants (Jang, 2016; Yoo et al., 2009). However, the availability of linguistically appropriate

health care services is limited in the U.S. (Kim et al., 2011) even though legislation has made a provision of language support to those who are unable to communicate in English. The provision of language access is in Title VI of the Civil Rights Act of 1964, which states that no person will be excluded, based on race, color, or national origin, from any program that has received federal financial assistance (U S Census Bureau, 2019). As a result of this legislation, a little movement has taken place, providing language access to non-English speakers. For instance, some states like New Jersey, California, and Washington have provided training to their providers so that they can address language access or understand cultural differences, and some states have provided interpreter services to publicly-funded medical care services. However, many illiterate patients are not aware of their legal rights of using English translations in their states (Chen et al., 2007).

Acculturation

Understanding the circumstances under which relationships among various SDH and acculturation variables exist has unique practical and theoretical implications in the study of psychological distress among the Asian American population. Acculturation, which can be broadly understood as cultural change, can influence outcomes related to mental health. A well-documented body of literature has demonstrated that the effect of psychological distress varies by acculturation across the Asian Americans, and the results are multidimensional and non-uniform (Bratter & Eschbach, 2005; Choi et al., 2020; Ai et al., 2019; Shen & Takeuchi, 2001; Takeuchi et al., 2007). In the literature on the Asian American population, the word acculturation has broadly emphasized the process of adaptation to the norms of the dominant culture while downplaying the process of

maintaining one's heritage cultural standards. Based on this conceptualization of acculturation to cultural values, it is reasonable to consider cultural elements in the study of Asian Americans and their health conditions. However, due to a lack of the measurement ability of culture in NHIS data, different proxies of acculturation have been extensively used in past studies (Abraido-Lanza et al., 2005; Maffini et al., 2015; Park et al., 2014).

Acculturation is a process that involves various forms of psychological and socio-cultural adaptations to a new culture (Chung & Epstein, 2014). Asian Americans may be challenged to balance the customs, values, and identities congruent with the new culture (host culture), and to those congruent with their Asian heritage culture (Lui & Zamboanga, 2018). The adaptation may be prone to stress since people have left their social environment behind, and they enter into a new culture. However, not all people and groups experienced the same level of acculturation. The level of acculturation was associated with SES, duration of stay in the U.S., and English language proficiency (Kim & Sung, 2016).

A substantial body of literature demonstrates that the effect of acculturation on psychological distress is primarily indirect (Ai et al., 2019; Shen & Takeuchi, 2001). A study that examined the association between acculturation and depression found that Chinese Americans with higher levels of acculturation tend to have more depressive symptoms (Shen & Takeuchi, 2001). One potential explanation for such elevated depressive symptoms may be attributed to racial and ethnic identity issues (Ai et al., 2019). Paradoxically, as demonstrated, a higher level of acculturation was associated with higher SES, which had a beneficial effect on mental health. Their findings revealed that

more acculturated Chinese Americans tended to achieve higher SES, and higher SES was related to better physical health, more perceived social support, and lower personality negativity. On the other hand, less acculturated Chinese Americans were more likely to achieve lower SES, rendering them at higher risk for psychological distress because of the lack of psychosocial protective effects of better financial and educational background.

When immigrants find a more significant disparity between the heritage culture and new culture, they may experience a poor state of wellbeing (Lui & Zamboanga, 2018). Hence, the country of birth influences how individuals approach ethnicity and culture, which, in turn, affects the psychosocial state of individuals. All Asians are potential targets of the stereotypic assumptions of foreigner objectification (i.e., frequent/typical questioning about being a foreigner and thereby “less American,” regardless of the actual place of birth) which is associated with more significant psychological distress among U.S.-born but not foreign-born individuals (Armenta et al., 2013). This finding is consistent with earlier studies (Frisbie et al., 2001; Takeuchi et al., 2007), documenting that foreign-born Asian Americans tend to have better health outcomes compared to their native-born counterparts.

Studies of acculturation among Asian Americans have suggested that Asian Americans who lived in the U.S. for a significant portion of their lives are more likely to adopt an American lifestyle (Acevedo-Garcia et al., 2010; Castañeda et al., 2015; Mui & Kang, 2006; Shen & Takeuchi, 2001). In other words, these studies support the acculturation hypothesis in which the health advantage of foreign-born immigrants appears to converge to the host society over time. Prolonged exposure to mainstream culture is often explicitly linked to their health and health outcomes (Castañeda et al.,

2015). For example, Asian Americans who had lived in the U.S. for 15 years or more, versus less than four years, had higher odds of self-reported physical health. However, the association was non-linear (OR=2.35 and 1.91, respectively) (Acevedo-Garcia et al., 2010). More specifically, Shen and Takeuchi's (2001) cross-sectional study found that Chinese Americans who lived in the U.S. for a longer duration were more likely to report depressive symptoms.

Demographic Characteristics

The three largest countries of origin of Asian immigrants mentioned in the National Health Interview Survey are China, the Philippines, and India. Asians originate from more than 20 national origins in the Far East, Southeast Asia, or the Indian subcontinent such as China, India, the Philippine Islands, Japan, Korea, Vietnam, Malaysia, Pakistan, Thailand, and Cambodia (U.S. Census Bureau, 2017).

Age

Age is often not considered a social determinant of health, but advancing age is a disadvantageous social factor (Link & Phelan, 2005). Consequently, the disadvantaged circumstances may be associated with an increased risk of adverse health outcomes over time (McMullin & Cairney, 2004). According to a report published by the Pew Research Center (2017), the median age for all immigrants, including Asian Americans in 2014 was 44 years compared to 36 years for the U.S.-born. Asian immigrants may have to go through an extra burden of their advancing age factor.

Gender

Gender is another well-documented predictor of immigrant health outcomes, which has demonstrated consistent relationships with mental health and health behaviors

(Bas-Sarmiento et al., 2017; Bromet et al., 2011; Stafford et al., 2010; Tummala-Narra et al., 2019) found that being a woman is an added risk factor for suffering psychological distress for both foreign-born and native populations. Asian cultural values are associated with gender identity. For example, the Chinese and Asian Indian cultural system places women at a lower status (Tummala-Narra et al., 2019). Both cultures have a strong and unique familial norm in which a woman obeys her father, follows her husband, and, later, her oldest son, commonly practiced by Asian women (Au, 2017). The women's disadvantaged ascribed status indicates that women have fewer socioeconomic resources than men (Ross & Mirowsky, 2006). Furthermore, well-educated women have less authority and autonomy and lower earnings compared to well-educated men (Reskin & Padavic, 1994); in turn, women may get fewer psychological benefits from several years of education. Thus, the gendered patterned socioeconomic resource distribution is one of the prominent reflections of the existing structural inequalities between men and women (Garcia-Calvente et al., 2012) that variation contributes to differences in exposure and vulnerability to certain risk factors for health (Krieger, 2003).

Considering both structural hierarchical and robust cultural norm systems of Asian Americans, Asian American women experience increased psychological distress compared to their male counterparts. A vital construct that needs to be studied in Asian Americans is gender because several studies demonstrated a disproportionate health burden of women (Ai et al., 2011; Jonnalagadda, 2005; Yoshihama et al. 2012). According to Ai and colleagues (2011), Filipino women had better mental health compared with their Chinese and Vietnamese counterparts. However, poor self-rated health was associated with the female gender among Asian Indians (Jonnalagadda, 2005).

Previous studies clearly point to the importance of examining possible gender differences in Asian American population groups. Therefore, we expect to determine the moderation effect of gender on the relationship between a series of predictors and psychological distress.

Marriage

Marriage is a particularly important unit of analysis among Asian Americans (Joel Wong et al., 2012; Park et al., 2018; Rollock & Lui, 2016; Walton & Takeuchi, 2010). A substantial body of literature examining the relationship between marital status and psychological distress reveals lower reported psychological distress among those who were married (Chung & Epstein, 2014; Rollock & Lui, 2016; Tran et al., 2016; Walton & Takeuchi, 2010). Tran and colleagues (2016) examined the association between marriage and psychological distress using data from California Health Interview Survey, and the authors investigated that the marriage significantly interacts with race/ethnicity in impacting psychological distress ($F(7,73)=2.48, p<.01$). The same study reported that unmarried Chinese had a statistically higher average psychological distress than married Chinese ($OR=2.591, 95\% CI=1.98-3.18$). Similarly, Zhang and Hong (2013) found that among Chinese, Filipino, and Vietnamese subgroups, never married reported the highest distress levels than married individuals. One possible explanation for these findings involves marital and spousal support which may help in mediating negative psychological consequences because married couples experience more significant emotional support and social integration (Tran et al., 2016). These characteristics are ingrained into Asian cultures that commonly emphasize collectivistic culture and norms with marital relationships (Kramer et al., 2002; Rollock & Lui, 2016).

Another possible reason why Asian Americans have more emotional support in their families is that interactions with partners tend to emphasize the good of the group rather than the wellbeing and self-actualization of individual members (Chung & Epstein, 2014; Kramer et al., 2002). Considering the real fact that Asian Americans have the highest rate of marriage and lowest divorce rate across the major ethnic groupings in the United States (U.S. Census Bureau, 2017) can provide strong evidence of low levels of psychological distress among married Asian Americans. The family is a backbone institution in the Asian American community, and family members have a strong tradition of extended, patriarchal, and kinship ties (Kramer et al., 2002; Zhou, 2009). Asian American literature found family with children at home is related to more psychological problems (McLanahan & Adams, 1987), but the effects are moderated by gender differences (Walton & Takeuchi, 2010). For example, the mental health of women is more responsive to changes in family composition such as an increase in the number of children in a family. Furthermore, in traditional Asian American families, women are mainly responsible for the caretaking of their children, and men are responsible for earning. On the other hand, men are more likely to be socially distant from family members, reflecting increased responsibility of women in raising their children (Walton & Takeuchi, 2010).

Conceptual Framework

The current study applies the social determinants of health (SDH) as a guided conceptual framework designed and adopted by the CDC for policy development to address health disparities (CDC, 2012). The CDC characterizes the SDH framework as

economic and social conditions that treat where and how people live (Braveman et al., 2011). The approach has been extensively used in developing and implementing new strategic plans to promote health equity (Dean & Fenton, 2013). Such strategies provide supportive policy frameworks for enhanced action in reducing health disparity. However, scholars do not commonly apply an SDH approach to understand how socioeconomic status and acculturation affect migrants' mental health conditions. Thus, the SDH framework guides our study as immigrant health research deals with large numbers of people with pre- and post-migration experiences shaped by social, structural, and acculturation processes.

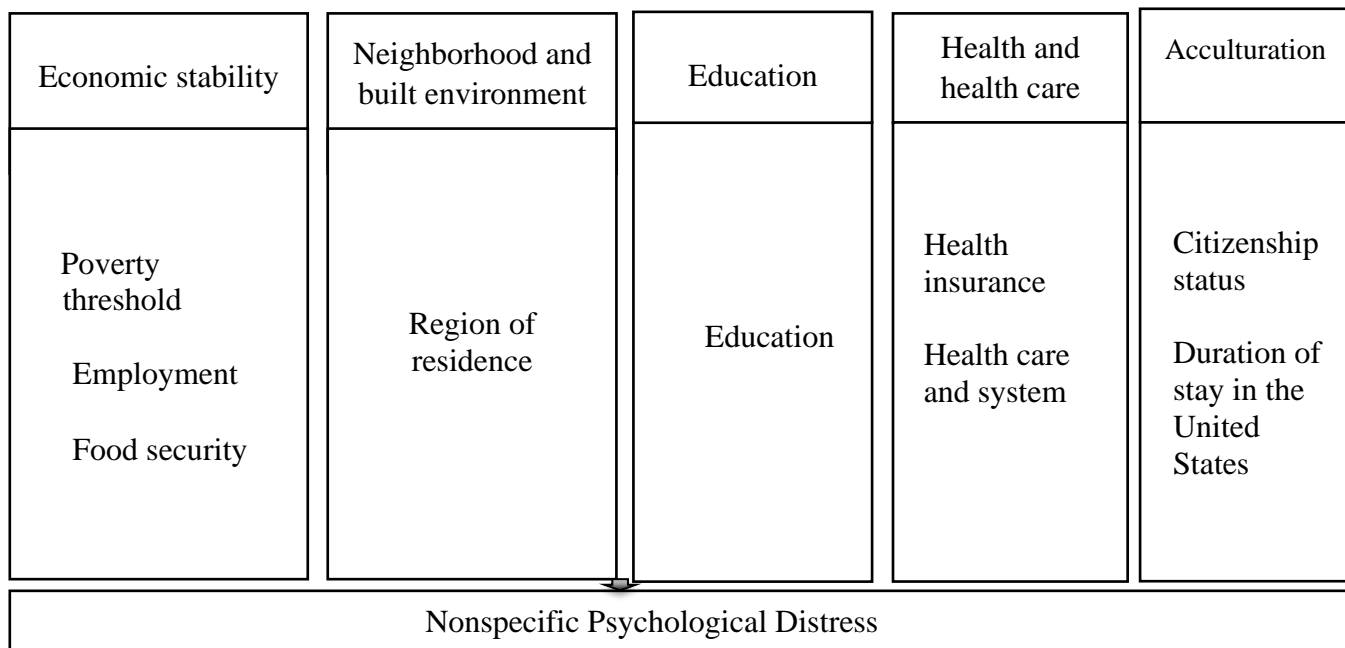
The World Health Organization Commission gives a standard and robust definition of social determinants of health. According to WHO, "Social determinants of health include the conditions in which people are born, grow, live, work and age, and the fundamental drivers of these conditions: the distribution of power; money; and resources" (Marmot & Bell, 2012, p. S4). Scholars working within the epidemiological, sociological, political economy, and human rights approaches begin to focus on these structural determinants (Castañeda et al., 2015) and they believe to varying degrees that general populations' health is influenced by different nonmedical determinants (Marmot, 2006; Raphael, 2006). These factors influence individuals' health, and these factors are not only related to medical care but also the social and economic characteristics of individuals and populations (Assari & Kumar, 2018; Dunn & Dyck, 2000).

The current study focuses on the significance of acculturation that is thought to be specific to Asian American subgroups. More specifically, our analyses are focused on the extent to which such group-specific factors demonstrate additional power in explaining

the moderate/severe psychological distress by the addition of citizenship status and duration of staying in the United States. Adding acculturation variables into the SDH framework allows us to move beyond the simple test of the direct relationship between the SDH and acculturation variables and psychological distress among Asian American subgroups. Such an integrative approach is instrumental for advancing a holistic understanding of the relationships between the broad socioeconomic and acculturation variables and the psychological state of individual adjustment. Thus, the SDH framework provides the perspective that allows us to examine variations in how different Asian American subgroups experience and recount various aspects of their health based on determinants.

The CDC's Healthy People 2030 highlights five domains: economic stability, neighborhood and built environment, health and health care, social and community context, and education (CDC, 2018). Due to a lack of data, we cannot measure all of these domains. Thus, we excluded the social and community context domain from our framework. We expanded CDC's framework by including an acculturation dimension as a social determinant of health (Lara et al., 2012; Zambrano & Carter-Porkas, 2010). A more nuanced SDH approach that takes into account the cultural perspective of individuals, such as U.S. citizenship status and nativity status, may have higher explanatory power and applicability to Asian American subjects (Schwartz et al., 2010). Hence, the SDH framework, including acculturation-related factors, can help in capturing differences in psychological distress because immigrants may have unique acculturation experiences due to their contact with the mainstream society.

Additionally, the understanding of determinants is conceptually crucial in understanding social inequalities in health and how they might be structured by the complex and divergent social and economic circumstances faced by ethnic minority groups in the U.S., ultimately affecting their health outcomes. These determinants are fundamentally related to social inequalities that account for health disparity among immigrants in the U.S. (Marmot, 2006; Raphael, 2006; WHO, 2008). The variations are measured in terms of ethnic groups based on the racial differences in health conditions, which can largely be accounted for differences in their social and economic circumstances (Wilkinson, 1999). More specifically, some social determinants apply differently to specific racial/ethnic groups (Assari & Kumar, 2018; Chappell, 2016). Assari and Kumar's (2018) indicate social determinants of health vary across Asian American subgroups, and subgroups differently influence Asian Americans' social determinants of health. This manuscript examined how the SDH and acculturation variables were related to psychological distress among three Asian Americans. Figure 1 presents a graphical presentation of our conceptual framework.



Source. Adapted from Centers for Disease Control and Prevention (CDC, 2018)

Note. We have included acculturation as a social determinant of health

Figure 1. Conceptual framework on the social determinants of health including acculturation variables.

Put together, though socioeconomic status, acculturation, and demographic factors have been shown to influence psychological distress, few studies have simultaneously assessed the impact of multiple social determinants of health factors on psychological distress in the Asian American population. Furthermore, studies that used these factors while examining the association between Asian American and psychological distress did not disaggregate Asian Americans into various subgroups (Chang & Ailee, 2016; Dong, 2018). The aggregate analysis may mask important ethnic-specific psychological distress patterns (Chandra et al., 2016; Chang & Moon, 2016; Chau et al.,

2018; Choi et al., 2020; Nadimpalli et al., 2012; Park et al., 2018). When health data are reported by the Asian American subgroup, it is generally indicated for one group alone (Holland & Palaniappan, 2012). Therefore, we do not overlook the ethnic-specific analysis of psychological distress because lumping of several Asian subgroups together makes the specific prevalence of psychosocial distress challenging to parse out. Another gap in the existing literature that examined the association between Asian Americans and psychological distress was related to the sample being studied. Many studies relied on a college-based sample that may hinder our researchers' understanding of how maturation influences Asian Americans' perception of racism (Alvarez et al., 2006). It seems likely that individuals who lived in the U.S. longer may have a more sophisticated understanding of and experiences with racism than college students.

More importantly, few mental health studies have been conducted based on adequate theoretical conceptualization that addresses the psychological distress at the subgroup level. There is a lack of research examining the SDH and acculturation variables associated with psychological distress across the three largest Asian American subgroups. While empirical and clinical investigations into the mental health of Asian American subgroups are only a recently growing endeavor (Chandra et al., 2016), our study sought to highlight major social determinants of health that influence psychological distress in specific Asian American subgroups.

Research Questions and Hypotheses

In this study, we tested the effects of the demographic characteristics, SDH factors, acculturation variables on psychological distress among Asian American

subgroups. Based on this prior research, we made several assumptions. Our study addressed the following research questions to validate these assumptions:

Research question 1. Does the prevalence of psychological distress differ by ethnicity?

- Hypothesis 1.1 – Asian Indian Americans will have the lowest prevalence of psychological distress across Asian American subgroups.
- Hypothesis 1.2 – Filipino Americans will have the highest prevalence of psychological distress across Asian American subgroups.
- Hypothesis 1.3 – Chinese Americans will have a middle level of psychological distress across Asian American subgroups.

Research question 2. How does marital status relate to psychological distress? Does gender moderate the association between marital status and psychological distress among Asian American subgroups?

- Hypothesis 2 -- Considering the long-standing positive relationship of marriage to health and well-being, we hypothesize that we will uncover a similar relationship among Asian Americans. Any observed associations of marital status and psychological distress likely arise in part from gender differences. Thus, we expect that gender will moderate the direct effects of marital status on psychological distress.
 - Hypothesis 2.1 -- Among never married Chinese Americans, lower levels of psychological distress will be reported by women.
 - Hypothesis 2.2 -- Among never married Filipino Americans, lower levels of psychological distress will be reported by women.

- Hypothesis 2.3 -- Among never married Asian Indian Americans, higher levels of psychological distress will be reported by women.

Research question 3. How does high food security status affect psychological distress among Asian American subgroups, and to what extent does gender moderate the association between food security status and psychological distress?

- Hypothesis 3 -- We hypothesize that highly food secured Asian Americans will be less likely to be psychologically distressed than food insecure Asian Americans.
 - Hypothesis 3.1 -- The moderation effect of gender on the association between food security status and psychological distress will be more robust among Asian Indian Americans than Filipino Americans.

Research question 4. How do employment and educational status relate to psychological distress among Asian American subgroups? Does gender moderate the association between employment status and psychological distress among Asian American subgroups?

- Hypothesis 4 -- We hypothesize that employed Asian Americans will have lower levels of psychological distress among Asian American subgroups.
 - Hypothesis 4.1 – Among employed Filipino Americans, lower psychological distress will be examined when individuals were females.
 - Hypothesis 4.2 -- Among employed Asian Indian Americans, higher psychological distress will be examined when individuals were females.
 - Hypothesis 4.3 -- Higher educational status will be related to lower levels of psychological distress among Filipino Americans.

Research question 5. How does U.S. citizenship status relate to psychological distress, and to what extent does this variable differ among Asian American subgroups?

- Hypothesis 5 -- We hypothesize that the U.S. citizenship status will have a different impact on psychological distress among Asian American subgroups.
 - Hypothesis 5.1 -- U.S. citizen Filipino Americans will have lower levels of psychological distress than their U.S.-born counterparts.

Research question 6. How are the effects of the nativity status on psychological distress different for the foreign-born relative to the U.S.-born among three Asian American subgroups?

- Hypothesis 6 -- We hypothesize that the foreign-born Asian Americans will have low levels of psychological distress across three Asian American subgroups.
 - Hypothesis 6.1 -- Among the three Asian American subgroups, Chinese- and Asian Indian American subgroups will have lower levels of psychological distress than the Filipino American subgroup.

DATA AND METHOD

Research Subjects

This study used data from the 2011-2015 National Health Interview Survey (NHIS). We extracted the NHIS data from the Integrated Public Use Microdata Series (IPUMS) provided publicly by the University of Minnesota, and the IPUMS provides harmonized U.S. census and survey data in a more efficient way at household and individual level (Lynn et al., 2019). The NHIS is an annually repeated nationally

representative, cross-sectional, personal household interview survey annually through the U.S. Census Bureau for the National Center for Health Statistics (NCHS [National Center for Health Statistics], 2018). A single random adult in each household was selected for a detailed interview on psychological distress (Singh et al., 2013). Additionally, NHIS data provided information on a variety of important health topics for adults.

The NHIS is the principal source of information on the health of the civilian noninstitutionalized population of the United States with core questions on demographics and key health-related variables including self-reported nonspecific psychological distress. The NHIS provides researchers the ability to pool multiple year data to analyze health characteristics among minority populations living in the United States. The annual response rate for the NHIS survey was approximately 70.00% representing 35,000 randomly selected households containing about 87,500 persons (Lynn et al., 2019).

We selected Asian adults aged eighteen years or more from the Sample Adult Core (SAC) component (NCHS, 2019). The Sample Adult files contain one randomly selected adult per family to provide self-report health information. Every adult in each family, except for active-duty armed force members, was eligible to be chosen as the sample adult. To determine Asian adults, the NHIS identified the three major ethnic groups (Chinese, Filipino, and Asian Indian Americans) and collapsed other Asian Americans into a single category labeled other. These are the three most populous Asian American subgroups as self-identified in the NHIS public files (NCHS, 2018). From the aggregated sample, we excluded cases with missing values. Hence, our study sample comprised 6,242 Asian Americans aged ≥ 18 years residing in the United States, including 2,162 Chinese Americans, 2,115 Filipino Americans, and 1,965 Asian Indian

Americans. Sample data were weighted to produce national estimates that are representative of Asian American populations. The NHIS has collected race/ethnicity by Asian-American subgroup since 1992 and this data collection practice has increased the number of health research publications regarding Asian American subgroup health (Holland & Palaniappan, 2012).

Measures

Dependent Variable

Psychological distress was the dependent variable that differentiates between respondents with no/low distress and moderate/severe psychological distress in the Asian American population (Kessler et al., 2010). Adult respondents (aged 18 years or older) who completed the 6-item scale (K6 scale) were included in the survey to estimate the prevalence of psychological distress. Response options ranged from “none of the time,” scored as zero, to “all of the time,” scored as four (Kessler et al., 2003). Then, these items were summed with scores ranging between zero and 24, with a score of five or higher indicated moderate distress (Kaul et al., 2017), and 13 or higher was an indication of being diagnosed with severe psychological distress (Kessler et al., 2002). Due to the small sample size and statistical power concerns, we collapsed moderate distress and severe distress into a single category of moderate/severe psychological distress (Davison et al., 2020). In our analyses, we categorized psychological distress as having no/low psychological distress (K6 score <5) and having moderate to severe distress (K6 score \geq 5). The cut-off score of 5 or higher indicates the presence of any mental illness in individuals. A similar threshold cut-point was used in most previous studies (Dedania &

Gonzales, 2019; Kaul et al., 2017; Kim & Zane, 2016; Paek et al., 2019; Prochaska et al., 2012). More importantly, the lower cut-off score may have a higher probability of representing true caseness when the prevalence of psychological distress is not severe (Mitchell & Beals, 2011). We conducted a sensitivity analysis using this dichotomous definition of psychological distress using other self-report items in the NHIS regarding general stress levels in the past 12 months, how much stress had affected the respondent's health, and if a mental health problem caused a limitation. Therefore, a cutoff of five or more is consistent with norm-based scoring developed for the K6 in the classification of scores generated and normalized in the 1997 NHIS (Kessler et al., 2002).

The K6 scale is a very brief screening scale designed to measure the frequency of experiencing six different items of psychological distress in the last 30 days in the general population: 1) nervous, 2) hopeless, 3) restless, 4) depressed, 5) everything is an effort, and 6) worthless (Kessler et al., 2002, 2003). The Kessler scale score provides a valid statistical and clinical measurement of the psychological distress for culturally diverse populations (Carra et al., 2011; Lee et al., 2012; Sunderland et al., 2011; Tomitaka et al., 2017). The scale is also commonly used in general population health surveys globally (translated into 22 languages using the WHO's translation protocol) (Kessler & Üstün, 2004), providing a measurement of distress, consistent with other depressive symptom scales (Tomitaka et al., 2017). The Chinese K6 scale was found to be reliable and was able to generate the likelihood of serious mental illness with substantial concordance with face-to-face clinical interviews (Lee et al., 2012). Altogether, the K6 scale has consistently been shown to be an appropriate screening tool used to measure

psychological distress among the diverse population (Lee et al., 2012; Sunderland et al., 2011).

Independent Variables

Based on results from the literature review and the SDH framework, five categories were selected to measure moderate/severe psychological distress: economic factors, neighborhood and built environment, educational status, health and health care system, and acculturation. In addition to the SDH variables, demographic characteristics were selected (i.e., race/ethnicity, age, gender, marital status, and family type). Put all together; there were six sets of independent variables.

Economic Stability Factors

We used three categorical measures of economic stability factor: family poverty threshold (poverty status), employment status, and family food security status. First, the total combined family income variable includes the respondent's income plus the income of all co-resident family members, including cohabiting partners and related armed forces members living at home (U.S. Census Bureau, 2019). To determine the poverty threshold, the reported total family income was compared to the U.S. Census Bureau's poverty thresholds for the year in question. These thresholds are adjusted for family size and the number of children under age eighteen. We recoded poverty threshold variable and dichotomized it into "1" if the reported family income figure was higher than the Bureau's poverty cutoff for families of that size and age composition, and "0" if the reported family income figure was less than the Bureau's poverty cutoff for families of that size and age composition (U.S. Census Bureau, 2019). This variable does not include

the value of noncash benefits such as Food Stamps, Medicaid, Medicare, and public housing.

Second, we added an indicator of current employment status, which was recoded as employed, unemployed, and not in the labor force. These categories were defined according to standard groups by the U.S. Census Bureau (2019). Individuals not in the labor force included those who were retired, disabled, and others if they had not worked in the past 12 months or more. The unemployed category includes both the unemployed on layoff and those looking for work. Employed consists of those who were working during the interview.

Finally, we added an indicator of family-level food security status on the 30-day food security scale via the ten item US Adult Food Security Survey Module (Long et al., 2020). All respondents were asked the 10-item module, and the food security score (0-10) was created to represent the number of affirmative responses to the food security items. The NHIS dataset assesses whether the individual's family has been able to afford adequate food for all adults during the previous 30 days (USDA, 2019). Following procedures used by the CDC and USDA, the NHIS classified the summative food security score as high food security (score = 0), marginal food security (score =1-2), low food security (score= 3-5), and very low food security (score = 6-10). In this study, the food security status was dichotomized: "1" if the individual's reported family food security status was high and "0" if his or her reported food security status was marginal, or low, or very low.

Neighborhood and Built Environment

Experiences of psychological well-being (Markus et al., 2004) vary according to the geographic location. Four regions were included in the analysis: Northeast, Midwest/North central, South, and West.

Educational Status

Educational status was measured by the number of years of formal education that the respondents had received at the time of the interview. We included an indicator of educational attainment to capture differences in education status among Asian American subgroups. The education status variable was recoded: less than high school, high school graduate or equivalent, some college degree or three years of college education, and college graduate or four years of a college education. In the NHIS, educational status can be measured as a categorical variable by assessing educational milestones, such as less than a high school degree, completion of high school, college degree, or graduate school. Thus, this category can be conceptualized in a framework as a major indicator that can capture the long-term influences of circumstances on health and the impact of their resources on health.

Health and Health Care System

We included health insurance coverage and health care access to capture the impact of health access and the system on psychological distress. We created the health insurance variable from responses to a series of questions indicating whether someone had private health insurance, Medicare, Medicaid, or military health care. We coded the variable as any insurance versus none.

Measurement of the availability of health care providers can be considered a useful component in assessing access to health care. Access to health is a self-reported

usual source of care for respondents that provides us information health care access. We examined health care access from this question: “Is there a place that you usually go to when you are sick, or you need advice about your health?” We created a dummy variable: who had a usual source of care as “1” or those who had not the usual source of care “0.”

Acculturation

The construct of acculturation was measured using items from two measures – Citizenship status and nativity status (native-born and foreign-born) which captures acculturation differences among Asian American subgroups. However, the NHIS does not have information on immigrants’ legal or refugee status (Singh et al., 2013). These are valid proxy measures of acculturation commonly used in health literature (Abraido-Lanza et al., 2005; Maffini et al., 2015; Park et al., 2014). First, the citizenship status was assessed based on response to the question, “Are you a citizen of the United States?” Among foreign-born Asians, those who were born in the U.S. territories or who became U.S. citizens by naturalization were considered U.S. citizens. Second, the differences in the prevalence of psychological distress between foreign-born and native-born Asian Americans were examined by categorizing samples into two groups based on country of origin (native-born and foreign-born). Based on the responses to the question “Where were you born?”, we defined foreign-birth as a birthplace either in a U.S. territory or outside of the United States. According to the U.S. Census Bureau (2018), native-born are those individuals who are U.S. citizens at birth including born in the U.S., born in Puerto Rico, born in U.S. Island Area, and born abroad of U.S. citizen parent(s). All naturalized U.S. citizens, legal permanent residents, temporary migrants, humanitarian

migrants, unauthorized migrants, and nonimmigrants (students, guest workers) fall in the foreign-born category. The U.S. or native-born refers to individuals born in the 50 contiguous states and the District of Columbia (Koya & Egede, 2007). We subdivided foreign-born Asians into two categories based on the number of years spent in the United States: less than 15 years and 15 years or more (Davison et al., 2020; Tran et al., 2016).

Demographic Characteristics

Our study includes a variety of demographic variables to capture demographic differences between Asian American subgroups: Asian ethnic groups, age, gender, marital status, and family type. First, ethnicity is the primary independent variable. This variable was determined by respondents' self-identification into predetermined categories with the question, "What ethnicity do you consider yourself to be?" In the NHIS questionnaire, the available choices for individuals considering themselves Asian American are Chinese, Filipino, Asian Indian, Korean, Vietnamese, Japanese, and Other Asians. For the sake of disclosure, responses marked Korean, Vietnamese, and Japanese, and Other Asians were consolidated to be in the category of "Other Asian" and not available for public release. Thus, each of the three ethnic groups (i.e., Chinese, Filipino, and Asian Indian) were dummy coded. The second demographic characteristic is age. Consistent with previous research examining nonspecific psychological distress using K6 scale (McVeigh et al., 2006; Swartz & Jantz, 2014), age was categorized into four groups: 18 to 24 years old, 25 to 44 years old, 45 to 64 years old, and 65 or older. Third, we included an indicator of gender, and it was coded as female "1" and male "0." For current marital status, we added three responses and coded them as married, separated or widowed, or divorced, and never married. Finally, we included a family type variable by

creating a dummy variable: the family who had children “1” and “0” for those who did not.

Statistical Analysis

We divided our statistical analyses into three parts: First, we presented descriptive statistics that show different sample characteristics, including the demographic, SDH, and acculturation-related variables for the three Asian American subgroups. Second, we used chi-square tests to compare Asian American subgroups stratified by their K6 score (no/low and moderate/severe psychological distress). We presented proportions for categorical variables. Finally, for the multivariable analysis, we ran logistic regressions in the aggregated Asians sample as well as in each Asian American subgroup. In all models, psychological distress was the dependent variable.

Logistic regression analyses were conducted using six-step analyses. In Model 1, we estimated psychological distress with a set of demographic variables. In Model 2, we assessed psychological distress with economic stability variables. Then, we estimated psychological distress by entering a region of residence variable in Model 3. In Model 4, we introduced an educational status variable. Then, health insurance coverage and health care access were entered in Model 5. Finally, we added two acculturation-related variables such as U.S. citizenship status and nativity status. In addition to the main effects of the SDH and acculturation variables, we tested potential interactive effects.

Tests of multicollinearity were conducted before proceeding with regression analyses. A variable inflation factor (VIF) ≥ 10 indicates multicollinearity. The predictors of this study were all < 10 , indicating that there was no violation of multicollinearity (Myers, 1986). Logistic regression results were interpreted using an odds ratio (OR). An

OR of less than 1.00 indicates that a 1-unit increase in the predictor variable is associated with decreased odds of moderate/severe psychological distress. In contrast, when the OR exceeds 1.00, the 1-unit increase is related to increased odds of moderate/severe psychological distress. A two-tailed test was used for our analyses because our hypotheses were bi-directional. Individuals with missing observations on the outcome variable were excluded from the study.

Weights

In this study, we applied pooled sampling weights to all our data analyses to consider for the NHIS multistage sampling design. We created a pooled weight variable by dividing each sample weight in the pooled dataset by the number of years (5 years) (Lynn et al., 2019; Ye et al., 2012). We performed weights using the “svy” family of commands in STATA. Additionally, to deliver our subsample analyses, we applied *subpop* survey commands. This approach enabled us to generate nationally representative statistics. Stata 15.1 (Stata Corp., 2017) was used to perform the analyses. We used $p < .01$, and $p < .05$ as statistical significance levels.

RESULTS

We first present the detailed results that show the associations between the demographic, SDH, and acculturation variables used throughout the analysis and the moderate/severe psychological distress. The result section provides detailed sample characteristics followed by multivariate regression analyses. In addition to examining Asian Americans in the aggregate, we ran separate logistic regression analyses for each of the three Asian American subgroups.

Sample Characteristics

Table 1 presents descriptive characteristics. The Filipino American subgroup reported a higher proportion of psychological distress (11.63%) than the Chinese American subgroup (10.73%) and Asian Indian American subgroup (9.31%). Still, there were no significant differences among the three subgroups. Of the total sample, 53.12% were female, and the mean age was 43.95 years old. The Asian Americans were more likely to be educated (more than three-quarters of them had college degrees), and nearly 55.50% were married. Asian Indian Americans were the youngest group being more likely to be male, married, highly educated, employed, and live in the South region of the United States. In contrast, Filipinos were more likely to be female and were widowed, divorced, or separated. Filipino American subgroup had a higher proportion of U.S. citizens (83.18%) than the Chinese American subgroup (67.67%), who had a higher U.S. citizens proportion than in the Asian Indian American subgroup (55.08%). Similarly, the Filipino American subgroup had a higher proportion of U.S.-born individuals (22.01%) than the Chinese (21.17%) who had a higher US-born proportion than Asian Indians (8.55%).

Table 1*Sample Characteristics of Three Asian American Subgroups: 2011-2015 National Health Interview Survey*

Variables	Asian American subgroups							
	All Asians (N=6,431)		Chinese (n=2,229)		Filipino (n=2,172)		Asian Indian (n=2,030)	
	n	%	n	%	n	%	n	%
Psychological distress status								
Distress (K6 ≥5)	686	10.54	233	10.73	272	11.63	181	9.31
No/Low distress (K6<5)	5,556	89.46	1,929	89.27	1,843	88.37	1,784	90.69
Demographic variables								
Age group								
18-24	737	10.13	359	13.6	173	8.93	205	8.45
25-44	2,959	45.74	880	41.25	829	38.53	1,250	56.92
45-64	1,726	31	615	31.55	689	35.13	422	26.54
65+	1,009	13.13	375	14.14	481	17.4	153	8.09
Gender								
Female	3,416	53.18	1,196	54.02	1,298	57.6	922	48.15
Male	3,015	46.82	1,033	45.98	874	42.4	1,108	51.85
Family type								
Without children	4,265	59.19	1,641	66.34	1,413	59.41	1,211	52.14
With children	2,166	40.81	588	33.66	759	40.59	819	47.86
Marital status								
Married	3,564	66.22	1,124	62.01	1,099	59.82	1,341	76.33
Widowed/Divorced/Separated	967	10.4	313	9.66	510	16.38	144	5.4
Never married	1,891	23.38	789	28.32	560	23.8	542	18.26
Economic variables								
Poverty threshold								
Poor	914	11.31	271	19.3	130	7.56	109	9.65
At or above the poverty	5082	88.69	1,593	82.59	1,801	92.53	1,688	90.79
Employment status								
Employed	4100	65.15	1,304	61.03	1,389	65.9	1,407	68.38
Unemployed	287	4.8	95	4.48	107	4.97	85	4.93
Not in the labor force	2038	30.05	829	34.49	673	29.12	536	26.69
Food security status								
Low food security	724	9.99	161	6.19	412	16.56	151	7.36
High food security	5707	90.01	2,068	93.81	1,760	83.44	1,879	92.64
Neighborhood & built environment								
Northeast	1206	20.77	519	25.83	235	13.18	452	23.19
Midwest	875	13.67	256	10.93	216	10.17	403	19.62
South	1359	22.22	311	13.93	413	20.78	635	31.51
West	2991	43.34	1,143	49.31	1,308	55.88	540	25.68

Educational status variable								
Less than high school	508	7.69	246	11.33	171	6.19	91	5.66
High school or equivalent	877	13.51	304	14.7	400	16.53	173	9.48
Some college	1313	20.19	413	17.28	684	32.41	216	11.3
College or more	3733	58.6	1,266	56.69	917	44.87	1,550	73.54
Health & health care variables								
Had insurance	5705	89.39	1,990	89.52	1,894	89.64	1,821	89.04
Uninsured	700	10.61						
Health care access			1,845	85.89	1,838	87.58	1,560	81.57
Had access	5243	84.96	1,845	85.89	1,838	87.58	1,560	81.57
Had no access	1131	15.04	368	14.11	308	12.42	455	18.43
Acculturation-related variables								
Citizenship status								
U.S. citizen	4202	68.42	1,427	67.67	1,765	83.18	1,010	55.08
Non-U.S. citizen	2212	31.58	795	32.33	401	16.82	1,016	44.92
Nativity status								
Foreign-born								
Less than 15 years	2418	35.47	831	34.07	464	21.16	1,123	50.39
15 years or more	2543	43.56	893	43.92	945	45.21	705	41.06
U.S.-born								
	1427	21.17	487	22.01	747	33.63	193	8.55

Note. All sample sizes shown are unweighted. The percentages are the weighted percentages.

Results for the categorical variables are reported as a proportion of the variable values.

The second set of analyses compared Asian Americans with ($K6 \geq 5$) and without ($K6 < 5$) psychological distress on key SDH and acculturation variables (Table 2). Of the total Asian American analytic sample, 10.54% reported moderate/severe psychological distress. Among them, 39.65% were Filipinos who had the highest percentage of saying they were distressed, whereas 33.97% of those indicating distress were Chinese, and 26.38% were Asian Indians. Factors significantly associated with psychological distress were Asian ethnic groups, age, gender, marital status, poverty threshold level, employment status, food security status, educational status, health coverage, and duration of stay in the U.S. (Table 2). In contrast, there were no significant differences in psychological distress by family type, the region of residence in the U.S., health care access, and citizenship status.

We found psychological distress to occur more frequently among individuals between the ages of 18 and 24 years than among older individuals, and the relationship was statistically significant. Compared with Asian American men, more women reported psychological distress (11.84% vs. 10.03%) (Table 2). When stratified by sex and ethnicity, females across all Asian American subgroups reported psychological distress (see Figure 3). Furthermore, individuals who reported psychological distress were being poor, unemployed, food unsecured, less educated, uninsured, and U.S.-born individuals.

Regarding acculturation variables, there was a significant difference in the duration of stay in the U.S. by psychological distress status. The bivariate analysis showed that Asian Americans with psychological distress were more likely to live in the U.S. for 15 years or more than individuals who lived in the U.S. for less than 15 years (10.73% vs. 9.83%). Thirteen-and-a-half percent of individuals born in the U.S. reported

psychological distress. In contrast, there was no significant difference in citizenship status by psychological distress status.

Table 2

Social Determinants of Health and Acculturation-related Variables by Nonspecific Psychological Distress: 2011-2015 National Health Interview Survey

Variables	Psychological distress status						
	Distress (K6 ≥ 5) (N=686)			No distress (K6 < 5) (N=5,556)			P ^a
	n	%	(95% CI)	n	%	(95% CI)	
Asian American subgroup							
Chinese	233	10.73	[9.273,12.37]	1929	89.27	[87.63,90.73]	0.00
Filipino	272	11.63	[9.833,13.70]	1843	88.37	[86.3,90.17]	
Asian Indian	181	9.31	[7.874,10.98]	1784	90.69	[89.02,92.13]	
Demographic variables							
Age group							
18-24	103	15.14	[11.93,19.02]	614	84.86	[80.98,88.07]	0.00
25-44	274	8.847	[7.498,10.41]	2611	91.15	[89.59,92.50]	
45-64	214	11.87	[9.92,14.14]	468	88.13	[85.86,90.08]	
65+	95	9.71	[7.68,12.21]	863	90.29	[87.79,92.32]	
Sex							
Female	392	11.84	[9.639,12.39]	2918	88.16	[87.61,90.36]	0.02
Male	294	10.03	[8.605,11.81]	2638	89.97	[88.19,91.40]	
Family type							
Without children	473	10.62	[9.572,11.78]	3653	89.38	[88.22,90.43]	0.84
With children	213	10.42	[8.787,12.31]	1903	89.58	[87.69,91.21]	
Marital status							
Married	278	8.28	[7.17,9.564]	3184	91.71	[90.44,92.83]	0.00
Widowed/Divorced/Separated	164	17.24	[14.78,20.02]	763	82.76	[79.98,85.22]	
Never married	244	13.99	[11.89,16.38]	1601	89.45	[83.62,88.11]	
Economic stability							
Poverty threshold							
Poor	137	15.07	[12.1,18.62]	741	84.93	[81.38,87.90]	0.00
At or above poverty	516	10.23	[9.20,11.36]	4441	89.77	[88.64,90.80]	
Employment Status							
Employed	372	8.913	[7.85,10.10]	3617	91.09	[89.9,92.15]	0.00
Unemployed	54	20.08	[14.97,26.38]	226	79.92	[73.62,85.03]	
Not in labor force	260	12.58	[10.83,14.57]	1707	87.42	[85.43,89.17]	
Food security status							
Low food security	219	28.22	[24.11,32.72]	485	71.78	[67.28,75.89]	0.00
High food security	467	8.56	[7.67,9.55]	5071	91.43	[90.45,92.32]	
Neighborhood & built environment							
Region of residence							
Northeast	122	10.96	[9.19,13.03]	1041	89.04	[86.97,90.82]	0.30
Midwest	96	9.73	[7.59,12.41]	749	90.26	[87.59,92.41]	
South	133	9.09	[7.27,11.33]	1191	90.9	[88.67,92.73]	
West	335	11.33	[9.77,13.09]	2575	88.67	[86.91,90.22]	

Educational status							
Less than high school	65	14.06	[10.41,18.72]	409	85.94	[81.28,89.59]	0.00
High school or equivalent	125	14.81	[11.93,18.24]	723	85.19	[81.76,88.07]	
Some college	167	12.42	[10.21,15.03]	1114	87.58	[84.97,89.79]	
College or more	329	8.46	[7.393,9.664]	3310	91.54	[90.34,92.61]	
Health & health care system							
Health insurance							
Had no insurance	114	16.70	[13.1,21.06]	568	83.3	[78.94,86.90]	0.00
Had insurance	569	9.78	[8.834,10.82]	4967	90.22	[89.18,91.17]	
Access to care							
Had no access	125	12.35	[9.796,15.47]	978	87.65	[84.53,90.20]	0.14
Had access	556	10.21	[9.178,11.33]	4557	89.79	[88.67,90.82]	
Acculturation variables							
Citizenship status							
U.S. citizenship	470	11.07	[9.922,12.34]	3599	88.93	[88.87,91.98]	0.09
Non-U.S. citizenship	216	9.46	[8.02,11.13]	1940	90.54	[87.66,90.08]	
Nativity status							
Foreign-born	232	9.83	[7.688,10.77]	2128	90.17	[89.23,92.31]	0.00
Less than 15 years							
15 years or more	263	10.73	[8.568,11.68]	2187	89.27	[88.32,91.43]	
U.S.-born	186	13.40	[11.12,16.22]	1202	86.60	[83.78,88.88]	

Note. All sample sizes shown are unweighted; percentages are the weighted percentages.

Results for the categorical variables are reported as a proportion of the variable values.

p^a is reported here from chi-square cross-tabs used to compare the differences in psychological distress at p<.05.

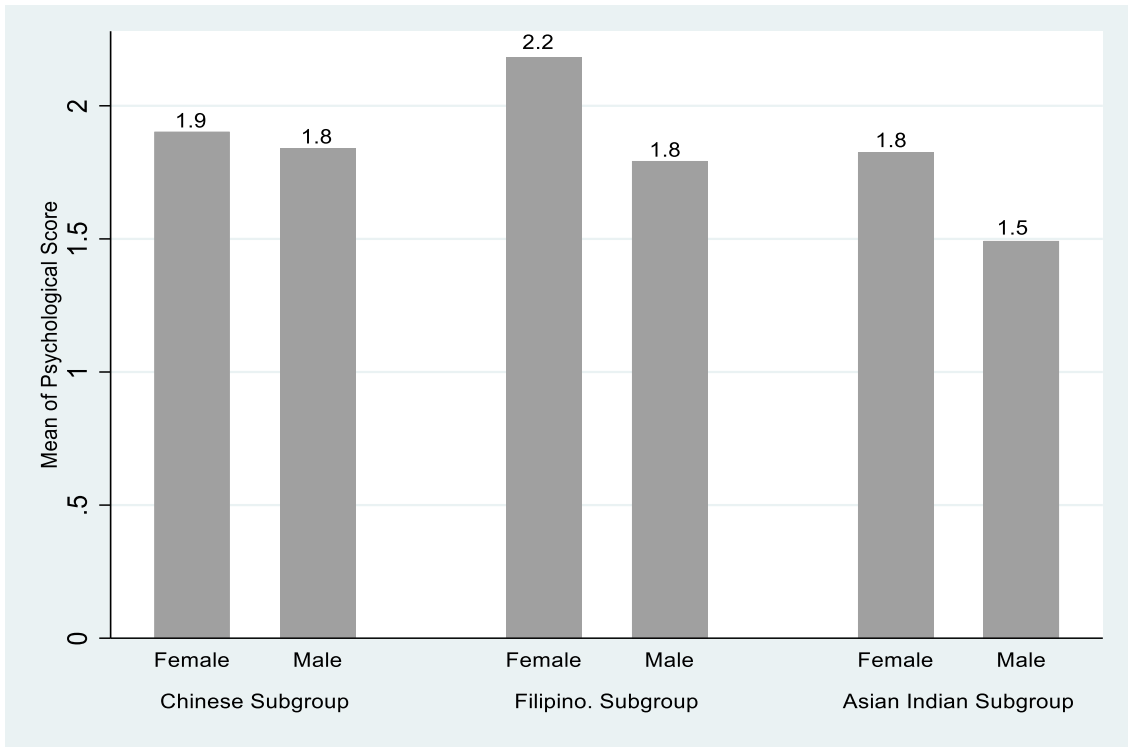


Figure 2. The weighted mean score of psychological distress by sex.

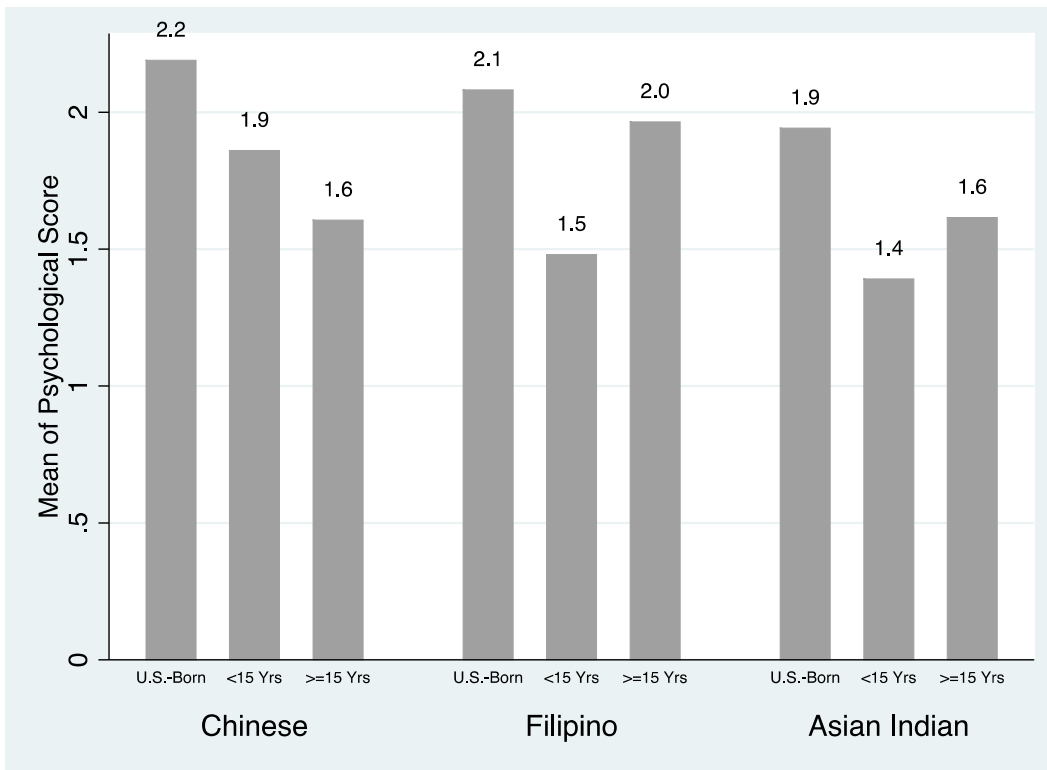


Figure 3. The weighted mean score of psychological distress by the duration of stay in the U.S.

Factors Related to Psychological Distress

We conducted a series of multivariate regression analyses to examine the association between the SDH and acculturation-related variables and psychological distress status for all Asians together (Table 3) and for each of the Asian American subgroups separately (Tables 4, 5, and 6). For logistic regression analyses, we specified six models to estimate the main effects of each of the five domains of SDH and one domain of acculturation. Model 1 included the five demographic variables (ethnicity, age group, sex, family type, and marital status); Model 2 included three economic variables (poverty status, employment status, and food security status); Model 3 added the neighborhood and build environment variable (region of residence); Model 4 included the educational status variable; Model 5 added two health and healthcare-related variables (health coverage and health and health care access); and Model 6 added two acculturation-related variables (U.S. citizenship status and duration of stay in the U.S.). Tables 3-6 display the multivariate logistic regression findings, including both main effects and interactive effects, by adding several interaction terms separately for each Asian American subgroup. We examined the interaction effect of gender on the association between significant predictors (for example, marital status, food security, employment) and psychological distress.

Table 3 presents the results of the multiple regression models for the psychological distress of the total Asian American sample. In Model 1, Asian Americans who had children had a significantly higher likelihood of having psychological distress compared to counterparts who had no children. Similarly, the odds of having psychological distress were approximately two times higher for Asian Americans who

were widowed or divorced or separated (OR= 2.35; 95% CI=1.85-2.99) compared to their counterparts. Individuals who had never married had higher levels of psychological distress (OR= 2.09; 95% CI= 1.52-2.88) compared to their peers. In Model 2, however, the effect of family type was altered by the entry of economic variables. Marital status remained a significant predictor of psychological distress while the family type was no longer significant. There were no statistically significant differences based on ethnic groups, gender, and age groups. The odds of reporting psychological distress were nearly two times higher for Asian Americans who were unemployed (OR=1.90; CI= 1.20-2.99) and one and half times higher for Asian Americans who were not in the labor force (OR=1.52; 95% CI=1.18-1.97) compared to their employed counterparts. However, Asian American households having high food security status were less likely than those who had low food security status to report psychological distress (OR=.27; 95% CI=.20 – .35). In Model 3, the pattern of marital status, employment, and family food security status were not altered by the entry of the neighborhood and built environment-related variable. At the same time, the region of residence was not associated with psychological distress. In Model 4, the adjustment for the educational status variable did not have a statistically significant relationship with psychological distress. Similarly, none of the health care variables were associated with psychological distress in Model 5. Finally, no significant differences were observed between acculturation-related factors and psychological distress (see Table 3, Model 6).

Findings provide some determinants with consistent relationships with psychological distress in Asian American samples. Marriage and high food security status have strong protective effects on mental well-being. Asian Americans who were not in

marital relationships were significantly and positively associated with the likelihood of psychological distress. In contrast, Asian Americans who had high food security status were significantly and negatively related to psychological distress. These results indicate that marital status and food security status had a significant and independent association with psychological distress among three Asian American subgroups.

Table 3*Factors Associated with Psychological Distress Among Three Asian American Subgroups: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic variables												
Asian American subgroup												
Filipino (vs. Chinese)	1.03	(0.80 - 1.34)	0.89	(0.68 - 1.16)	0.89	(0.68 - 1.18)	0.89	(0.67 - 1.17)	0.88	(0.66 - 1.16)	0.88	(0.66 - 1.16)
Asian Indian (vs. Chinese)	0.96	(0.77 - 1.21)	0.94	(0.75 - 1.17)	0.98	(0.76 - 1.25)	0.99	(0.78 - 1.26)	0.99	(0.77 - 1.26)	0.99	(0.77 - 1.26)
Age group (vs. 18-24)												
25-44	0.76	(0.52 - 1.11)	0.88	(0.58 - 1.31)	0.87	(0.58 - 1.31)	0.89	(0.59 - 1.34)	0.91	(0.60 - 1.38)	0.91	(0.60 - 1.38)
45-64	1.20	(0.75 - 1.91)	1.38	(0.85 - 2.23)	1.36	(0.84 - 2.20)	1.32	(0.80 - 2.16)	1.33	(0.81 - 2.18)	1.33	(0.81 - 2.18)
65+	0.87	(0.53 - 1.43)	0.85	(0.51 - 1.43)	0.84	(0.50 - 1.41)	0.81	(0.48 - 1.38)	0.84	(0.48 - 1.45)	0.84	(0.48 - 1.45)
Female (vs. male)	1.04	(0.82 - 1.32)	0.96	(0.73 - 1.24)	0.96	(0.74 - 1.25)	0.96	(0.74 - 1.24)	0.95	(0.73 - 1.24)	0.95	(0.73 - 1.24)
Family with children (vs. no children)	1.32*	(1.05 - 1.66)	1.22	(0.95 - 1.58)	1.22	(0.95 - 1.57)	1.21	(0.94 - 1.55)	1.19	(0.91 - 1.54)	1.19	(0.91 - 1.54)
Marital status (vs. married)												
Widowed/Divorced/Separated	2.35**	(1.85 - 2.99)	2.05**	(1.61 - 2.61)	2.06**	(1.62 - 2.62)	2.04**	(1.60 - 2.60)	2.00**	(1.58 - 2.54)	2.00**	(1.58 - 2.54)
Never married	2.09**	(1.52 - 2.88)	2.04**	(1.48 - 2.81)	2.02**	(1.46 - 2.79)	2.02**	(1.47 - 2.79)	1.97**	(1.42 - 2.73)	1.97**	(1.42 - 2.73)
Economic variables												
At or above poverty (vs. poor)			1.13	(0.82 - 1.55)	1.13	(0.83 - 1.56)	1.19	(0.87 - 1.63)	1.19	(0.87 - 1.62)	1.19	(0.87 - 1.62)
Employment (vs. employed)												
Unemployed			1.90**	(1.21 - 2.99)	1.90**	(1.21 - 2.98)	1.88**	(1.20 - 2.96)	1.77*	(1.13 - 2.79)	1.77*	(1.13 - 2.79)
Not in the labor force			1.52**	(1.18 - 1.97)	1.53**	(1.19 - 1.98)	1.49**	(1.16 - 1.93)	1.51**	(1.17 - 1.95)	1.51**	(1.17 - 1.95)
High food security (vs. low)			0.27**	(0.20 - 0.35)	0.27**	(0.20 - 0.35)	0.28**	(0.21 - 0.36)	0.28**	(0.21 - 0.37)	0.28**	(0.21 - 0.37)

Neighborhood & built environment									
Region in the U.S. (vs. Northeast)									
Midwest	0.87	(0.61 - 1.23)	0.89	(0.62 - 1.25)	0.87	(0.61 - 1.23)	0.84	(0.59 - 1.20)	
South	0.85	(0.62 - 1.16)	0.85	(0.62 - 1.16)	0.84	(0.61 - 1.15)	0.83	(0.60 - 1.14)	
West	1.01	(0.77 - 1.31)	1.02	(0.78 - 1.32)	1.02	(0.78 - 1.32)	1.02	(0.78 - 1.33)	
Educational status variable									
Education (vs. < high school)									
High school or equivalent			1.18	(0.73 - 1.91)	1.18	(0.72 - 1.91)	1.20	(0.73 - 1.967)	
Some college			0.84	(0.53 - 1.34)	0.86	(0.53 - 1.38)	0.87	(0.53 - 1.42)	
College or more			0.81	(0.52 - 1.26)	0.85	(0.54 - 1.32)	0.86	(0.54 - 1.36)	
Health & health care variables									
Had insurance (vs. uninsured)									
					0.77	(0.52 - 1.15)	0.76	(0.50 - 1.13)	
Had health care access (vs. no access)									
					1.02	(0.72 - 1.43)	1.01	(0.71 - 1.431)	
Acculturation-related variables									
U.S. citizen (vs. non-U.S citizen)									
							0.97	(0.68 - 1.38)	
Nativity status (vs. U.S.-born)									
Foreign-born									
Less than 15 years									
							0.79	(0.53 - 1.18)	
15 years or more									
							0.80	(0.57 - 1.11)	

Note. NHIS annual weights are used. The sample size varies due to the non-reporting of the dependent variable.

OR odds ratio, *CI* confidence interval; and confidence intervals are in parentheses; Model 1 controls for the demographic variables; Model 2 controls for the economic variables; Model 3 controls for the region of residence variable; Model 4 controls for the education variable; Model 5 controls for the health care & health variables; and Model 6 controls for the acculturation-related variables.

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

To test our hypotheses, we conducted ethnic-specific logistic regression models for three Asian American subgroups individually. Tables 4-6 illustrate the full model for each of the Asian American subgroups. Table 4 presents the results of the multiple regression models for the psychological distress of the Chinese subgroup. In Model 1, the odds of having psychological distress were approximately two times higher for Chinese Americans who were widowed, divorced, or separated (OR= 1.89; 95% CI=1.12-3.21) compared to their married counterparts. Similarly, Chinese Americans who had never-married also had approximately two times higher odds for reporting psychological distress (OR= 1.89; 95% CI= 1.05-3.38) compared to their married counterparts. However, there were no statistically significant differences based on gender and age. In Model 2, Chinese Americans who had high food security status were less likely than those who had low food security status to report psychological distress (OR=.29; 95% CI=.17-.49). Chinese Americans who were unemployed had about 91.00% higher odds (OR=1.91; 95% CI= 1.17-3.09) for reporting psychological distress compared to those who were employed. Similarly, Chinese Americans who had not been in the labor force had about 53.00% higher odds (OR=1.53; 95% CI=1.15-2.01) of being psychologically distressed compared to those who were employed. Marital status remained significantly associated with psychological distress after the addition of the economic variables. In Model 3, the region of residence in the U.S. was not related to psychological distress. At the same time, the patterns and strength of the relationships between the significant variables (marital status, employment status, and family food security status) and the psychological distress remained unchanged in Model 3. In Model 4, the addition of the educational status variable did not have a statistically significant

relationship with psychological distress. Education did not significantly predict psychological distress among Chinese Americans. Similarly, none of the health care variables were associated with psychological distress in Model 5. In Model 6, citizenship status and duration of stay in the U.S. did not contribute to predicting psychological distress. Interestingly, given that psychological distress was significantly different between employed versus unemployed Chinese individuals, the addition of acculturation variables in Model 6 contributed marginally to reduce distress. This difference provides some implications of the importance of the addition of acculturation variables into the framework. We found that two of the SDH variables and none of the acculturation-related variables had significant relationships with psychological distress in the Chinese American subgroup. Overall, Chinese Americans who had not been in marital relationships (widowed, divorced, separated, never married) were strongly and positively associated with psychological distress. Additionally, high food secured and employed Chinese Americans had negative associations with psychological distress.

Table 4*Factors Associated with Psychological Distress Among Chinese American Subgroup: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic variables												
Age group (vs. 18-24)												
25-44	0.68	(0.39 - 1.18)	0.64	(0.32 - 1.27)	0.64	(0.32 - 1.28)	0.58	(0.29 - 1.14)	0.58	(0.30 - 1.14)	0.59	(0.30 - 1.16)
45-64	0.72	(0.32 - 1.62)	0.77	(0.36 - 1.62)	0.79	(0.37 - 1.70)	0.73	(0.35 - 1.54)	0.74	(0.35 - 1.57)	0.86	(0.43 - 1.72)
65+	0.95	(0.43 - 2.07)	1.05	(0.48 - 2.30)	1.09	(0.49 - 2.44)	1.00	(0.45 - 2.23)	1.07	(0.47 - 2.42)	1.27	(0.56 - 2.89)
Female (vs. male)	0.90	(0.60 - 1.34)	0.85	(0.55 - 1.34)	0.85	(0.54 - 1.33)	0.85	(0.54 - 1.33)	0.86	(0.54 - 1.36)	0.89	(0.56 - 1.41)
Family with children (vs. no children)	1.29	(0.84 - 1.98)	1.28	(0.80 - 2.06)	1.29	(0.80 - 2.07)	1.34	(0.82 - 2.17)	1.34	(0.82 - 2.19)	1.29	(0.78 - 2.12)
Marital status (vs. married)												
Widowed/Divorced/Separated	1.89*	(1.12 - 3.21)	1.85*	(1.08 - 3.17)	1.84*	(1.08 - 3.15)	1.97*	(1.14 - 3.42)	1.92*	(1.11 - 3.31)	1.97*	(1.14 - 3.38)
Never married	1.89*	(1.05 - 3.38)	2.10**	(1.23 - 3.57)	2.12**	(1.25 - 3.59)	2.16**	(1.25 - 3.73)	2.16**	(1.26 - 3.71)	2.12**	(1.21 - 3.72)
Economic variables												
At or above poverty (vs. poor)			1.42	(0.89 - 2.26)	1.40	(0.88 - 2.23)	1.39	(0.87 - 2.22)	1.40	(0.87 - 2.24)	1.43	(0.87 - 2.34)
Employment (vs. employed)												
Unemployed			1.91**	(1.17-3.09)	1.90**	(1.18-3.08)	1.89*	(1.17-3.08)	1.78*	(1.09-2.90)	1.85*	(1.14-3.00)
Not in the labor force			1.53**	(1.15-2.01)	1.54**	(1.17-2.02)	1.50**	(1.14-1.98)	1.52**	(1.15-2.00)	1.51**	(1.15-2.00)
High food security (vs. low)			0.29**	(0.17 - 0.49)	0.29**	(0.17 - 0.48)	0.27**	(0.16 - 0.46)	0.27**	(0.16 - 0.46)	0.27**	(0.16 - 0.45)
Neighborhood & built environment												
Region in the U.S. (vs. Northeast)												
Midwest					1.15	(0.57 - 2.33)	1.12	(0.56 - 2.27)	1.13	(0.56 - 2.27)	1.04	(0.50 - 2.15)
South					1.31	(0.71 - 2.42)	1.28	(0.68 - 2.40)	1.25	(0.67 - 2.34)	1.26	(0.67 - 2.37)
West					1.05	(0.76 - 1.45)	1.05	(0.76 - 1.45)	1.05	(0.76 - 1.44)	1.02	(0.74 - 1.42)
Educational status variable												
Education (vs. < high school)												
High school or equivalent							1.73	(0.67 - 4.46)	1.71	(0.67 - 4.39)	1.75	(0.66 - 4.63)
Some college							1.14	(0.44 - 2.94)	1.16	(0.45 - 2.98)	1.18	(0.44 - 3.17)
College or more							1.61	(0.61 - 4.25)	1.66	(0.63 - 4.38)	1.67	(0.62 - 4.51)

Health care & health variables			
Had insurance (vs. uninsured)	0.77	(0.37 - 1.60)	0.78 (0.37 - 1.63)
Had health care access (vs. no access)	0.97	(0.52 - 1.78)	0.98 (0.54 - 1.79)
Acculturation-related variables			
U.S. citizen (vs. non-U.S. citizen)			0.90 (0.54 - 1.49)
Nativity status (vs. U.S.-born)			
Less than 15 years			0.89 (0.48 - 1.62)
15 years or more			0.72 (0.38 - 1.35)

Note. NHIS annual weights are used. The sample size varies due to the non-reporting of the dependent variable.

OR odds ratio, *CI* confidence interval, and confidence intervals are in parentheses.

Model 1 controls for the demographic variables; Model 2 controls for the economic variables; Model 3 controls for the region variable; Model 4 controls for the education variable.

Model 5 controls for the health & health care variables; and Model 6 controls for the acculturation variables.

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

Table 5 presents the multiple regression models for the psychological distress of the Filipino subgroup. We found a different pattern of relationships in which few new SDH variables and all acculturation-related variables were significantly associated with distress. Such a relationship did not happen with the Chinese American subgroup. In Model 1, gender and age did not have a relationship with distress. The odds of experiencing psychological distress were about two and a half times higher for Filipino Americans who were widowed or divorced or separated (OR= 2.35; 95% CI=1.78-3.12) compared to their married counterparts. Similarly, Filipino Americans who had never-married had high psychological distress were compared to married counterparts. In Model 2, Filipino Americans who had high food security status were less likely than those who had low food security status to report psychological distress (OR=.24; 95% CI=.16-.36). Filipino Americans who had not been in the labor force had about 69.30% higher odds (OR=1.69; 95% CI= 1.14-2.51) for reporting psychological distress. Similarly, the employment status of Filipino Americans contributes significantly to predicting distress as in the Chinese subgroup. Filipino Americans who were unemployed were more likely than those who were employed to report psychological distress (OR=1.91; 95% CI=1.17-3.09). Filipino Americans who had not been in the labor force had 53.00% higher odds (OR=1.53; 95% CI=1.16-2.01) of reporting distress compared to those who were employed. Marital status showed a different pattern of association with psychological distress after the addition of economic variables. For example, the effects of not being in the current marital status were reduced significantly than the similar effects on the earlier model. The effect was stronger among those who were widowed, divorced, or separated. In Model 3, the region of residence demonstrated unstable and

weak relationships with distress. None of the regions were significant in Model 3. The significant independent variables remained almost consistent after the addition of the region variable. In Model 4, Filipino Americans who had some college education had about 56.70% lower odds (OR=.43; 95% CI=.23-.82) for reporting psychological distress compared with those who had less than high school education supporting hypothesis 4.3. Similarly, Filipino Americans who had a college degree had about 68.50% lower odds (OR=.31; 95% CI=.16-.63) for reporting psychological distress compared with those who had less than high school education. The results indicate that higher educational status appeared to be a protective determinant of psychological distress in the Filipino American subgroup. More interestingly, the addition of an educational status variable contributed different patterns on the effect of region variable (see Model 4). Some of the regions of residence in the U.S. significantly contributed to predicting distress. Filipino Americans were less likely to report psychological distress regardless of their region of residence in the U.S. except for the West region of the United States. In Model 5, we found an almost similar pattern of the significantly associated variables (marital status, employment, food security, region, and education) with psychological distress after the addition of health care variables (health coverage and health care access). In Model 6, U.S. citizenship status had a significant and independent association with psychological distress. However, there was no difference between nativity status and psychological distress. Compared to the analysis of the Chinese American subgroup, Model 6 contributed to predicting psychological distress in the Filipino American subgroup. For example, Filipino Americans who had U.S. citizenship status had nearly 47.70% lower odds (OR=.52; 95% CI=.28-.96) of reporting psychological distress compared with their

non-U.S. citizen peers. This result provides support to indicate the protective effect of U.S. citizenship status against psychological distress in specific Asian ethnic groups. More interestingly, after the addition of acculturation variables, the main effects of the employment variable attenuated significantly, indicating the protective role of employment status in reducing distress among Filipino Americans. However, overall, our results did not confirm the health advantage of foreign-born Asian Americans against psychological distress.

Table 5*Factors Associated with Psychological Distress Among Filipino American Subgroup: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic variables												
Age group (vs. 18-24)												
25-44	0.69	(0.38 - 1.27)	0.76	(0.40 - 1.47)	0.75	(0.38 - 1.48)	0.81	(0.41 - 1.61)	0.83	(0.42 - 1.64)	0.84	(0.42 - 1.70)
45-64	1.00	(0.46 - 2.19)	1.18	(0.53 - 2.63)	1.17	(0.51 - 2.65)	1.21	(0.54 - 2.74)	1.20	(0.53 - 2.72)	1.20	(0.54 - 2.68)
65+	0.66	(0.31 - 1.43)	0.60	(0.27 - 1.33)	0.59	(0.26 - 1.33)	0.60	(0.27 - 1.34)	0.60	(0.26 - 1.36)	0.61	(0.28 - 1.35)
Female (vs. male)	0.97	(0.63 - 1.48)	0.87	(0.56 - 1.35)	0.88	(0.56 - 1.38)	0.93	(0.60 - 1.45)	0.88	(0.57 - 1.38)	0.93	(0.60 - 1.44)
Family with children (vs. no children)	1.33	(0.89 - 1.99)	1.22	(0.78 - 1.90)	1.23	(0.78 - 1.93)	1.18	(0.75 - 1.85)	1.12	(0.72 - 1.75)	1.12	(0.71 - 1.74)
Marital status (vs. married)												
Widowed/Divorced/Separated	2.35**	(1.78 - 3.12)	2.03**	(1.55-2.79)	2.06**	(1.53-2.78)	2.04**	(1.51-2.76)	2.01**	(1.48-2.72)	1.98**	(1.46-2.69)
Never married	2.10**	(1.53-2.88)	2.02**	(1.45-2.81)	2.02**	(1.45-2.84)	2.03**	(1.44-2.84)	1.97**	(1.40-2.77)	1.90**	(1.35-2.68)
Economic variables												
At or above poverty (vs. poor)			0.84	(0.45 - 1.56)	0.84	(0.46 - 1.55)	1.02	(0.57 - 1.80)	1.02	(0.57 - 1.80)	1.09	(0.59 - 1.99)
Employment (vs. employed)												
Unemployed			1.91**	(1.17-3.09)	1.89**	(1.17-3.06)	1.88*	(1.16-3.05)	1.77**	(1.09-2.88)	1.84*	(1.33-2.97)
Not in the labor force			1.53**	(1.16-2.01)	1.53**	(1.17-3.06)	1.49**	(1.13-1.97)	1.51**	(1.15-1.99)	1.50**	(1.14-1.98)
High food security (vs. low)			0.24**	(0.16 - 0.36)	0.24**	(0.16 - 0.35)	0.25**	(0.17 - 0.38)	0.25**	(0.17 - 0.38)	0.24**	(0.16 - 0.36)
Neighborhood & built environment												
Region (vs. Northeast)												
Midwest					0.47	(0.20 - 1.09)	0.42*	(0.18 - 0.96)	0.38*	(0.17 - 0.86)	0.39*	(0.17 - 0.88)
South					0.60	(0.33 - 1.12)	0.49*	(0.27 - 0.91)	0.49*	(0.26 - 0.90)	0.50*	(0.27 - 0.93)
West					0.66	(0.37 - 1.18)	0.61	(0.34 - 1.10)	0.61	(0.34 - 1.09)	0.61	(0.34 - 1.11)
Educational status variable												
Education (vs. < high school)												
High school or equivalent							0.73	(0.35 - 1.52)	0.72	(0.34 - 1.49)	0.72	(0.33 - 1.56)
Some college							0.43*	(0.23 - 0.82)	0.43*	(0.22 - 0.84)	0.47*	(0.23 - 0.93)
College or more							0.31**	(0.16 - 0.63)	0.33**	(0.16 - 0.66)	0.35**	(0.17 - 0.74)

Health care & health variables				
Had insurance (vs. uninsured)	0.75	(0.39 - 1.43)	0.73	(0.36 - 1.50)
Had access to care (vs. no access)	1.00	(0.57 - 1.76)	1.04	(0.58 - 1.86)
Acculturation-related factors				
U.S. citizen (vs. non-U.S. citizen)			0.52*	(0.28 - 0.96)
Nativity status (vs. U.S.-born)				
Less than 15 years			0.49	(0.26-0.91)
15 years or more			0.92	(0.59-1.43)

Note. NHIS annual weights are used. The sample size varies due to the non-reporting of the dependent variable.

OR odds ratio, *CI* confidence interval, and confidence intervals are in parentheses.

Model 1 controls for the demographic variables; Model 2 controls for the economic variables; Model 3 controls for the region variable; Model 4 controls for the education variable.

Model 5 controls for the health care & health variables; and Model 6 controls for the acculturation variables.

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

Table 6 presents the multiple regression models for the psychological distress of the Asian Indian subgroup. We found the unique effects of a specific age, marital status, and citizenship status in the Asian Indian subgroup. In Model 1, Asian Indian Americans who were in the 45-64 years old age group had a three times higher likelihood of experiencing psychological distress (OR= 3.00; 95% CI=1.16-7.76) than younger peers (the 18-24 years old age group). However, other age groups and psychological distress were not significant. Asian Indian Americans who had widowed, divorced, or separated had approximately 135.00% greater odds (OR=2.35; 95% CI=1.78-3.13) of reporting psychological distress than those who had married. Similarly, Asian Indian Americans who had never-married had approximately 109.00% greater odds (OR=2.09; 95% CI=1.52-2.89) of reporting psychological distress than those who had married. In Model 2, marital status remained a significant determinant of psychological distress. The negative effect of the 45-64 years old age group increased after the addition of economic variables. Compared to their employed counterparts, unemployed Asian Indians reported 90.00% higher odds (OR=1.90; 95% CI=1.17-3.08) of psychological distress, whereas those who had not been in the labor force reported 53.00% greater odds (OR=1.53; 95% CI=1.17-2.02) of psychological distress. Unemployment status appears to be more detrimental to Asian Indians' mental health. Asian Indian Americans who had high food security status were less likely than those who had low food security status to report psychological distress (OR=.32; 95% CI=.18-.55). In Model 3, the region of residence in the U.S. was not associated with psychological distress. At the same time, the patterns and strength of the relationships between the significant variables (age, marital status, employment status, and family food security status) and the psychological distress

remained unchanged. In Model 4, the addition of the educational status variable did not have a statistically significant relationship with psychological distress. Thus, education was not a contributor to explaining the variation of psychological distress among Asian Indian Americans and Chinese Americans. However, after the addition of an education variable, the main effects of marriage and employment variables were attenuated in Model 4. In Model 5, none of the health care variables were associated with psychological distress. Similarly, none of the acculturation variables were associated with distress in Model 6. Neither the shorter duration nor the longer duration was associated with psychological distress. More interestingly, the analyses showed that the main effect of the marriage was significantly attenuated; however, the main effects of employment status were increased in Model 6. Previous research showed that Asian American women and men of different immigration status (foreign-born vs. U.S.-born; U.S. citizenship vs. non-U.S. citizenship) had varying psychological distress (Rollock & Lui, 2016).

Table 6

Factors Associated with Psychological Distress Among Asian Indian American Subgroup: 2011-2015 National Health Interview Survey

Variables	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic variables												
Age group (vs. 18-24)												
25-44	1.20	(0.53 - 2.74)	1.48	(0.63 - 3.48)	1.40	(0.59 - 3.32)	1.57	(0.61 - 4.00)	1.66	(0.65 - 4.26)	1.83	(0.70 - 4.73)
45-64	3.00*	(1.16 - 7.76)	3.38*	(1.21 - 9.43)	3.31*	(1.20 - 9.16)	3.47*	(1.20 - 10.01)	3.52*	(1.23 - 10.08)	3.82*	(1.26 - 11.65)
65+	1.07	(0.33 - 3.53)	1.00	(0.30 - 3.35)	0.97	(0.29 - 3.23)	1.07	(0.31 - 3.64)	1.12	(0.32 - 3.85)	1.22	(0.33 - 4.46)
Female (vs. male)	1.38	(0.89 - 2.14)	1.13	(0.71 - 1.79)	1.12	(0.70 - 1.79)	1.12	(0.70 - 1.78)	1.11	(0.70 - 1.78)	1.12	(0.70 - 1.81)
Family with children (vs. no children)	1.44	(0.95 - 2.19)	1.27	(0.81 - 1.98)	1.27	(0.82 - 1.97)	1.27	(0.82 - 1.96)	1.25	(0.80 - 1.95)	1.29	(0.82 - 2.04)
Marital status (vs. married)												
Widowed/Divorced/Separated	2.35**	(1.78-3.13)	2.02**	(1.50-2.72)	2.03**	(1.51-2.74)	1.98**	(1.46-2.68)	1.98**	(1.46-2.48)	1.95**	(1.44-2.65)
Never married	2.09**	(1.52-2.89)	2.02**	(1.45-2.83)	2.01**	(1.43-2.81)	1.94**	(1.39-2.73)	1.94**	(1.39-2.73)	1.88**	(1.34-2.64)
Economic variables												
At or above poverty (vs. poor)			1.11	(0.59 - 2.07)	1.08	(0.59 - 1.96)	1.07	(0.59 - 1.92)	1.02	(0.58 - 1.76)	1.00	(0.56 - 1.78)
Employment (vs. employed)												
Unemployed			1.90**	(1.17-3.08)	1.90**	(1.17-3.06)	1.77**	(1.09-2.87)	1.77**	(1.09-2.87)	1.84**	(1.13-2.96)
Not in the labor force			1.53**	(1.17-2.02)	1.54**	(1.17-2.03)	1.55**	(1.18-2.05)	1.55**	(1.18-2.05)	1.54**	(1.17-2.04)
High food security (vs. low)			0.32**	(0.18 - 0.56)	0.30**	(0.17 - 0.53)	0.32**	(0.18 - 0.57)	0.32**	(0.18 - 0.58)	0.34**	(0.19 - 0.62)
Neighborhood & built environment												
Region (vs. Northeast)												
Midwest					0.94	(0.53 - 1.68)	0.97	(0.54 - 1.73)	0.96	(0.54 - 1.72)	0.95	(0.53 - 1.69)
South					0.76	(0.45 - 1.27)	0.77	(0.46 - 1.30)	0.78	(0.46 - 1.31)	0.77	(0.46 - 1.31)
West					1.50	(0.91 - 2.47)	1.51	(0.91 - 2.50)	1.56	(0.94 - 2.58)	1.55	(0.95 - 2.54)
Educational status variable												
Education (vs. < high school)												
High school or equivalent							1.26	(0.52 - 3.04)	1.30	(0.53 - 3.21)	1.22	(0.47 - 3.19)
Some college							1.21	(0.44 - 3.35)	1.26	(0.45 - 3.51)	1.12	(0.38 - 3.28)
College or more							0.90	(0.41 - 1.98)	0.95	(0.42 - 2.16)	0.92	(0.39 - 2.19)

Health care & health variables				
Had insurance (vs. uninsured)	0.74	(0.37 - 1.48)	0.69	(0.34 - 1.39)
Had access to care (vs. no access)	1.26	(0.69 - 2.31)	1.19	(0.64 - 2.20)
Acculturation-related factors				
U.S. citizen (vs. non-U.S. citizen)			1.82	(1.00 - 3.32)
Nativity (vs. U.S.-born)				
Less than 15 years			0.66	(0.36 - 1.21)
15 years or more			0.85	(0.37 - 1.97)

Note. NHIS annual weights are used. The sample size varies due to nonreporting of the dependent variable.

OR odds ratio, *CI* confidence interval, and confidence intervals are in parentheses.

Model 1 controls for the demographic variables; Model 2 controls for the economic variables; Model 3 controls for the region variable; Model 4 controls for the education variable; Model 5 controls for the health care & health variables; and Model 6 controls for the acculturation variables.

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

Overall, our study suggests that marriage and food security status were important predictors of psychological distress across three Asian American subgroups. In addition, there are some predictors that are related to the specific Asian American subgroup. For example, in addition to marital status and food security variables, education, the region of residence, and U.S. citizenship variables were significantly associated with psychological distress among Filipino Americans. In addition to marital status and food security variables, employment status was related to psychological distress among Asian Indian Americans. However, none of the SES and the acculturation variables were related to psychological distress among Chinese Americans.

Based on the findings from our analysis and the reviewed literature, gender is an important variable that can moderate the associations between significant determinants (for example, marriage, food security) and psychological distress among three Asian American subgroups. Hence, we created a series of two-way and three-way interactions to test how gender moderates the relationship between a) marriage and psychological distress; b) food security status and psychological distress; c) employment status X psychological distress.

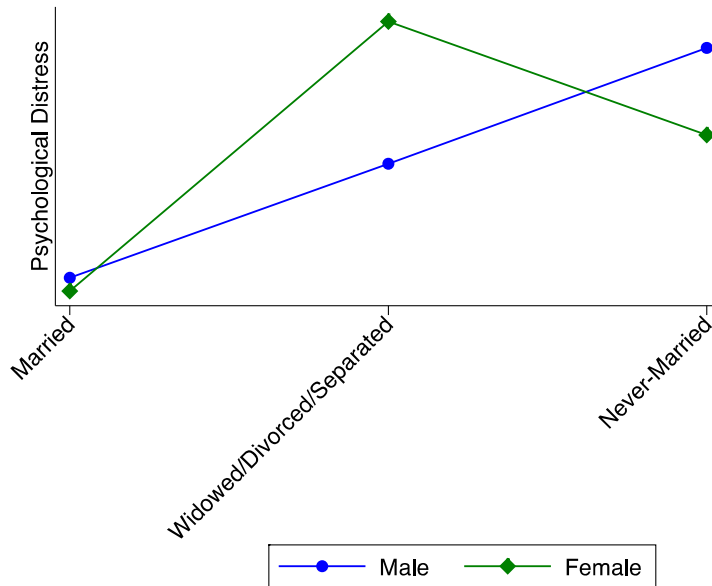


Figure 4. Moderation effect of gender with current marital status on psychological distress in Chinese American subgroup.

The crossed line on the graph (Figure 4) suggests that there was an interaction effect of gender on the association between marital status and the Chinese American subgroup. The married Chinese Americans category appears to be universally protective against distress. Among Chinese Americans, the direct effect of being widowed, separated, or divorced on psychological distress was not moderated by gender, demonstrating that being widowed, separated, or divorced had higher levels of psychological distress among Chinese American women. However, the direct effect of being never married on psychological distress was significantly moderated by gender demonstrating that being never married had lower levels of psychological distress among Chinese American women supporting hypothesis 2.1. Chinese American men were more reactive and more affected by psychological distress than Chinese American women

when they had never married. In general, Chinese Americans with a non-marital status are at increased risk of reporting greater psychological distress. However, gender has moderating effects on the association between marital status and psychological distress. The pattern of results is consistent with the notion that marriage has a buffering effect on psychological distress for all Asian Americans whereas being widowed, divorced, or separated could be conceptualized as a risk factor for Chinese and Filipino women. This interaction pattern is consistent with our assertion that the moderating effects of gender on marital status-psychological distress relationships are best understood when we considered interaction effects.

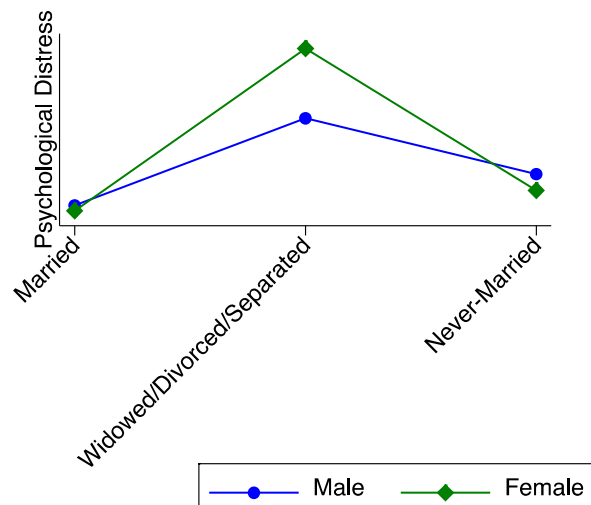


Figure 5. Moderation effect of gender with current marital status on psychological distress in Filipino American subgroup.

The crossed line on the graph (Figure 5) suggests that there was an interaction effect of gender on the association between marital status and the Filipino American subgroup. The married Filipino American category appears to be universally protective against distress. Among Filipino Americans, the direct effect of being widowed, separated, or divorced on psychological distress was not moderated by gender, demonstrating that being widowed, separated, or divorced had higher levels of psychological distress among Filipino American women. The effect of this perspective is more pronounced among Filipino American women suggesting a wider gap of effect size between men and women. However, the direct effect of being never married on psychological distress was significantly moderated by gender, demonstrating that being never married had lower levels of psychological distress among Filipino women supporting hypothesis 2.2. Among Filipino Americans, both men and women were more reactive to psychological distress when they had never married. In general, Filipino Americans with a non-marital status are at increased risk of reporting greater psychological distress.

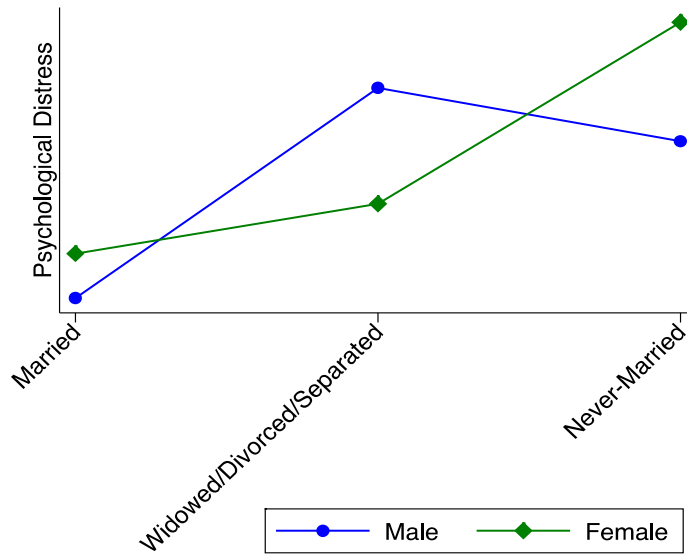


Figure 6. Moderation effect of gender with current marital status on psychological distress in Asian Indian American subgroup.

The crossed lines on the graph (Figure 6) suggests that there was an interaction effect of gender on the association between marital status and the Asian Indian American subgroup. Married Asian Indians appear to be universally protective against distress. Among Asian Indians, the direct effect of being widowed, separated, or divorced on psychological distress was not mediated by gender, demonstrating that being widowed, separated, or divorced had higher levels of psychological distress among Asian Indian American men. The effect of this perspective is unique to this Asian American subgroup because women reported greater psychological distress when they were widowed, divorced, or separated than those who were Chinese- and Filipino Americans. However, the direct effect of being never married on psychological distress was significantly moderated by gender, demonstrating that being never married had higher levels of

psychological distress among Asian Indian American women. The study finding provides evidence to support hypothesis 2.3. Among Asian Indian Americans, women were more reactive than men to psychological distress when they had never married. Overall, the Asian Indian American subgroup demonstrates a unique relationship between psychological distress and marital status among the three Asian American subgroups.

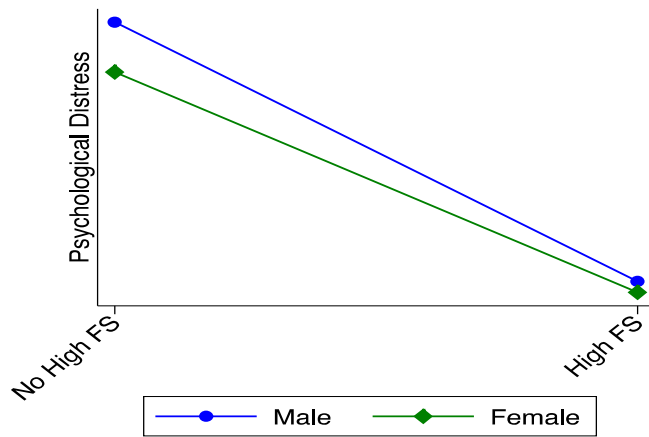


Figure 7. Moderation effect of gender with food security status on psychological distress in Chinese American subgroup.

The paralleled lines on the graph (Figure 7) suggests that there was no interaction effect of gender on the association between high food security status and the Chinese American subgroup.

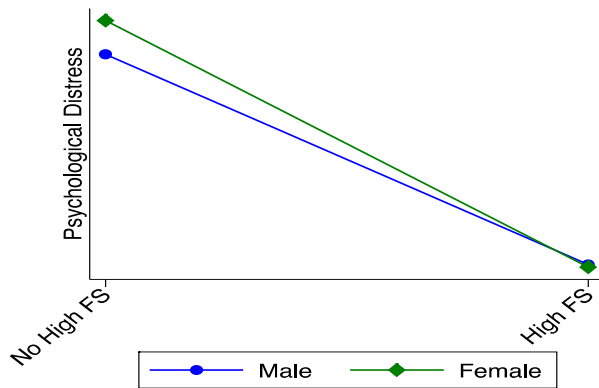


Figure 8. Moderation effect of gender with food security status on psychological distress in Filipino American subgroup.

The crossed line on the graph (Figure 8) suggests that there was an interaction effect of gender on the association between high food security status and the Filipino American subgroup. However, there was a marginal interactive effect of gender on the association between food security status and psychological distress.

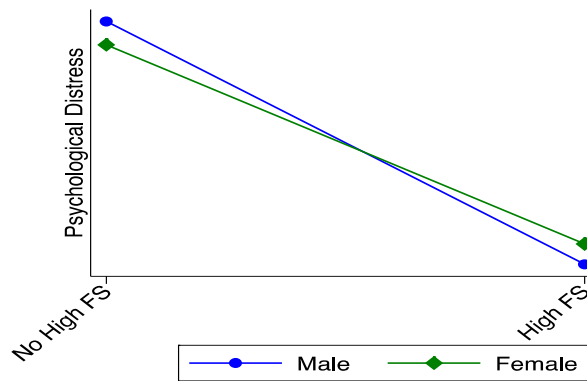


Figure 9. Moderation effect of gender with food security status on psychological distress in Asian Indian American subgroup.

The crossed line on the graph (Figure 9) suggests that there was an interaction effect of gender on the association between high food security status and the Asian Indian American subgroup. High food security status has a strong protective effect against distress. Among Asian Indian Americans, the direct effect of having high food security status on psychological distress was moderated by gender, demonstrating that having low food security status had higher levels of psychological distress among Asian Indian American men. Among Asian Indian American men, those having high food security status reported less psychological distress. Among Asian Indian Americans, both men and women were more reactive to psychological distress when they had high food security status. The moderating effect of gender on the association between psychological distress and food security status was more robust among Asian Indian Americans supporting hypothesis 3.1. Overall, our findings suggest that Asian Americans differ in the effect of marital status and food security status.

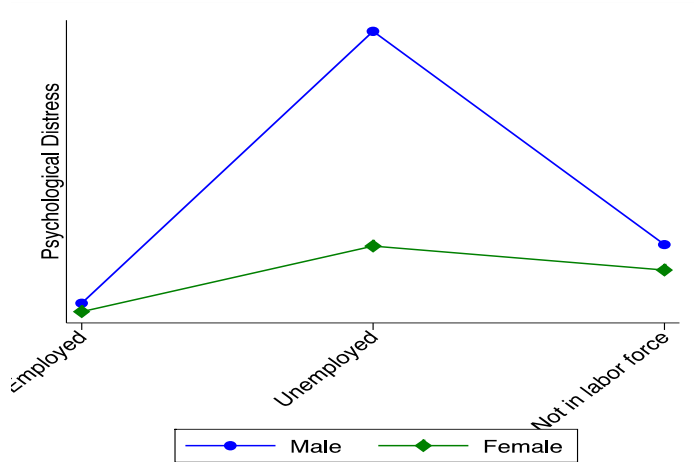


Figure 10. Moderation effect of gender with employment status on psychological distress in Chinese American subgroup.

The parallel lines on the graph (Figure 10) suggest that there was no interaction effect of gender on the association between employment status and psychological distress among Chinese Americans. However, gender moderated the association between educational status and psychological distress among Filipino Americans (Figure 11). Employed Filipinos reported less psychological distress indicating the health advantage of employment status. The moderating effect demonstrated that employed Filipino Americans reported less psychological distress when they were females. The study finding provides evidence to support hypothesis 4.1.

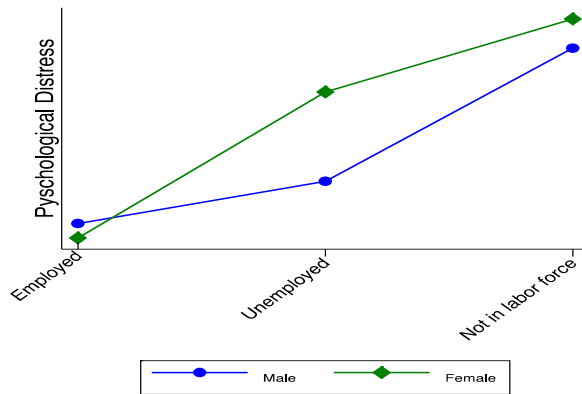


Figure 11. Moderation effect of gender with employment status on psychological distress in Filipino American subgroup.

The crossed line on the graph (Figure 12) suggests that gender had a moderation effect on the association between employment status and psychological distress among Asian Indian Americans demonstrating that employed Asian Indian Americans reported higher psychological distress when they were females. The study finding provides evidence to support hypothesis 4.2. Furthermore, gender had a moderation effect on the association between had not been in the labor force and psychological distress implicating that had not been in the labor force reported higher psychological distress among Asian Indian Americans when they were females. Hence, our findings suggest that Asian Indian American women experience higher levels of psychological distress compared to men.

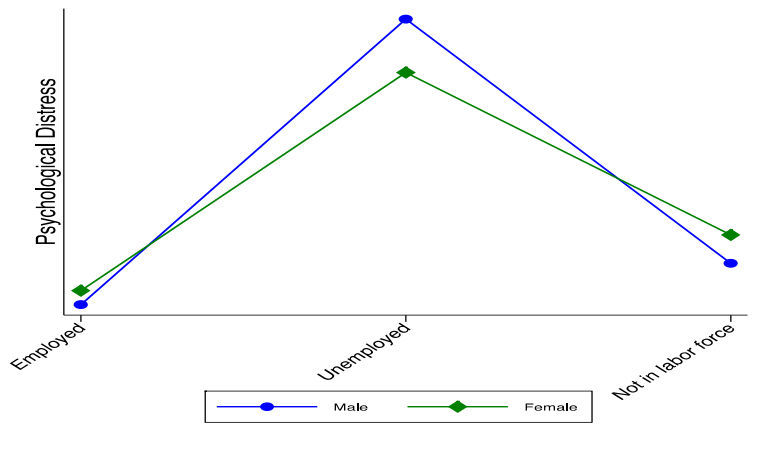


Figure 12. Moderation effect of gender with employment status on psychological distress in Asian Indian American subgroup.

In conclusion, we show that Asian ethnic-specific predictors that explain variations on psychological distress across three American subgroups. The main effects of marriage, one of the demographic variables, has a protective effect against psychological distress on all subgroups. High food security, one of the SDH variables, also have a protective-health effect against psychological distress on all subgroups. None of the neighborhood, educational status, health and health care, and acculturation variables were significantly related to psychological distress among Chinese- and Asian Indian Americans. Neighborhood and built environment, educational status, employment status, and U.S. citizenship status variables were also important determinants of psychological distress among Filipino Americans. However, employment status, one of the SDH variables, and a specific age category, one of the demographic characteristics, were important determinants of psychological distress among Asian Indian Americans.

DISCUSSION

The discussion section provides a series of sections including a summary of findings, comparative analysis, implications for public policies and practice, study limitations and implications for future, and the conclusion.

Summary of Findings

We showed that there were significant social disparities remain in psychological distress. Marked disparities in psychological distress in Asian American subgroups indicate the underlying significance of social determinants in psychological wellbeing and draw the attention of policymakers, researchers, and practitioners to address the existing health inequalities according to social factors.

In this study, we examined the associations between the SDH variables and psychological distress in both aggregated Asians and disaggregated Asian Americans. Among demographic variables, only current marital status demonstrated a significant relationship with psychological distress across Asian American subgroups. The protective effect of marriage persisted after accounting for all the SDH and acculturation-related variables. Among the economic stability variables, only high food security status was significantly related to psychological distress across three Asian American subgroups. High food security status consistently showed a strong and protective effect against psychological distress across three Asian American subgroups.

After stratification, three Asian American subgroups revealed similar patterns on the significant correlates of psychological distress. Some unique relationships were also examined in stratified analyses. The significant association between educational status

and psychological distress was found only among Filipino Americans indicating the protective effect of higher educational status against psychological distress. However, there were no significant relationships between employment status and psychological distress among Chinese- and Asian Indian American subgroups. In addition, the region of residence, employment status, and U.S. citizenship) were also important predictors of psychosocial distress among Filipino Americans. Among Asian Indian Americans, a specific age category and unemployment status were also important predictors of psychological distress among Asian Indian Americans.

Adding acculturation variables to the SDH framework is another important analysis to examine how the effects of U.S. citizenship and nativity status on psychological distress differed by Asian American subgroups. However, only Filipinos demonstrated a significant relationship between U.S. citizenship status and psychological distress. No differences were found between nativity status and the psychological distress in any of the Asian American subgroups.

Our results showed that there were no significant relationships between Asian American subgroups and psychological distress. Despite the nonsignificant relationship, the parameter estimates were in the expected direction for these subgroups. The nonsignificant relationships between Asian American subgroups and psychological distress might be an area for further exploration since they are different in their cultural, structural, and historical background.

Comparison with Previous Studies

The following six sub-sections provide a detailed comparison between our empirical analyses and the literature. Asian ethnic variation was confirmed to provoke

psychological distress in our population-based study. The current results suggest the significant direct effects of marital status and high food security status on psychological distress among the three Asian American subgroups. Furthermore, results showed that the relationship between various independent variables (marital status, food security status, employment status, and citizenship status) and psychological distress differed for subgroups, and gender moderated such linkages. These results suggest important directions for policymakers and researchers by recognizing the importance of psychological distress that vary with types of Asian American subgroups.

Ethnic variations in psychological distress

Our bivariate analyses indicated significant differences among Asian American subgroups and psychological distress meaning that ethnicity is a significant predictor of psychological distress. However, multivariate regression analyses demonstrated a nonsignificant relationship between Asian American subgroups and psychological distress. It is possible that culture can modulate the frequency, structure, and content of different psychotic symptoms rather than relatively stable structural forms (McLean et al., 2014). Therefore, the results tend to be less affected by control variables to show significant relationships.

Considering the lack of past empirical research exclusively examining psychological distress among three Asian American subgroups, we can propose precise interpretations based on the unique cultural background of three Asian American subgroups, but at the risk of speculation: Why do Asian Indian Americans have the lowest levels of psychological distress? Why do Filipino Americans have the highest

levels of psychological distress despite having higher acculturation and SES? Why do Chinese Americans have lower levels of psychological distress than Filipino Americans?

First, there are several explanations of why Asian Indian Americans have the lowest levels of psychological distress. This study finding provides evidence to support hypothesis 1.1. Asian Indian Americans are twice as likely to be employed in management, business, science, and arts occupations compared to the overall foreign- and-native born populations (U.S. Census Bureau, 2019). Human capital theory suggests that higher educational attainment is rewarded in the labor market because employers value the skills, training, and knowledge that come from higher education (Lancee & Thijs, 2017). Hence, the employment status of Asian Indian Americans may serve a protective factor in reducing psychological distress. Second, Asian Indian Americans may have been exposed to the Western values, beliefs, and customs resulting from their history of colonization by the British, and such historical experiences may provide them additional flexibility to adjust to the American societies (Lee et al., 2015). Third, a body of literature argued that the lower prevalence of psychological distress among Asian Indian Americans might be associated with Asian Indian culture (Chandra et al., 2016; Kumar & Nevid, 2010; Mahapatra, 2012; Nieuwsma et al., 2011). Asian Indians have different perspectives on the manifestations of psychological distress as compared to those in the United States (Nieuwsma et al., 2011). Manifestations may be accompanied by indirect communication of their unhappiness about the situation (for example, fatalistic verbalizations of hopelessness and sadness) (Chandra et al., 2016). The manifestation is a part of a collectivistic culture in which shame or social stigma may hinder reporting their mental health problems to the outsiders (Kumar & Nevid, 2010;

Roberts et al., 2016). A meta-analysis of multiple types of discrimination and mental health revealed that when individuals adopt stigmatized views about their identity which may be harmful to mental health (Vargas et al., 2020). They have greater adherence to their traditional culture that would lead to the underestimation of psychological distress (Mahapatra, 2012). More research is needed to corroborate the result by examining the cultural factors underlying the development and maintenance of psychopathology for Asian Indians. Finally, Asian Indians underreported psychological distress because they do not do anything unless distress does not affect their lives. Furthermore, Asian Indians tolerate and try to avoid emotionality or develop a sense of fatalism and forbearance (Inman et al., 2015). Additionally, some of them also use traditional distress coping strategies such as actively interacting with others, seeking family/ethnic community support, and engaging in social activity.

Second, consistent with previous studies (Ai et al., 2015; Chang & Moon, 2016; Singh et al., 2015), Filipino Americans reported the highest levels of psychological distress across three Asian American subgroups supporting hypothesis 1.2. However, past studies argued that Filipino Americans have English proficiency skills and their cultural and institutional system are similar to that of the United States (Tseng, 2009). Therefore, Filipino Americans have privileges of adaptation to mainstream culture than most other Asian American subgroups do not have (Tseng, 2009).

Despite such a comparative advantage of being Filipino Americans, our study did not support their comparative advantage in reducing psychological distress. Some important explanations attributed to the highest levels of psychological distress are model minority stereotype, colonial mentality, ethnic identity crisis, racial discrimination.

Contrary to the model minority myth, racism has been a significant part of Asian Americans' realities (Ai et al., 2015). Therefore, the myth does not apply to Filipino Americans despite their higher socioeconomic status (Cunanan et al., 2006). One possibility that may shed light on the increased levels of psychological distress is related to the Filipinos' colonial mentality. Due to hundreds of years of colonization in the Philippines by the U.S. and their more recent status as a minority within a minority, Filipino Americans attempt to balance their multiple identities and multiple roles (Eisen, 2019; Napholz & Mo, 2010). The colonial mentality characterizes Filipino culture as being inferior to Western culture (Eisen, 2019). It seems that Filipino Americans are facing an increasingly complex bicultural identity crisis. This colonial mentality possibility among Filipino Americans may be the focus of future research. Filipinos experience internalized inferiority, feelings of shame and embarrassment, rejection, and discrimination from both the majority and minority communities (David & Okazaki, 2006; Tracey, 2006). They are often overshadowed (Eisen, 2019) and are often struggling to find a place within the Asian American community (Root, 2006). Other important factors of higher levels of distress among Filipinos are related to perceived discrimination (Alvarez et al., 2006; Gee et al., 2007), ethnic isolation (Ling & Austin, 2015), conflicts between heritage and host cultures (Napholz & Mo, 2010), and pressures to conform to the model minority stereotype. Gee and colleagues (2007) identified that race, ethnicity, or skin color are more responsible for discrimination than age, income, or education. Higher discrimination among Filipinos is attributed to their social statuses acquired through subjugation (David & Okazaki, 2006). Unfortunately, Filipino identity formation through subjugation is similar to non-Asian American minorities (Ai et al., 2015).

Similarly, Filipino Americans are the least likely among all Asian American subgroups to live in a homogeneous ethnic enclave. Perceived discrimination is consistently linked to psychological distress (Garcia et al., 2019; Huynh, 2012; Huynh et al., 2013). A full investigation of how Asian American subgroups report discrimination is worthy of future research.

Third, there are several explanations of why the Chinese have a middle level of psychological distress supporting hypothesis 1.3. Why do the Chinese do not perceive high levels of discrimination that does not have a direct negative effect on distress despite historical anti-Chinese racism (Ai et al., 2015)? Previous research also found that Chinese Americans had lower depressive disorder than Filipino Americans (Gee et al., 2007). One possible explanation is related to Chinese cultural values. Chinese culture is based on the Confucian principle that emphasizes social obedience to achieve internal harmony within an individual-family state hierarchy network (Ai et al. 2015). Another explanation responsible for Chinese psychological distress is related to racial and ethnic identity. Ai and colleagues (2015) identified that the Chinese subgroup had the highest racial and ethnic identity level compared with other subgroups. Racial and ethnic identity affects Asian Americans' self-image, their meaning in lives, their feelings about themselves, and their intercultural and group relationships. Racial and ethnic identity positively related to social support. Chinese Americans have a well-established social support system. For example, Chinese Americans have established Chinatowns in major cities along the West and Northeast coasts of the United States (Ling, 2009). Chinatowns allow them to make a living among themselves and provide social networks to interact with co-ethnic group

members, thus mitigating concerns related to language proficiency (Dong et al., 2012; Singh et al., 2015; Zhao, 2010).

Effect of marital status in psychological distress

Our findings strongly support the results obtained by previous studies (Joel Wong et al., 2012; John et al., 2012; Park et al., 2018; Rollock & Lui, 2016; Walton & Takeuchi, 2010; Zhang & Hong, 2013) that married Asian Americans had less psychological distress than the separated, widowed, divorced, and never married across three Asian American subgroups. Walton and Takeuchi (2010) found a profound negative effect of marital status on psychological distress among married Asian Americans. Married couples experience greater emotional support and social integration and have more support for maintaining a healthy lifestyle (Walton & Takeuchi, 2010). Emotional support also decreases depression and anxiety. The social integration that comes with marriage helps to create a sense of security, belonging, and direction, which may provide a sense of purpose and responsibility to stay healthy to care for one's spouse and other family members (Umberson, 1992). Marriage provides a mental health advantage in the Asian community as we expected in this study. Asian cultures place greater importance on being in marital status (Lee & Choi, 2018). Our results indicated that gender accounts for the relationship between marriage and psychological distress across three Asian American subgroups. Among never married Chinese Americans, lower levels of psychological distress were reported by women supporting hypothesis 2.1. A similar relationship was found among Filipino Americans. Among never married Filipino Americans, lower levels of psychological distress were reported by women supporting hypothesis 2.2. However, among Asian Indian Americans, never married women were

more likely to report higher levels of psychological distress than men. This study finding provides evidence to support hypothesis 2.3. Among Asian Americans, Asian Indian Americans (64.00%) were more likely than others (Chinese Americans, 44.00%, and Filipino Americans, 51.00%) to say that having a successful marriage is one of the most important things in their lives (Pew Research Center, 2012). Asian Indians are less comfortable with being in never married. Our results suggest that Asian Indian American women experience higher levels of psychological distress compared to men. Our finding is consistent with previous studies (Kumar & Nevid, 2010; Mahapatra, 2012; Napholz & Mo, 2010; Tummala-Narra et al., 2019; Walton & Takeuchi, 2010; Zhang & Hong, 2013). Past studies identified some important potential factors including conflicting family expectations, gender roles, and subjective assessments of economic distress, which might be associated with higher distress. Conflicting cultural conflicts impact women's self-esteem and sense of control over their lives. Many Asian American women have to deal with stress and conflict while maintaining both traditional family values and mainstream culture (Lee & Choi, 2018; Napholz & Mo, 2010). In general, women are at increased risk of reporting higher levels of psychological distress when they had a conflict with their families (Walton & Takeuchi, 2010). According to John and colleagues (2012), women without a spouse may be less likely to have adequate levels of social support when raising kids, which, in turn, may lead to higher levels of psychological distress due to gender-role differentiation. Given that Asian Indian culture may adhere more closely to gender-role differentiation in which women are responsible for caretaking. It is thus not surprising to find that women's well-being is tied more closely to the emotional makeup of the marriage than men's (Walton & Takeuchi, 2010).

Asian cultures have socially ascribed women's roles as wife and mother, and wife and mother are usually engaged in noneconomic household activities, including child-rearing practices and housekeeping activities. Previous studies showed that women could face an extra burden of taking care of the family due to a lack of spousal support (John et al., 2012; Park et al., 2018). In this sense, further research should be considered to determine if the association differs based on the type of jobs.

Another possible explanation for the higher rate of psychological distress among Asian Indian women may be related to the Asian culture (Mahapatra, 2012; Tummala-Narra et al., 2019). Mostly Asian Indian culture emphasizes women's lower status and places men at the top of society, and their higher socioeconomic statuses also do not contribute to attenuate psychological distress (Mahapatra, 2012). In Asian Indian culture, family structure follows a strict hierarchy that places men at the top of society with high status, decision-making roles, and responsibilities (Tummala-Narra et al., 2019). Asian cultures have socially ascribed women's roles as wife and mother, and wife and mother are usually engaged in noneconomic household activities, including child-rearing practices and housekeeping activities. Previous studies showed that women could face an extra burden of taking care of the family due to a lack of spousal support (John et al., 2012; Park et al., 2018). Therefore, the traditional culture of Asian Indians may adhere strictly to gender-role differentiation leading to extra psychological burden to women (Kumar & Nevid, 2010). Thus, we might expect that a deep sense of patriarchal norms and traditional gender roles embedded in Asian Indian culture may be conducive to males, not females, indicating a disproportionate burden of psychological distress to females.

However, past studies suggest that the effects of family structure on mental well-being are not universal (Crisostomo et al., 2014; Walton & Takeuchi, 2010). Never-married Asian Americans experience the highest discrimination and distress levels (Zhang & Hong, 2013). However, the link between never married and distress depends on the effect of gender. Our results demonstrated a stronger link among Filipino Americans when they were females and had not been married. Among never married Filipino Americans, women were less likely to report psychological distress than men. Past research has revealed that Filipino American women had better mental health self-rating compared with their Chinese and Vietnamese American counterparts (Appel et al., 2011). One plausible explanation is related to the increased levels of awareness of women's rights among modern Filipino American women (Crisostomo et al., 2014). Filipino American women tend to be tolerant and self-controlled in negotiating problems with their families and partners during the 21st century. However, in the traditional Filipino culture, men are expected to be heads of families, and women are usually considered as their subordinates or, at most, their equals (Reyes et al., 2019). In addition, most Filipino American women in the present study were U.S.-born suggesting that they might have been exposed to the modern American culture in which women are more often asserting their independence and becoming breadwinners and decision-makers in the family (Crisostomo et al., 2014). However, most Chinese- and Asian Indian Americans in our study were first-generation immigrants, suggesting that their Asian cultural values might have remained unchanged in which the individual is group-focused and one's wants are subordinate to those of one's family (Lee et al., 2007). Therefore, further research is needed to explore cultural values among Asian American subgroups,

particularly how cultural factors affect the relationship between race/ethnicity and psychological distress.

Effect of food security in psychological distress

Our findings suggest that high food secured Asian Americans were consistently less likely to be psychologically distressed compared with those who were food insecure supporting hypothesis 3. Additionally, there were differences in the effect of gender on the association between food security status and psychological distress among Asian American subgroups. The moderating effect of gender on the association between psychological distress and food security status was different between Asian Indian- and Filipino American subgroups. However, there was no moderating effect of gender on the association between psychological distress and food security status among Chinese Americans. Among Asian Indian Americans, the direct effect of having high food security status on psychological distress was moderated by gender, demonstrating that among high food secured Asian Indian Americans, women reported higher levels of psychological distress than men counterparts. The moderation effect of gender on the association between food security status and psychological distress was more robust among Asian Indian Americans. However, Filipino American women reported relatively less psychological distress if they were high food secured. These results indicate that the moderation effect of gender on the association between food security status and psychological distress appeared to be stronger among Asian Indian Americans than Filipino Americans. This study finding provides evidence to support hypothesis 3.1. None of the nationally-representative studies has documented the effects of gender on the association between food security and psychological distress among Asian Americans.

Previous research documenting food insecurity among Asian Americans was limited to small samples of college students (Abu & Oldewage-Theron, 2019). However, it is worth noting that in this study, Asian Indian American women reported higher distress in different determinants of distress compared to Asian Indian men. On the other hand, Filipino American women compared to male counterparts reported less psychological distress on those determinants of psychological distress we examined for Asian Indian Americans. Some differences may be related to the smaller sample size of Asian Indian Americans reporting food insecurity status. Food insecurity estimates may also be affected by how the respondent views the concepts of food security module used in the survey (Long et al., 2020). Additionally, answering to food security items may influence the cultural differences. For example, Asian Indian Americans reported broader views of family and households that extend to distant relatives and individuals who may not always reside in the household (McElfish et al., 2019), which may affect food insecurity estimates among this group. The past study also identified that acculturation proxies were associated with food insecurity among Asian Americans (Becerra et al. 2018). The same study found that Chinese who spoke a language other than English at home was associated with 7.24 times higher prevalence of being food insecure as compared to those who spoke English only. Similarly, the prevalence of food insecurity was significantly associated with being foreign-born among Chinese, Filipino, and South Asians. Therefore, future study is necessary to examine the independent effect of acculturation on food security status among the Asian American population.

Effect of employment status in psychological distress

Our results indicate that Asian Americans differ in the adverse effect of unemployment status. Unemployment may be responsible for low earning, and low earning may contribute to depression (Mossakowski, 2007; Napholz & Mo, 2010; Singh et al., 2017). Our results found that among employed Filipino Americans, lower psychological distress was reported when individuals were females supporting hypothesis 4.1. However, we found that among employed Asian Indian Americans, higher psychological distress was reported when they were females supporting hypothesis 4.2.. The type of employment is also quite diverse. Furthermore, the employment trend partly reflects the gender roles in the immigrant countries of origin and their impact on the behavior of immigrant women in the United States (NASEM, 2017). Although some of the Asian Indian Americans are somewhat better off financially, they are still more than 1-1/2 times more likely than white Americans to live in poverty (U.S. Census Bureau, 2017). Singh and colleagues (2017) found that adults without a job were at an increased risk of psychological distress. Our interactive effect of gender reflects higher levels of distress among Asian Indian American women. In Asian culture, role investment may be characterized by value congruence, which emphasizes family and cultural value systems rather than separating their own identity as in an individualistic culture (Lobel, 1991). Napholz and Mo (2010) found that women who valued work highly tend to have considerably more years of education, higher self-esteem, and tend to have depression. Asian women who reported placing career over family scored significantly higher on anxiety (Napholz & Mo, 2010). If an individual finds both their career and family life equally satisfying, experiences equivalent pressures to invest in both areas such as work-family conflict may be expected in many Asian families, if the demand continues to

participate in both areas, the highest degree of work-family conflict may be expected. Many Asian Indian American women were unemployed. Our descriptive analysis showed a wide gap between men and women among currently employed Asian Indian Americans (65.32% versus 34.68%). On the other hand, our analyses revealed that higher proportions of females were currently employed than males among Filipino- and Chinese Americans. When they were employed, some of them worked in the informal sector as caregivers, domestic workers, house cleaners, and garment workers (Burnham & Theodore, 2012; NASEM, 2017). The low-wage earners are struggling to make ends meet, face hazardous work conditions, and often endure abuse as a result of their immigration status (Pew Research Center, 2017). The existing discrepancy may also be partly explained by cultural and language barriers that prevent equal access to employment to immigrants (Burnham & Theodore, 2012). Even though Asian Indians appear to have among the highest levels of educational attainment among Asian Americans, women lacked educational advantage. Larger nativity differentials in labor force participation are common. According to the NASEM (2017), immigrant women are somewhat less likely (about 5.00 to 10.00% points) to be employed than their native-born counterparts. Future studies should assess the effect of nativity status in the association between employment status and psychological distress among Asian American subgroups.

Effect of educational status in psychological distress

Our results did not provide a significant association between educational status and psychological distress among Chinese- and Asian Indians Americans. However, there was a significant association between educational status and psychological distress

among Filipino Americans. This study finding provides evidence to support hypothesis 4.3. Consistent with the previous study (Zhang & Hong, 2013), we found that Filipino Americans who had a college level of education reported a significantly lower level of psychological distress. This finding implies that the educational status might be an important factor in explaining psychological distress for Filipino Americans than the other two American subgroups. Potential explanations for the nonsignificant relationship between higher education and psychological distress among Chinese American and Asian Indian American subgroups. One potential explanation is related to the nonsignificant impact of educational status is visa and documentation status (Gee et al., 2016). Many Asian immigrants are preferentially selected for entry into the United States based on their occupational skills (Pew Research Center, 2017). Some of the Asians are also undocumented immigrants and others are refugees. Therefore, these structural indicators might be related to psychological distress among Chinese and Asian Indian Americans. Another potential explanation is related to the place of education. Given that most Chinese and Asian Indian adults are immigrants and have received their primary education (i.e., education before age 16) in foreign countries. Past studies showed that the overseas education does not result in the same health payoffs for increasing educational attainment compared to U.S. schooling because the overseas education is often related to limited English proficiency, fewer economic resources, and limited psychosocial resources (Walton et al., 2010; Zhang & Hong, 2013). Therefore, when examining the role of education on psychological distress among Asian Americans, the place of education appears to be an important confounding variable. Place of education works together with educational status to jointly affect the levels of psychological distress

(Zhang & Hong, 2013). However, we have limited ability to measure the place of education because NHIS does not ask the place of education of the respondents. Other surveys such as National Latino and Asian American Study (NLAAS) asked respondents, “In what country did you receive most of your education before age 16?” (Zhang & Hong, 2013). Future research on the role of educational status and place of education on the psychological distress among Asian Americans with different immigration status will be necessary.

Effect of citizenship status in psychological distress

Our results also indicated that acculturation variables partly accounted for the observed differences in psychological distress in some Asian American subgroups. Consistent with previous studies (Gee et al., 2016; Gubernskaya et al., 2013), findings from our analyses showed that among Filipino Americans who had U.S. citizenship status reported lower levels of psychological distress. The study finding provides evidence to support hypothesis 5.1. Gee and colleagues (2016) found that U.S. citizens reported less psychological distress compared with noncitizens after accounting for acculturative stress and a variety of sociodemographic characteristics. The U.S. citizens experience considerable advantages compared with noncitizens. Noncitizens may face barriers to employment, educational attainment, and wages (Gee et al., 2016). Hence, it is possible that any disparities between citizens and noncitizens could be explained by discrimination, and, in turn, poor mental health. Similarly, this relationship might further vary by the age at which someone obtains citizenship (Gee et al., 2016). According to Gee and colleagues (2016), a stronger effect of citizenship was found to reap the social and economic advantages of citizenship status among those immigrants who became

citizens at a younger age compared with those who gained citizenship at older generations.

Although the estimated odds ratio shifted a bit with the inclusion of acculturation variables, the predicted probabilities of psychological distress were not significantly different among Chinese Americans and Asian Indian Americans. Past studies showed that U.S.-born individuals were more responsive to considerable distress due to perceived discrimination than their foreign-born counterparts (Rollock & Lui, 2016). Therefore, we speculate that U.S. citizens may not report their reactions to the perceived discrimination as psychological distress. The same study found that higher acculturation was related with higher stress, which, in turn, contributed to more elevated depressive symptoms among Chinese Americans. However, the acculturation contributed to depressive symptoms only through indirect pathways. One important factor contributed to the indirect relationship is perceived discrimination. Perceived race-based discrimination significantly related to self-esteem and psychological distress with small effects. However, non-race characteristics produce medium to large effect sizes (Schmitt et al., 2014). Perceived unfair treatment are based on specific personal characteristics such as weight, physical disability, age, and gender are attributed to non-race characteristics. This result suggests that distinct sources of discrimination are warranted as separate predictors of psychological distress.

Effect of nativity status in psychological distress

Consistent with the previous studies (Lee & Choi, 2018), our results indicated that nativity status was not associated with psychological distress among the three Asian American subgroups. However, past studies found better health status among foreign-

born Asian Americans compared to U.S.-born counterparts (Chang & Moon, 2016; Frisbie et al., 2001; SAMHSA, 2019; Yoshihama et al., 2012). Chang and Moon (2016) found that Asian Americans, including Filipino Americans who had been in the U.S. for more than two years, had significantly reported higher levels of psychological distress compared to those who had been in the U.S. for less than one year or one year. Similarly, national data suggest that Asian immigrants generally have a lower prevalence of distress than do U.S.-born Asians (SAMHSA, 2019). Chang and Moon (2016) examined psychological distress by using the Kessler 6 Scale, and they measured acculturation by English proficiency among Asian Americans. However, the NHIS does not have questions that can measure the English proficiency of Asian Americans.

Contrary to our expectations, the study finding did not provide evidence to support hypothesis 6.1 that the Chinese American and Asian Indian American subgroups would report lower levels of psychological distress than the Filipino American subgroup. Neither shorter duration of stay in the U.S. nor longer duration of stay in the U.S. exerted significant effects on psychological distress indicating that protective effects of foreign-born status were salient. A past study confirmed our finding that there were no significant differences in psychological distress by nativity status among Chinese, Filipinos, and Vietnamese (Zhang & Hong, 2013). One explanation of nonsignificant relationship against the established literature is related to the research design of the current study. In the Chinese American and Asian Indian American subgroups, the protective effect of foreign-born status against psychological distress may emerge only when multiple dimensions of acculturation (e.g., racial discrimination, ethnic identity, English proficiency, and social network) were measured (Sue & Sue, 2008). Consequently, a lack

of inclusion of multiple dimensions of acculturation is likely to have less predictive abilities of the model for Asian American subgroups. There has been little attention paid to the racial discrimination and ethnic identities that Asian Americans face (Sue & Sue, 2008) despite experienced by an increased number of Asian Americans. Future research in this area should include racial discrimination, ethnic identity, English proficiency, and social support while examining the effect of nativity status in psychological distress among Asian American subgroups.

Implications for Public Policies and Work Practice

Overall, the findings indicate that there are important differences in psychological distress among three Asian American subgroups suggesting that heterogeneity of the Asian American population should be considered in policy, research, and practice. The findings of our study have public policy implications on making mental health treatment strategies based on Asian American subgroups rather than treating all Asians as a single treatment strategy. Although the health care reform act/Obama care created greater access to services for Asian Americans, there was little consideration for how culturally relevant these services may be or how they could become more culturally relevant (Nagayama Hall & Yee, 2012). Therefore, the policymakers should shift their secondary priorities of the mental health issues as consistent with other physical diseases such as cancer, CVD, HIV/AIDS, obesity prevention, and diabetes. Similarly, U.S. federal mental health policy has shifted from an emphasis on increasing accessibility to treatment to improving the quality of care in 2012. However, federal mental health policy largely overlooked Asian Americans because policymakers might have inaccurate or biased beliefs and attitudes about Asian Americans' mental health needs (Nagayaman Hall & Yee, 2012). Therefore,

it is necessary to prioritize mental health policies that can reach to the neglected Asian American populations.

Another policy implication is about the underutilization mental health care services among Asian Americans. The underutilization may be explained by the lack of cultural relevance of available services and the use of alternative medicine, particularly, by those who do not speak English (Hall & Eap, 2007). The mental health care seeking attitudes may be influenced by how well the treatment addresses the perceived etiology of psychopathology ((Sue et al., 2012). Therefore, there is a need for implementing culturally and linguistically appropriate mental health care services for this rapidly growing group of American society.

Furthermore, social determinants at the Asian American population level are considered underlying and fundamental determinants of psychological distress and are amenable to change through public policy (Singh et al., 2017). Since disparities in psychological distress are multifaceted, a multi-sectoral approach involving mental health education, culturally sensitive health communication, and culturally and linguistically appropriate health services is needed to tackle health disparities in psychological distress effectively. Such an approach demands increased collaboration among public, private, and non-profit sectors and various stakeholders including state and local agencies and focused the need for Asian American community-based affordable interventions to reducing disparities in psychological distress (Marmot, 2006; Penman-Aguilar et al., 2016). Policymakers should prioritize the development of more affordable interventions that destigmatize the treatment of mental illness.

Policymakers should also divert their attention to the organization of health care delivery systems by integrating mental health care services. The long-term health care needs of chronic mental disorders are similar to the needs of other chronic conditions (Petersen et al., 2017). The U.S. health care policy is critical to addressing the need for adequate supply chain management of psychiatric treatment. To fill the existing gap of psychiatric therapy, policymakers should give priority to budget allocations to properly implement mental health policies and plans by strengthening human resource capacity who can understand mental health issues related to specific minority ethnic groups.

The findings also revealed several implications for each of the Asian American subgroups.

Among Chinese Americans, marriage and food security are important predictors of psychological distress. We show that the effect of marital status on psychological distress is conditional on gender. The results of the current study inform policymakers to minimize gender disparity in psychological distress by developing gender-specific mental health plans and programs. Mental health providers must assess these demographic characteristics such as whether the individual is currently married or not because the manifestation of mental disorders is affected by gender. Hence, the availability of culturally competent marital counselors who can understand Asian cultural values, norms, and the contexts – can go a long way to assist couples in resolving issues and enhance their understanding of each other (Singh & Bhayana, 2015).

Food security, a critical social determinant of health, has a consistent and robust effect on experiencing low distress. It is essential to understand food security to acculturation. Low acculturation is predominantly related to the higher prevalence of

food insecurity among most Asian American subgroups (Becerra et al., 2018). About 6.00% of the Chinese received Supplemental Nutrition Assistance Program (SNAP) benefits in the last year which is substantially lower than the national average (11.00%) (USDA, 2019). Yet, it is an imperative need for future research and policymakers to understand the barriers to ensuring food security among those Chinese Americans who have received public benefits regularly. It is recommended to develop targeted public health efforts among the most at-risk Chinese Americans who received public benefits. Local and state government should expand their outreach to identify individuals who are the most at-risk groups. Therefore, it is necessary to enhance collaborative effort among food stamp programs and public health and nonprofit organizations to make sure that Chinese Americans who received public benefits are experiencing the burden of food insecurity. Therefore, community health workers are necessary to assess food availability and increase participation in food assistance program to alleviate the burden of food insecurity among the most vulnerable Asian American populations (Becerra et al., 2018).

Overall, the manifestation of psychological distress is affected by marriage and food security in Chinese Americans. Additionally, the cultural factor is an important contextual variable that needs to be understood by policymakers. The stereotype of Asian Americans all looking the same is grossly inaccurate if one simply examines the range of phenotype between various Asian groups. Therefore, policymakers should be knowledgeable of the myths about Chinese Americans and how Chinese Americans have been affected by the higher levels of psychological distress.

Among Filipino Americans, marital status, food security, employment status, education, the region of residence, and U.S. citizenship status are significant predictors of

psychological distress. Our results highlighted that psychological distress is conditional on gender. The gender moderates the association between a series of predictors (i.e., marriage, food security, and employment status) and psychological distress among Filipino Americans. Our results indicated that Filipino women were less likely to report psychological distress than men counterparts. The observed gender difference is a notion that policymakers should keep in mind the existing gaps in mental health status based on gender. Additionally, the main effects of food security, employment, educational status, and the region of residence are structural and contextual factors that influence the perception of discrimination and shape individuals' health statuses (Misra & Hunte, 2016). Higher discrimination among Filipino Americans is attributed to their social statuses acquired through colonial mentality (David & Okazaki, 2006; Nadal et al., 2011). Addressing health inequity due to these structural and contextual determinants requires addressing the underlying policies, structures, and resource allocation focusing on Filipino American men and women separately. The current study's findings must be viewed in the context of the importance of social determinants of mental health. In that context, the prevalence and disparities documented in this study will be immediately useful to policymakers to inform policy and practice since it reduces the disparity in Filipino Americans' psychological distress.

Among Asian Indian Americans, age, marriage, food security, and employment status are important predictors of psychological distress. Although Asian Indian Americans, in particular, have higher levels of education and income, they might not be perceived as having vulnerability to the experiences of psychological distress (Misra & Hunte, 2016). More interestingly, our results highlighted that experience of psychological

distress is conditional on gender. The gender moderates the association between a series of predictors (i.e., marriage, food security, and employment status) and psychological distress among Asian Indian Americans. Being female is associated with higher psychological distress in the Asian Indian American subgroup. It is evident that the manifestations of psychological distress in Asian American women are more somatic than emotional (Appel et al., 20110). On the other hand, many Asian Indian Americans may not consider mental health treatment to be that beneficial or helpful because of their cultural beliefs on traditional healers and social stigma related to helping seeking behaviors (Chandra et al., 2016; Kumar & Nevid, 2010).

In addition to policy implications, there are important practical implications of the findings of this study. The cultural values such as interpersonal harmony, loss of face, and filial piety on Asians' beliefs play important roles while making public health interventions to reduce psychological distress among Asian Americans. The crucial useful insight of our findings is that psychiatric/mental health care professionals should be provided with adequate, culturally competent training that would help them effectively while providing mental health care for specific Asian American subgroups. Hence, integrated care models that emphasize the role of mental health service providers, psychiatrists, and bilingual health workers can lead to improving the mental health conditions of Asian Americans.

Since this study indicates variations in psychological distress across Asian American subgroups, a differential-treatment approach toward groups of different origins, rather than a uniform-treatment approach, may be warranted. If not adequately treated, psychological distress can lead to impairment in social, occupational, and school-

related functioning (Muntaner et al., 2012) further disadvantaging populations who are already at risk. Furthermore, individuals with psychological distress have unmet health needs – including the ability to afford prescription drugs – irrespective of immigration status (Dedania & Gonzales, 2019). More research is needed to identify best practices for improving access to routine and affordable medical care for adults living with psychological distress.

It is recommended to focus on gender-based mental health literacy, anti-stigma interventions, and culturally informed health care services as well as long-term community care and rehabilitation (Petersen et al., 2017). This particular line of public health efforts should continue to be of interest because Asian Indian Americans are the second largest subgroup of Asians in the United States. Indeed, if there is a lack of gender-based public health policies and mental health treatment strategy, this may exacerbate the overall health burden of the Asian Indian Americans given that chronic health conditions are relatively high among this ethnic group despite their relatively higher socioeconomic status (Misra & Hunte, 2011). Furthermore, this might become a systemic problem that could contribute to deteriorating further the psychological wellbeing of Asian Indian American women.

Our existing health care system and health care professionals have minimal expertise in providing ethnic-specific mental health services. Consequently, the lack of specialties may lead to misdiagnosis and poor treatment of physical health problems for individuals with mental health issues. Additionally, based on a national study of Asian Americans examining mental health-related service use (Spencer et al., 2010), it is crucial to collaborate both formal and informal ethnic-centered mental health treatment to Asian

Americans. Understanding of culturally informed conceptualizations of mental illness by health professionals may encourage Asian Americans to openly disclose their feelings and problems (Joel Wong et al., 2010; Kim & Zane, 2016). Unfortunately, there is considerable evidence indicating that Asian Americans have less favorable attitudes toward and are less likely to use mental health services than other ethnic groups in the United States (Appel et al., 2011; Ting & Hwang, 2009). Understanding what influences help-seeking attitudes may help shed light on why Asian Americans refrain from seeking mental health treatment. Some of the recommended practices, such as the use of peer support, often involve mutual support groups within clinical settings and can be extended in future research. Community-based programs that emphasize on improving mental health literacy and promoting help-seeking behaviors can lead to reducing the chance of subsequent episodes (Dedania & Gonzales, 2019).

Racial discrimination hinders the ability to seek professional mental health services among Asian Americans, in turn, reinforcing to the use of more informal mental health services (Spencer et al., 2010). Filipino Americans are, particularly, in a distinctive position in that they battle an array of microaggressions and stereotypes (Nadal et al., 2011). Hence, our results demonstrate a need for the development of treatment interventions that target the Filipino Americans.

Hence, this study fills an essential gap in the literature by documenting psychological distress among a nationally representative sample of Asian American adults. Asian Americans are experiencing gendered-patterned psychological distress. The existing gender disparity in psychological distress is related to marriage and high food security status among three Asian American subgroups. Additionally, gender disparities

in psychological distress among Asian American subgroups found in this study illustrate the need for researchers to identify and test strategies to improve mental health, considering the cultural norms of Asian-specific groups.

Study Limitations and Implications for Future Research

This study had several limitations.

The first limitation stems from the study's use of cross-sectional research design. We cannot infer the direction of causality among the SDH determinants, acculturation variables, and psychological distress because there is no temporal ordering of the variables (Creswell, 2009). Regardless of this limitation, our correlational study is a useful step to examine associations among various social determinants of health and psychological distress that have been neglected by aggregating all Asians into a single category (Nadimpalli et al., 2012).

The second limitation centers on the way how our Asian American respondents chose to express their distress utilizing research instruments. NHIS's research instrument measures psychological distress including words like "nervousness," "hopeless," "restless," "depressed," "worthless," and "everything effort is an effort." Asian Americans may have a difficult time understanding these Western-based scales, and they may provide responses that are not conceptually equivalent to the measures' intended meanings (Chu & Sue, 2012). Although the K6 screen has excellent validity and reliability (Lee et al., 2012), these cultural variations in idioms of distress on self-report measures might tend to contribute to the underestimation or under detection of mental health symptoms in Asian Americans (Chu & Sue, 2012; Kim et al., 2011; Swartz & Jantz, 2014; Yip et al., 2008). Researchers and mental health professionals must

encompass these cultural influences while making the selection of their assessment instrument, providing an interpretation of reported responses, and performing differential diagnosis decisions. Therefore, it would be necessary to consider the context in which the K6 cut-off decision criterion should be utilized (Mitchell & Beals, 2011). Since the K6 screening tool consistently provides predictive information about the physical and mental quality of life, it appears to capture data on individuals' psychological distress that is unique beyond mood, substance, and physical disorders (Mitchell & Beals, 2011). Thus, the selection of an appropriate cut-off point can capture the likelihood of respondents' sensitive information and, therefore, result in more robust findings.

The third limitation relates to the small sample size of Asian Indians to consider gender and nativity concurrently. Future studies might investigate how these two factors work together. This type of analysis might be helpful to clarify questions such as whether it is only U.S.-born women that are not protected by nativity status, or whether the negative aspects extend to U.S.-born men as well. However, Asian Indian Americans are underrepresented in research; in particular, research on psychological distress by gender although Asian Indians have become the second-largest subgroup of the Asian American population and third largest ethnic minority population in the United States (Misra & Hunte, 2016; Yoshihama et al., 2012).

The fourth limitation centers on the self-reported data used in our study. The cognitive and motivational biases may have influenced our findings by underreporting psychological distress (Huynh et al., 2014; Lee et al., 2015; McVeigh et al., 2006).

Fifth, the study did not assess the psychological distress of the most potentially distressed population (Tam et al., 2016). For example, NHIS does not include a survey of

homeless or institutionalized groups which are known to have a higher prevalence of psychological distress. Thus, our analyses might misestimate the real impact of distress due to the exclusion of these groups, particularly those in psychiatric institutions.

The sixth limitation of our study is related to the use of the Kessler 6 scale, which does not provide clinical diagnoses (Witt et al., 2009). Our findings might have been more persuasive if we had been able to measure clinical depression. Nonetheless, previous studies demonstrated that the K6 is highly correlated with DSM-IV diagnoses and is valid for use in population-based survey research (Furukawa et al., 2003; Kessler et al., 2002, 2003). More importantly, the K6 screening tool can be used in disability assessment settings as an agenda for an in-depth follow-up clinical interview to ascertain the presence of state mental disorder (Cornelius et al., 2013).

Seventh, the data for this study was collected from post-immigration, and there exists no comparable data on pre-immigration resources including cultural orientation, belief in traditional Asian culture, or having any previous exposure to foreign countries. The cultural understandings, meanings, and symbols that immigrants bring with them from their home countries are critical in understanding how the pre-immigration cultural influences shape psychosocial well-being. Pre-immigration characteristics include exposure to diversity, the caste system, and the colonial mentality among Filipino- and Asian Indian Americans. In contrast, post-immigration features include openness to multiple diversity, ethnic minority status, employment opportunities, level of acculturation, exposure to the individualistic host society, and racial microaggressions (Inman et al., 2015). Further research is required to understand changing patterns of psychological distress by using binational data that help in analyzing pre- and post-

immigration cultural characteristics and racial discrimination. Racial discrimination hinders the ability to seek professional mental health services among Asian Americans, in turn, reinforcing the use of more informal mental health services (Spencer et al., 2010). By understanding what influences help-seeking attitudes may help shed light on why Asian Americans refrain from seeking mental health treatment. More research is critical to further examine factors associated with the underuse of mental health services by Asian Americans. Despite this limitation, we believe that this study sheds important light on the mental health conditions of Asian Americans by including a broad range of variables guided by a robust theoretical foundation. In future research, using social determinants of health as a theoretical foundation, including cultural factors affecting nonspecific psychological distress, may also be needed. Further study must examine the implications of cultural factors not only in terms of Asian Americans but also on service provider cultural bias.

Finally, one of the acculturation factors is English proficiency, which would have shed light on reporting psychological distress (Park et al., 2018), but this variable was not included in our analyses. This is due to the limited nature of the measure available in the NHIS dataset, which does not directly measure respondents' English abilities (Kim & Sung, 2016; Lopez-Gonzalez et al., 2005). Future research should include cultural attitudes to understand the role of acculturation in psychological distress. Still, the survey reports the language in which the interview was conducted. The languages included in the NHIS survey were English, Spanish, English and Spanish, and others. However, one of the disadvantages of the NHIS dataset is the lack of language variables (Singh et al., 2013). Regardless of the limitations of self-report data, the NHIS data revealed necessary

interconnections among social determinants, acculturation measures, and demographic characteristics.

Conclusion

To our knowledge, our study is the first quantitative research guided by social determinants of health framework examining Asian ethnic differences in psychological distress among the three largest Asian American subgroups – Chinese-, Filipino-, and Asian Indian Americans. Importantly, no Asian American subgroup studies to date appear to have focused on psychological distress using social determinants of health framework. Although Asian Americans have reported substantially lower psychological distress, intragroup disparities in psychological distress have persisted and remain marked, which represents a major area of policy concern. This disparity is particularly observed for Filipino Americans. The focus was on disaggregated Asian Americans, especially previously understudied ethnic groups, and examination of intragroup disparities in psychological distress have persisted and remain marked, which represents a major area of policy concern.

Our cross-cultural study showed intragroup variations on psychological distress based on marital status, food security, employment status, and U.S. citizenship status. Furthermore, remarkable differences of psychological distress across Asian American subgroups are a result of the subgroups' different cultural norms, which is consistent with previous studies (Cho et al., 2014; Kim & Zane, 2016). Disaggregated Asian Americans into various ethnic groups allowed us to identify ethnic-specific determinants of psychological distress. These determinants of the psychological disparities reported here are multifactorial in nature (Singh et al., 2017). Our results indicate that differences in

economic stability factors (i.e., food security and employment status) and acculturation (i.e., U.S. citizenship status) are important social determinants contributing to persistent disparities in psychological distress among Asian American subgroups. Addressing inequities in these determinants should be an important focus from both research and policy standpoints. Therefore, our results highlight not only the need for a more comprehensive assessment of psychological distress using an SDH framework but also provide Asian ethnic-specific policy and work practice recommendations. Because of the growing numbers of Asian Americans and their unique historical, cultural, and health characteristics, the need for Asian American-specific research is also pressing.

Increasing Asian immigrants' population in the United States may lead to an increase in psychological distress which indicates the rates of psychological distress depend on the ethnic group. This premise is supported by our study's findings suggesting variations of psychological distress among Asian American subgroups. Although this study was conducted on three most significant Asian American subgroups, hopefully, it may also shed some light on the shared experiences shared by all the immigrants and minority groups because our existing health care system considers them on a one-size-fits-all approach to mental health care with Asian Americans which is potentially problematic (Joel Wong et al., 2010). Instead, it is essential for the health care system to identify within-group differences among their Asian American clients based on Asians' mental health beliefs and guided by their unique cultural system. Through continued research, policy change, health provider action, and community participation, the negative impact of psychological distress may be enriched to promote the psychological well-being of the increasing Asian population in the United States. The emerging new

demographic will most certainly have an impact on our political and social structures and influence the ways how different social determinants of mental health affect daily lives.

Our findings do not demonstrate the predictability of all of the factors of the SDH framework but lend support for extending the framework by considering acculturation variables. Additionally, demographic variables that are not included in the original SDH framework provide strong evidence that it is crucial to consider in the framework. In the current study, through empirical analyses, we have found that gender affects differently to the association between marriage and psychological distress of all Asian American subgroups. The differences in the effect of gender on the association between marriage and distress can be interpreted within the sociocultural contexts of the three Asian American subgroups (Ai et al., 2015). Advancing the literature, our evidence underscores the importance of cultural contexts that could influence variations in psychological distress between males and females Asian Americans. Recognition of the diverse cultural system adopted by Asian ethnic groups has brought calls for the provision of culturally sensitive mental health care and psychoeducation for a particular Asian American subgroup (Reyes et al., 2019). While socioeconomic status factors are often used in the literature in the study of Asian Americans' health, the findings in this current study reveal that these factors, albeit important social determinants, are not strong predictors of psychological distress of all Asian American subgroups. Among these factors, only high food security status demonstrates a strong and consistent health-protective effect in all subgroups whereas employment status demonstrates a different effect on psychological distress among three Asian American subgroups.

Our results suggest that it is imperative to explore and understand the differential effects of the U.S. citizenship status and the duration of stay in the U.S. on psychological distress. The rapidly increasing presence of non-White racial minorities in the United States makes this study of Asian American families and psychosocial well-being, particularly consequential. Asian Americans' psychological distress must be viewed within their acculturation levels to provide insights for both mental health providers and researchers. In this regard, policymakers and health care providers could use the social determinants of health framework to better understand the effects of various non-medical factors (such as social determinants of health) on psychological distress.

There are also several strengths to this study. The sampling design of NHIS and survey-weighted analyses allow for generalization to Asian Americans in the United States, thus increasing the external validity of this study. Furthermore, the results provide one of the first assessments of psychological distress among the most populous three Asian American subgroups, especially since there remains limited data to assess Asian Indian health with NHIS being one of the few to provide public access to such data. As such, this study's results provide a valuable addition by providing the first comprehensive analyses, using the SDH framework adopted by the CDC, of the burden of mental health among disaggregated Asian American populations. Overall, our findings contribute to the growing body of literature aimed at eventually reducing disparity in mental health in the United States by drawing attention to the policymakers for providing mental health service considering the intersection of demographic characteristics, social determinants of health, and acculturation variables.

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Chapter 3

EXAMINING CIGARETTE SMOKING AND ALCOHOL CONSUMPTION AMONG CHINESE, FILIPINO, ASIAN INDIAN AMERICAN SUBGROUPS: DO GENDER, SOCIOECONOMIC STATUS, AND ACCULTURATION MATTER?

Cigarette smoking and alcohol consumption are both risk factors leading to poor health outcomes. According to the 2015 National Survey on Drug Use and Health (NSDUH), Asian Americans had lower (34.20%) rates of lifetime cigarette smoking compared to whites (69.90%) (SAMHSA, 2016). An adult who has smoked 100 cigarettes in his or her lifetime is categorized as a lifetime cigarette smoker (NCHS, 2018). In terms of alcohol consumption, 43.70% of Asian Americans engaged in alcohol consumption in their lifetime whereas 61.60% of whites were involved in similar health behaviors in 2015. Alcohol consumption is defined as any use of alcohol in the past 30 days (SAMHSA, 2016). According to the CDC (2020), a standard drink is equal to 14.0 grams (0.6 ounces) of pure alcohol (for example, 12 ounces of beer, 8 ounces of malt liquor, 5 ounces of wine, 1.5 ounces of 80-proof distilled spirits or liquor). Globally, a recent WHO report estimates that 20.20% of the world's population (aged ≥ 15 years) were current smokers in 2015, indicating that smoking rates decreased by 6.70% globally since 2000 and by 4.10% since 2005 (World Health Organization [WHO], 2019). According to this report, tobacco consumption has begun to decrease substantially in many countries. Nevertheless, the world will still not reach the target of a 30.00% reduction in prevalence between 2000 and 2025. WHO's *Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020* set this target to

reduce tobacco use globally (WHO, 2019). Similarly, globally alcohol consumption contributes to 3 million deaths each year as well as to the disablement and poor health of millions of people. Overall, the harmful use of alcohol is responsible for 5.10% of the global burden of disease (WHO, 2019).

In the United States, cigarette smoking and alcohol consumption are both the leading causes of preventable lifestyle-related health-risk behaviors, accounting for billions of dollars in direct health care expenditures and productivity losses each year in the United States (CDC, 2019). In keeping with the increasing Asian American population growth pattern (U.S. Census Bureau, 2017), it is apparent that the Asian American population is likely to rise further. The Asian share of the total U.S. population in 2014 was 5.40% and is projected to account for 9.30% of the total U.S. population in 2060 (Pew Research Center, 2017). Evidence suggests that immigrants to the United States are likely to adopt lifestyle patterns and health behaviors more similar to those in the U.S. (Abraido-Lanza et al., 2006; Ro, 2014). Indeed, Asian Indian college students are more likely to drink alcohol than any other college students from different ethnic races (Hrywna et al., 2016). The risk of alcohol consumption increases among Asian women as they acculturate to the more lenient U.S. cultural norms with respect to female drinking culture (Becerra et al. (2013). Therefore, it is prudent to examine cigarette smoking and alcohol consumption in the Asian American population.

The following sections shed light on different literature on Asians' smoking and alcohol consumption, gender, culture and smoking, culture and drinking, SES characteristics, and acculturation.

Smoking and Alcohol Consumption in Asian Americans

According to the WHO (2019), tobacco use represents the use of any smoked or smokeless tobacco products. The indicators of tobacco smoking are current and daily tobacco smoking and current and regular cigarette smoking. Any tobacco excludes the use of products that do not contain tobacco such as electronic nicotine delivery systems. In China, age-adjusted current cigarette smoking prevalence rates were 44.20% among the male Chinese aged 15+ years; however, rates were only 1.70% among the female Chinese of the same age group (WHO, 2019). In India, age-adjusted current cigarette smoking prevalence rates were 12.10% among the Indian males aged 15+ years; however, rates were only .50% among the Indian females of the same age group (WHO, 2019). In the Philippines, age-adjusted current cigarette smoking prevalence rates were 38.40% among Filipino males aged 15+ years; however, rates were 6.40% among Filipino females of the same age group (WHO, 2019). In the United States, age-adjusted current cigarette smoking prevalence rates were 19.60% among the American males aged 15+ years; however, rates were 15.40% among the American females of the same age group (WHO, 2019). WHO estimates these figures using the national survey data of these countries to predict the underlying smoking prevalence trends by gender. Recent statistics suggest that current smoking rates are the highest among the Chinese nationals, whereas the current smoking prevalence rates are the lowest among the Asian Indian citizens. The cross-national comparison of adult current smoking prevalence rates indicates great variability in the prevalence of smoking behaviors among Chinese-, Asian Indian-, Filipino Americans.

Turning to alcohol consumption, the WHO Global Status Report on Alcohol and Health 2018 (WHO, 2018) reports that about 2.3 billion people of the global population aged 15 years and over were current drinkers in 2016. WHO presents country-specific alcohol consumption rates based on three-year (2015-2017) averages of alcohol consumption in liters. For example, China's per capita alcohol consumption was 7.2 liters of pure alcohol; however, the Chinese females consumed a significantly lower amount of alcohol (2.5 liters per capita) compared to the Chinese males (11.7 liters per capita). India's per capita alcohol consumption was 5.7 liters of pure alcohol; however, Indian females consumed a much lower amount of alcohol (1.7 liters per capita) compared to Indian males (9.4 liters per capita). The Philippines' per capita alcohol consumption was 6.6 liters of pure alcohol; however, Filipino females consumed a significantly lower amount of alcohol (1.9 liters per capita) compared to the Filipino males (11.3 liters per capita).

Furthermore, WHO projects that total alcohol per capita consumption in persons aged 15 years and over will further increase in India, China, and the Philippines. Recent figures indicate that there are significant gender differences in alcohol consumption across these three Asian countries. Among current drinkers, females are less often to be current drinkers than males, and when women consume alcohol, they consume less than men. Surprisingly, the per capita alcohol consumption of Asian men went up from 7.1 liters in 2010 to 9.4 liters in 2016. In the same vein, the per capita alcohol consumption of Asian women went up from 1.3 liters in 2010 to 1.7 liters in 2016 (WHO, 2018). In contrast, per capita alcohol consumption went down from 12.1 liters in 2010 to 11.3 liters in 2016 among Filipino men, and per capita alcohol consumption went down from 2.2

liters in 2010 to 1.9 liters in 2016 among Filipino women (WHO, 2018). Per capita alcohol consumption among the Chinese remained almost unchanged. For example, per capita alcohol consumption went up slightly from 11.5 liters in 2010 to 11.7 liters in 2016 among Chinese men, and per capita alcohol consumption went a point down, i.e., from 2.6 liters in 2010 to 2.5 liters in 2016 among Chinese women (WHO, 2018). When comparing per capita alcohol consumption among these three Asian countries and the United States, Chinese and Filipinos had higher per capita use than the United States. Recent global figures on alcohol consumption indicate that females are less likely to be current drinkers than males. When women consume alcohol, they consume less than men in all three Asian countries and the United States. The differing trajectories that have been observed in men and women resulted in a gender-gaps across Asian American subgroups.

The country-specific data reveal that the prevalence of smoking and alcohol consumption exceeds that of the general U.S. population in some Asian American subgroups (such as Chinese American and Filipino Asian American subgroups). We can theorize that the trends of smoking and alcohol consumption behaviors are related to the gendered-norms in these behaviors among Asian countries. Furthermore, male Asians, in particular, have more permissive attitudes toward smoking and alcohol consumption compared with female Asians (Lee et al., 2013; Mao et al., 2014). We expect Asian culture and societal norms may have direct or indirect influences in smoking and alcohol consumption, and such impacts can be attributed to reflecting interethnic group differences in health-risk behaviors. Taken together, our research highlights the

significant within-group differences among Asian Americans and underscores the importance of analyzing Asian American subgroups independently.

Below, we review some important factors that have been reported to be associated with cigarette smoking and alcohol consumption among the three Asian American subgroups.

Demographic Characteristics

Demographic characteristics may play a part in explaining the variations of health and health outcomes. Commonly used characteristics are age, gender, race/ethnicity, family type, marital status, and region of residence. Asian ethnic groups differ significantly concerning age composition, marital status, and the region of residence (Singh & Siahpush, 2002). The general tendency for all groups is that their health will deteriorate when individuals are getting older (Jasso et al., 2004). Asian Americans aged 35 or older were less likely to have binge alcohol use than their counterparts aged 18 to 24 (Lee et al., 2013). However, alcohol consumption varies by sex, gender, and parenting status (McKetta & Keyes, 2019). The past studies demonstrated that trends in binge and heavy drinking over time depend on parenting status. A study that examined national trends in binge drinking by sex, gender, and parenting status using the 2006-2018 waves of NHIS found that men and women with children reported consistently lower levels of drinking than those families who had no children (McKetta & Keyes, 2019).

Marital disruption is generally much lower among immigrants, with Asian Americans having the lowest rate (Singh & Siahpush, 2002). The same study found that Asian American adults who were never married were 1.6 times more likely to have binge alcohol use than their married counterparts.

Previous studies suggest that the region of residence does not contribute greatly to the observed ethnic-specific differentials in all-cause and cause-specific mortality and morbidity (Singh & Siahpush, 2002). Contrary to this finding, ethnically concentrated areas in the United States found high rates of the use of tobacco products among Asian Americans (Chae et al., 2006; Hrywna et al., 2016). Using data from the National Latino and Asian American Study (NLAAS), Chae and colleagues (2006) found that the region of residence was associated with current smoking ($X^2=9.51$; 3 df; $p<.05$). The same study found that the participants who resided in the West reported the lowest smoking prevalence (12.20%). Similarly, another recent study conducted in the Asian Indian American community in New Jersey, Hrywna and colleagues (2016) found that people used tobacco products in social functions like weddings and religious ceremonies. Thus, the contextual factors might provide access to tobacco products for specific ethnic groups.

Gender

Studies have shown that gender is a major contributing factor in cigarette smoking and alcohol consumption among Asian Americans (An et al., 2008; Delker et al., 2016; Lopez-Gonzalez et al., 2005; Martell et al., 2016; Maxwell et al., 2012). For example, using the 2005 California Health Interview Survey data to examine the prevalence of alcohol and tobacco use in Asian American subgroups, Maxwell and colleagues (2012) estimated that smoking and alcohol prevalence was higher among men than women. According to the CDC, among 14.00% of all adults (34.3 million people), 15.80% of men and 12.20% of women, respectively, were current cigarette smokers in 2017 (CDC, 2019). Regarding alcohol consumption, CDC reports that about 58.00% of adult men age

21 and over said alcohol consumption in the last 30 days. Another study that examined disparities in adult cigarette smoking by gender found that the overall prevalence of cigarette smoking was higher among men than among women during both 2002-2005 (30.00% men versus 23.90% women) and 2010-2013 (26.40% men versus 21.10%) ($p < 0.05$) (Martell et al., 2016). Additionally, multiple gender-patterned studies conducted globally have shown that smoking and alcohol consumption are more likely to be done by men than women (Singh et al., 2017).

In addition to gender-patterned on smoking and alcohol consumption behaviors, there were large differences in these behaviors amongst Asian ethnic groups (Gordon et al., 2019; Martell et al., 2016; Maxwell et al., 2012). One of the studies reported that there were significant variations in heavy drinking in the past 30 days among Asian American subgroups, and the ranges were from 8.00% among Chinese American men to 23.00% among Filipino American men (Maxwell et al., 2012). Similarly, another study reported that Filipino American men were more likely to smoke than Chinese Americans and Asian Indian Americans (Gordon et al., 2014). Martell and colleagues (2016) also found significant differences in smoking prevalence between men and women in the following three Asian American subgroups: Chinese Americans (13.10% men versus 2.90% women), Filipino Americans (20.60% versus 7.50%), and Asian Indian Americans (11.60% versus 3.30%). These findings indicate disproportionately higher smoking and alcohol consumption prevalence's among men compared with women within racial/ethnic groups. The plausible explanation for the protective effect of gendered-pattern in cigarette smoking and alcohol consumption among Asian women may be that their traditional cultural values apply to Asian women only because of the association

between smoking and low morals (Lai et al., 2004). Asian cultural norms are likely to pose more restrictions on women's smoking and alcohol consumption (Yeramaneni & Sharma, 2009). On the other hand, the exchange of cigarettes is an accepted social practice, a cultural norm, and a reflection of the respect of others among Chinese and Filipino men (Ma et al., 2002). However, these norms may not apply to Asian Indian men in general. In Asian Indian culture, family factors can significantly inhibit the use of smoking and alcohol consumption (Rastogi & Wadhwa, 2006). Even though they may have adapted to mainstream American culture, Asian Indian Americans frequently continue to adhere to traditional practices.

Culture and Smoking

There is a wealth of evidence that demonstrates that cultural norms around gender and smoking may account for the variations on cigarette smoking among Asian American men (Chae et al., 2006; Mao et al., 2014). For example, Chae and colleagues (2006) found a higher prevalence of smoking among foreign-born Asian American men for whom smoking may be more culturally acceptable behavior. Contrastingly, the same study found the lower prevalence of smoking among foreign-born Asian American women for whom societal norms may prohibit smoking behavior. Similarly, a study conducted by Mao and colleagues (2014) in the Chinese community found cigarettes as a normal gift for male family smokers, indicating gendered-norms of smoking limited to Chinese men. The same study found traditional familism and collectivism that guide smoking practices among men only. Similar to the situation in Chinese culture, smoking is predominantly taken up by men in India (Khera & Nakamura, 2018). Based on these studies, we might explain the role of Asian culture as being connected to the association

between gender and cigarette smoking behavior. Therefore, we expect that Asian American women may be more likely to follow traditional Asian gender norms on cigarette smoking. A similar cultural impact can also be observed in other ethnic minority populations in the United States. A study conducted by Yu et al. (2010) that examined cigarette smoking status among Latino/Hispanic adolescents found that culture-specific value is an important factor in cigarette smoking.

Culture and Drinking

Ethnic drinking culture is an important factor that may significantly influence alcohol consumption by Asian Americans (Becerra et al., 2013; Cook et al., 2012; Dong et al., 2011; Park et al., 2014). Ethnic drinking cultures refer to the cultural norms and values related to alcohol consumption in an immigrant's home country (Cook et al. 2012). The basic premise of ethnic drinking culture is that immigrants often maintain the connection with drinking practices in their countries of origin and maintain heritage culture so that the drinking practices in their countries of origin still influence their alcohol consumption in the host country. For instance, the Chinese Confucian philosophy emphasizes the inhibition of excessive drinking habits (Park et al., 2014). Therefore, Chinese ethnic drinking culture guided by Confucian philosophy seems to be protective in reducing Chinese people's engagement in alcohol consumption.

In light of the well-documented heterogeneity in alcohol consumption patterns among Asian American ethnic groups, well-documented literature has demonstrated that alcohol consumption is associated with social stigma, mainly directed at women who drink, and this cultural influence does not apply to Asian men (Becerra et al., 2013; Lee et al., 2013; Park et al., 2014; Sudhinaraset et al., 2016). A study that examined the

prevalence of past 30-day alcohol consumption among six Asian American subgroups found that male adults were 3-5 times more likely to have binge alcohol use than female adults among five Asian American subgroups, including Chinese Americans, Filipino Americans, and Asian Indian Americans (Lee et al., 2013). These studies strongly support low alcohol consumption among Asian American women. Hence, the effect of the Asian ethnic alcohol consumption culture differently applies to males and females. The Asian culture may partially explain one possible explanation for this gendered-pattern difference. Asian ethnic smoking and alcohol consumption encourages us to focus on the gendered-roles in examining smoking and alcohol consumption behaviors and to consider other potential SES factors in relation to these behaviors in three Asian American subgroups.

In addition to the Asian cultural perspective on gender differentiation, the gendered patterning of health disparities prominently reflects the existing structural inequalities between men and women (Garcia-Calvente et al., 2012). Inequality contributes to differences in exposure and vulnerability to certain risk factors for health (Bas-Sarmiento et al., 2017). Therefore, our approach is informed by previous studies (Viruell-Fuentes et al., 2012), which suggest that gender is a social construct, not a biological characteristic might have different effects on smoking and alcohol consumption across American subgroups. How gender gives rise to ethnic differences in smoking and alcohol consumption needs to be further explored by Asian American subsamples. Overall, the prominent role of ethnic drinking and culture among Asian Americans may be due to the broader range of drinking patterns among Asian countries (WHO, 2019).

Socioeconomic Status

Research on SES characteristics among Asian American subgroups is highly under-investigated. Current research shows that Asian Americans, compared to other racial and ethnic minority groups, have persistent gender-patterned health-risk behaviors that lead to higher morbidity rates (Kane et al., 2016). A strong body of literature suggests an inconsistent relationship between SES variables and smoking and alcohol consumption (Gor et al., 2019; Huang, 2018; Jasso et al., 2004; Lee et al., 2013; Singh et al., 2017). For example, Singh and colleagues (2017) found the marked socioeconomic and racial/ethnic disparities in smoking; furthermore, they found that adults with annual family incomes <\$35,000 have 3.6 times higher current smoking rate than those with family income \geq 100,000. One explanation would be that poorer health tends to increase vulnerability among lower socioeconomic status individuals, consequently becoming less able to avoid increased exposure to vulnerability due to a lack of resources. Conversely, those in higher socioeconomic status groups enjoy a more extensive range of resources for better health and have better access to health care services (Jasso et al., 2004).

Analyses of studies that examined the impact of educational status on health-risk behaviors among Asian Americans (Ma et al., 2004; Zhang & Wang, 2008) suggest a consistently negative association between smoking and education: the higher the education, the less likely for an individual to be a smoker. The previous study showed a negative association between alcohol consumption and higher educational status (Allen et al., 2018; Szaflarski et al., 2011). For example, Szaflarski and colleagues (2011) found that individuals who had less than a college degree were more likely to have higher odds of excessive drinking than those with a college degree among the U.S.-born.

Another important predictor of smoking and alcohol consumption is income, which may explain variations of these health behaviors across Asian American subgroups (Barbeau et al., 2004; Gor et al., 2019; Hiscock et al., 2012; Huang, 2018; Lee et al., 2013). For example, in a study of the prevalence of current smoking using NHIS data, Barbeau et al. (2004) found that the prevalence was greatest among those individuals who had a low income. Similarly, in a review study on socioeconomic status and smoking, Hiscock et al. (2012) found that the smoking prevalence was higher among those with lower SES groups. The authors suggest that those in positions of greater economic deprivation showed higher levels of continued concentration on cigarette smoking than those in more affluent positions. However, contrary to these findings, Lee and colleagues (2013) found that Asian Americans who had an annual family income of \$75,000 or more reported one and half times more alcohol use in the past month than their counterparts with family income less than \$20,000 (OR=1.50; 95% CI=1.20-2.00). In another study, adults of higher SES were more likely to frequently engage in alcohol consumption than those in lower SES positions (Huang, 2014). The same study revealed that among adults who earned incomes of 40.00% or higher above the poverty level, 75.60% were current alcohol drinkers. Hence, the established pattern in the literature is that income has a variable effect on health-risk behaviors.

On the other hand, some studies found that income was not significantly associated with cigarette smoking and alcohol consumption (Gor et al., 2019). In a cross-sectional study of 1,416 Asian Indian Americans living in Houston, Texas examined an association between income and health-risk behavior. In their study, 7.00% of their respondents reported current smoking (who smoked at least 100 cigarettes in their

lifetime) while 43.00% of the samples reported alcohol consumption. However, the authors did not find significant differences in smoking and alcohol consumption among Asian Indian Americans by income groups. This study indicates that Asian Indian Americans who had socioeconomic advantage may not be necessarily practice desired health behaviors associated with better health outcomes. An essential contributor to smoking and alcohol consumption as indicated by Gor and colleagues (2019) is the influence of cultural beliefs and social norms of Asian Indian Americans.

Food insecurity is another SES measure that affects health-risk behaviors. Participants who were current smokers had 1.88 greater odds of being food insecure compared to those who never smoked (OR=1.88; 95% CI: 2.54-4.43). Similarly, former smokers also had greater odds of being food insecure compared to those who had never smoked (OR=1.35; 95% CI: 1.34-2.65) (Marshall et al., 2019).

On the other hand, past studies have reported unexpected findings, indicating that factors besides socioeconomic characteristics influenced health behaviors. These factors include cultural factors like religiosity and underutilization of preventive services (Bharmal et al., 2013; Mehrotra et al., 2012).

Acculturation

The relationship between acculturation and cigarette smoking and alcohol consumption has been studied extensively in the Asian American population (Barbeau et al., 2004; Chae et al., 2006; Gordon et al., 2019; Huang et al., 2013; Kenji Iwamoto et al., 2016; Lopez-Gonzalez et al., 2005; Park et al., 2014). Among Asian Americans, some migrated from a culture of social acceptability of smoking (e.g., China) and alcohol consumption (e.g., the Philippines), and some migrated from a culture of social

unacceptability of alcohol consumption (e.g., India) to the United States. The admixture of Asian cultures contributes to the variable influence on smoking and alcohol consumption behaviors (Lee et al., 2013). Considering the majority of foreign-born individuals in the Asian American population, we focused on how acculturation influences health-risk behaviors among Asian American subgroups.

“Acculturation is a process by which individuals or groups accept, selectively, aspects of another culture, often a dominant one that those individuals or groups intend to adopt without completely relinquishing their own” (Ma et al., 2004, pp. 615). The process includes cultural beliefs, social norms, and lifestyles that individuals or groups may face in the new environment. More specifically, individuals’ lifestyle-related health behaviors may be influenced by the dominant mainstream culture. In contrast, those behaviors may also be preserved by maintaining individuals’ heritage culture (Huang et al., 2013; Vaeth et al., 2017). Hence, acculturation contributes to our conceptual framework for understanding the relationship between changes in health behaviors and Asian American subgroups.

Previous studies showed that the health behavior of more acculturated immigrant women is less protective than that of less acculturated women (Lopez-Gonzalez et al., 2005; Ma et al., 2004; Maxwell et al., 2005). Lopez-Gonzalez and colleagues (2005) conducted a cross-sectional study using the 1998-2001 National Health Interview Surveys to examine the association between acculturation and immigrant smoking and alcohol use. Their study found that acculturation was related to less desirable behavior among immigrants, especially with increasing duration of stay in the U.S. The same study reported that the health behavior of female immigrants was far superior to that of U.S.-

born women. Ma et al.'s (2004) study on Asian Americans found that the more acculturated male adults had lower smoking rates than the less acculturated male adults). The authors also found that the more acculturated females were more likely to smoke (OR=1.39). A study that used a population-based sample of Chinese American and Filipino American adults also found a higher smoking prevalence among more acculturated females (Maxwell et al., 2005). These findings confirm that acculturation has a stronger effect on health-risk behavior among Asian females than those of Asian males. Asian immigrant women seem to have a larger health advantage than non-immigrants. Since the majority of Asian Americans are foreign-born individuals, a future study examining the moderation effect of gender on the association between acculturation and health behavior is warranted.

Research substantiates the existence of gender differences in smoking and alcohol consumption. We propose that these differences are the result of the citizenship status and duration of stay in the United States. Both citizenship status and duration of stay in the U.S. can serve as proxy acculturation measures that help to capture individuals' increased level of exposure to the mainstream cultural norms (Hahm et al., 2003; Maxwell et al., 2005; Szaflarski et al., 2017). Citizenship status legally defines the relationship of an immigrant to the United States (Kuerban, 2016) indicating an essential factor that helps explain differences in smoking and alcohol consumption (Lopez-Gonzalez et al., 2005). According to Lopez-Gonzalez and colleagues (2005), foreign-born individuals who were non-citizens reported 58.00% lower odds of heavy smoking, 28.00% lower odds of light smoking, and 45.00% lower odds of former smoking compared to U.S.-born individuals.

Rates of cigarette smoking and alcohol consumption vary within subgroups of Asian Americans by gender (Li & Delva, 2012; Maxwell et al., 2005; Park et al., 2014). For example, according to Maxwell and colleagues (2005), the smoking rates tended to be higher among U.S.-born Chinese and Filipino females than those who were foreign-born. This study showed that acculturation to the U.S. could increase smoking prevalence rates among Asian women ignoring traditional Asian cultural values that prevent Asian women from smoking (Maxwell et al., 2005). Along the same line of thought, acculturation may be a strong predictor in alcohol use when the protective effect of heritage culture tends to be disappeared in the dominant mainstream culture (Szaflarski et al., 2011). Li & Delva (2012) found that the longer Filipino American men lived in the U.S., the lower their odds were of smoking, a trend similar to that observed for Chinese American men.

Another acculturation variable is the duration of stay in the U.S., which is used as an indicator to measure Asian immigrants' acculturation status, suggesting that longer the duration of migration, the more they are acculturated (Kuerban, 2016). Previous studies indicate that alcohol consumption increases as acculturation increases across generations (Lopez-Gonzalez et al., 2005; Park et al., 2014; Szaflarski et al., 2011). For example, in a study analyzing the impact of acculturation on alcohol use in three Asian American subgroups (Chinese, Filipino, and Vietnamese), Park and colleagues (2014) found that the duration of stay in the U.S. was significantly associated with alcohol consumption behavior. Those who had lived in the U.S. for 10-20 years ($\beta = 0.06$, $p < .01$) and those who had lived in the U.S. for more than 20 years ($\beta = .04$, $p < .001$) consumed alcohol more than those who had lived in the U.S. for fewer than ten years. The same study also

investigated whether the duration of stay in the U.S. showed a more varied relationship with alcohol consumption patterns among Asian American subgroups. In their research, they found that Filipino Americans consumed more alcohol as they lived longer in the U.S. These findings indicate that the influence of acculturation upon health behavior varies among different groups.

Acculturation had a variable effect on the smoking of male and female adults (An et al., 2008; Maxwell et al., 2005). For example, studies conducted with Asian Americans found a higher likelihood of smoking among highly acculturated women, and a lower risk of smoking among highly acculturated men (An et al., 2008; Ma et al., 2004). Similarly, a study conducted by Huang (2018) found that acculturation negatively predicted alcohol consumption among Asian males whereas acculturation positively predicted alcohol consumption among Asian females. A similar relationship is also found in studies of other ethnic groups. For instance, Raffaelli et al. (2007) reported that Latino Americans showed a positive relationship between acculturation and alcohol use for women, but the link was the opposite for men. Hence, gender moderates the association between the acculturation of alcohol consumption. Higher acculturation as a risk factor for smoking and alcohol consumption among Asian American women is based on the premise that women's rates of smoking and alcohol consumption tend to increase as societies modernized and gender equality increases (Waldron et al., 1988). When Asian Indian women come to the U.S., they may maintain or acquire the American lifestyle which may precipitate alcohol consumption (Becerra et al., 2013). Shifts in health-risk behaviors have been associated with adaptation to U.S. culture (Shelley et al., 2004; Vaeth et al. 2017). Immigrants may learn the behaviors and adopt the lifestyles often associated with

alcohol consumption in American society. Similarly, Ma et al. (2004) found that the more acculturated Asians males were less likely to smoke, while the more acculturated Asians females were more likely to smoke. Furthermore, adopting and maintaining healthy behaviors are closely associated with ethnicity (An et al., 2008; Ma et al., 2013; Singh et al., 2017).

Conceptual Framework

We draw a conceptual framework based on the previous literature to frame the impact of gender, SES, and acculturation on current smoking and alcohol consumption. A theoretically guided framework explains why and how these independent variables (factors) should be related to smoking and alcohol consumption. Also, our conceptual framework guides us to draw logical reasoning to connect these variables at each end of the relationship. The proposed framework provides such connections to develop hypotheses. Previous studies have demonstrated why gendered-role moderates the association between health-risk behavior and acculturation. Based on these relationships, we generated our hypotheses.

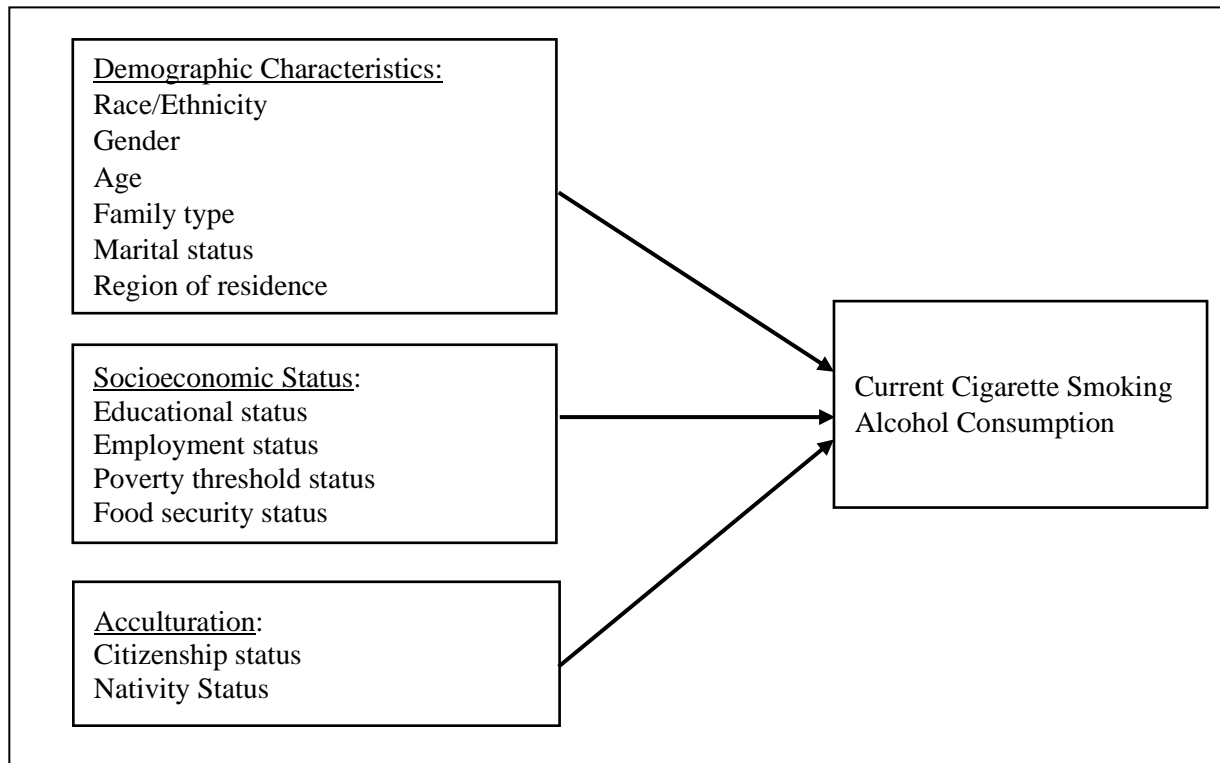


Figure 1. A Conceptual Model of Cigarette Smoking and Alcohol Consumption

Studies suggest that aggregated all Asian Americans may obscure considerable heterogeneity in smoking alcohol consumption patterns between among Asian American subgroups, subsequently misrepresenting those health-risk behaviors (Chae et al., 2006; Le & Delva, 2011; Park et al., 2014). Although several researchers have examined health-risk behavior in the American population, few researchers have explored health-risk behavior in Asian Americans. As part of the study’s underlying conceptual framework, we propose that gender, SES, and acculturation variables can play influential roles in explaining variations on Asian Americans’ smoking and alcohol consumption (see Figure 1). Much research on immigrant health and health-risk behavior has

extensively been guided by the acculturation paradigm (Cook et al., 2012). The acculturation hypothesis assumes that immigrants tend to merge with the mainstream American culture of heavy drinking behavior (Lopez-Gonzalez et al., 2005). With increased acculturation, the protective cultural buffering effect on health outcomes is very likely to be dissipated, and such buffering effects occur mostly during the earlier part of immigrants' duration of stay in the U.S. (Lopez-Gonzalez et al., 2005). The health status may be further worsened over time moving closer toward the U.S. norm. Hence, acculturation can partially predict smoking and alcohol consumption, which may be riskier with greater acculturation, particularly for Asian females (Lui & Zamboanga, 2018).

Most research on cigarette smoking and alcohol consumption have relied on small samples (Ma et al., 2004), or adolescents and college students (Kenji Iwamoto et al., 2016; Yu et al., 2010) or do not include comparisons in Asian American subgroups. Furthermore, as noted above, most research has reported data for Asian Americans as a single group, concealing information on variability within this population (Alang et al., 2015; Chandra et al., 2016; Li & Delva, 2011; Maxwell et al., 2012). The lumping of several Asian subgroups in epidemiological studies makes it difficult to parse out the specific prevalence of smoking and alcohol consumption for specific subgroups. In addition, much of the prevalence work on Asian Americans revolves around specific ethnic groups from a particular geographic area (Maxwell et al., 2012; Shi et al., 2015). For example, in California, Filipino Americans were more likely to report heavy drinking than Chinese Americans (23.00% vs. 3.00%, respectively). Prior work also fails to include factors known to affect health behaviors, and that may vary by citizenship status

or duration of stay in the U.S. Therefore, the generalizability of the findings from these past studies was largely limited. Hence, there is a gap in the existing literature that does not provide a clear picture of prevalence rates of smoking and alcohol consumption of disaggregated Asian Americans (Shelley et al., 2004). Past studies have also recommended examining smoking and alcohol consumption behaviors among the Asian American population (Sharma, 2020).

Taking into consideration the limitations of prior research, we sought to better understand the impact of gender, SES, and acculturation on the smoking and alcohol consumption of Chinese Americans, Filipino Americans, and Asian Indian Americans. These are the most populous Asian American subgroups with heterogeneity in terms of gender, income, education, citizenship status, and duration of stay in the United States. The heterogeneity in different measures contributes to disparities seen within the population and is, thus, essential to stratify when considering smoking and alcohol consumption behaviors (Delker et al., 2016; Maxwell et al., 2012; Saraiya et al., 2019). Using nationally representative data, we compared smoking and alcohol consumption behaviors in these ethnic groups. To our knowledge, no studies have presented these health-risk behavior estimates at the subgroup level. Thus, we extend current knowledge by simultaneously considering a fuller array of Asian American populations and a broad range of factors (such as gender, SES, and acculturation) associated with smoking and alcohol consumption.

Research Questions and Hypotheses

The current study examined the following questions in our sample of three Asian American subgroups:

Research question 1. Does the prevalence of smoking and alcohol consumption differ by ethnicity?

- Hypothesis 1 -- The prevalence of smoking and alcohol consumption will differ across Asian American subgroups. Based on previous studies, we hypothesize that Asian Indian Americans will have the lowest, and Filipino Americans will have the highest prevalence of cigarette smoking and alcohol consumption.

Research question 2. Does the prevalence of smoking and alcohol consumption differ by gender, and to what extent does gender-difference affect smoking and alcohol consumption across the three Asian Americans subgroups?

- Hypothesis 2 --The prevalence of smoking and alcohol consumption will differ by gender across three Asian American subgroups.
 - Hypothesis 2.1 -- Among Asian American women, Asian Indian American women will be less likely to smoke.
 - Hypothesis 2.2 -- Among Asian American women, Asian Indian American women will be more likely to be engaged in all levels of alcohol consumption.

Research question 3. What are the relative effects of socioeconomic status on cigarette smoking across three Asian American subgroups?

- Hypothesis 3 -- We hypothesize mixed relationships between different SES factors and smoking behavior across three Asian American subgroups.
 - Hypothesis 3.1 -- Highly educated Chinese- and Filipino Americans will be less likely to be current smokers.

- Hypothesis 3.2 -- Unemployed Asian Indian Americans will be less likely to be current smokers than their employed counterparts.

Research question 4. What are the relative effects of socioeconomic status on alcohol consumption across three Asian Americans subgroups?

- Hypothesis 4 -- We hypothesize mixed relationships between different SES factors alcohol consumption across three Asian American subgroups.
 - Hypothesis 4.1 -- Compared to Chinese Americans with having a less than high school education, highly educated Chinese Americans will be more likely to be light drinkers than to be abstainers.
 - Hypothesis 4.2 -- Compared to Asian Indian Americans with having a less than high school education, highly educated Asian Indian Americans will be more likely to be former drinkers than to be abstainers.

Research question 5. How do U.S. citizenship and nativity status relate to cigarette smoking across three Asian Americans subgroups?

- Hypothesis 5 -- We hypothesize mixed relationships between U.S. citizenship and nativity statuses and smoking behavior across three Asian American subgroups.
 - Hypothesis 5.1 Asian Indian Americans who have U.S. citizenship status will be less likely to be current smokers.
 - Hypothesis 5.2: As the duration of stay in the U.S. increases, Filipino Americans will be more likely to be current smokers.

Research question 6. How do U.S. citizenship and nativity status relate to alcohol consumption across three Asian American subgroups?

- Hypothesis 6.1 -- We hypothesize a significant relationship between U.S. citizenship status and alcohol consumption across three Asian American subgroups.
- Hypothesis 6.2 -- We hypothesize significant relationships between nativity status and alcohol consumption across three Asian American subgroups.
 - Hypothesis 6.2.1 -- Compared to the U.S.-born Chinese Americans, the foreign-born Chinese who lived in the U.S. for less than 15 years will be less likely to be light drinkers relative to be abstainers. Among foreign-born Chinese, as the duration of stay in the U.S. increases, Chinese Americans will be more likely to be light drinkers than to be abstainers.
 - Hypothesis 6.2.2 -- Compared to the U.S.-born Filipino Americans, the foreign-born Filipinos who lived in the U.S. for less than 15 years will be less likely to be light drinkers relative to be abstainers. Among foreign-born Filipinos, as the duration of stay in the U.S. increases, Filipino Americans will be more likely to be moderate/heavy alcohol consumers than to be abstainers.
 - Hypothesis 6.2.3 -- Compared to the U.S.-born Asian Indian Americans, the foreign-born Asian Indians who lived in the U.S. for less than 15 years will be less likely to be light drinkers relative to be abstainers. Among foreign-born Asian Indians, as the duration of stay in the U.S. increases, Asian Indian Americans will be more likely to be light drinkers than to be abstainers.

DATA AND METHOD

Research Subjects

We pooled data from the 2011-2015 administrations of the National Health Interview Survey (NHIS). The NHIS, conducted continuously since 1957, is an annual cross-sectional, nationally representative survey of the U.S. institutionalized civilian population that uses a multistage area probability sampling design (NCHS, 2019). It is conducted continuously throughout each survey year by the National Center for Health Statistics of the Centers for Disease Control and Prevention. Each year's data were collected from approximately 35,000 households containing about 87,500 persons of all ages.

The NHIS questionnaire has two components, i.e., Core questions and Supplements (Lynn et al., 2019). First, the Core questions contain four major components: Household, Family, Sample Adult, and Sample Child. The Sample Adult Questionnaire contains questions about smoking and alcohol consumption. The NHIS included alcohol use questions in the basic annual core questionnaire in 1997. The questions were administered to one randomly selected adult aged 18 or older from each household (Lynn et al., 2019). In NHIS, questions about cigarette smoking and alcohol consumption are designed to assess general levels of smoking and alcohol consumption among adults 18 years of age and older; all information is self-reported (Singh et al., 2013). The Sample Adult Questionnaire includes questions (identical from year to year) on demographic factors, alcohol consumption, and cigarette smoking. Items on alcohol consumption, along with cigarette smoking questions in NHIS, are important vital lifestyle-related

variables for understanding the health of the American people (Rodu & Cole, 2009).

Healthy People 2020 attests to the continued prominence of such health indicators (CDC, 2018). Parsons et al. (2014) provided details on the NHIS sample design. Previous studies commonly used NHIS data for measuring cigarette smoking and alcohol consumption in the U.S. population (Schoenborn & Adams, 2002). Details on the NHIS sample design can be found in Parsons et al. (2014).

The NHIS is redesigned every ten years, and the major revisions to the survey questionnaires were made in 1982. Our pooled datasets followed the same survey design allowing consistencies in self-reported responses of the survey participants. We restricted our Asian ethnic groups to adults we classified as Chinese Americans ($n=2,229$), Filipino Americans ($n=2,172$), and Asian Indian Americans ($n=2,030$), but the aggregated All Asian group is ($N=6,431$). All Asian group includes aggregated data for the three Asian American subgroups.

Measures

Dependent Variables

The dependent variables for the study were self-reported current cigarette smoking and self-reported current alcohol consumption.

Our study examined current smoking prevalence by asking whether respondents identified themselves as current smokers, former smokers, or never smoked at the time of the interview. In NHIS, respondents smoking status was determined by asking questions to sample adults 18 and over and the respondents' current smoking status were recorded in categories of current smoker (every day current smoker or someday current smoker), former smoker, and never smoked (NCHS, 2018). For multivariate analysis, we

dichotomized current smoking status as current smoker versus former smoker/never smoked. The operationalization of current smoking status is a valid measure of smoking prevalence. The current smoking status was defined based on CDC recommended criteria used in NHIS in which participants who smoked ≥ 100 cigarettes in their lifetime and reported smoking every day/somedays were classified as current smokers (CDC, 2018). The current cigarette smoking variable consists of current smokers if respondents reported being an “every day current smoker” or being a “sometimes current smoker,” and nonsmokers if respondents were former smokers or never smokers. A commonly used operational definition of current smoking was to have smoked at least 100 cigarettes in one’s entire lifetime (Chae et al., 2006; Zhang & Wang, 2008) was commonly used in previous studies that used the NHIS (Barbeau et al., 2004; Jamal et al., 2014; Koya & Egede, 2007). The same measurement of current cigarette smoking was used in the past studies that used National Latino and Asian American Survey (Li & Delva, 2011), California Health Interview Survey (Maxwell et al., 2005; Maxwell et al., 2012) and National Survey on Drug Use and Health (NSDUH) (Martell et al., 2016). However, past studies used different categories of current smoking status (Yu et al., 2010). For example, Yu and colleagues (2010) categorized cigarette smoking status into four groups: nonsmokers, experimental smokers, occasional smokers, and regular smokers (Mansoo et al., 2010). The authors used the 2009 US National Youth Tobacco Survey in which respondents were asked how many puffs or a whole cigarette did they smoke. However, NHIS did not ask respondents about puffs.

The second dependent variable of this study was alcohol consumption. In the NHIS, the alcohol consumption questions have been on the NHIS Sample Adult core

health behaviors section since 1997, and these questions were developed in close collaboration with the National Institute on Alcohol Abuse and Alcoholism (NIAAA) (NCHS, 2019). Additionally, the survey uses a twelve-month reference period and provides an indicator of lifetime alcohol use status and average drinking levels for the past year with a series of questions: (1) In any one year, have you had at least 12 drinks of any alcoholic beverage? (2) If no: In your entire life, have you had at least 12 drinks of any alcoholic beverage? (3) In the past year, how often did you drink any alcoholic beverage? (4) In the past year, on those days that you drank alcoholic beverages, on average, how many drinks did you have? (5) In the past year, on how many days did you have (5 or more, if male; four or more, if female) drinks on any alcoholic beverage? NHIS changed the threshold for women from five drinks to four in 2014 (NCHS, 2019). Based on these NHIS questions, we measured alcohol consumption in a four-category variable: *abstainers* (lifetime abstainer who consumed 0-11 drinks in a lifetime), *former drinkers* (who had zero drinks in the past year); *current light drinkers* (consumed three or fewer alcohol on average per week in the past year); *current moderate drinkers* (consumed 4-14 drinks for male or 4-7 drinks for female on average per week in the past year; and *current heavy drinkers* (consumed more than 14 drinks for male, or more than seven drinks for female on average per week in the past year (Manuel, 2018; NCHS, 2019). However, we collapsed current moderate drinkers and current heavy drinkers into a single category “*current moderate/heavy drinkers*” due to small Asian Indian drinker population. Of note, several published studies that analyzed population-based research on alcohol consumption used similar constructed alcohol consumption categories (French et al., 2009; Lopez- Gonzalez et al., 2005). The alcoholic beverages included are liquor,

beer, wine, and any other type of alcoholic beverage. Liquor includes brandy, liqueurs, scotch, whiskeys, tequila, and gin. Beer includes stout, ale, malt liquor, or light beer, but does not include alcohol-free beer. Wine includes port, sherry, sangria wine coolers, and champagne and liquor.

Independent Variables

We selected independent variables based on our conceptual framework and previous research. The independent variables were race/ethnicity, age, sex, family type, marital status, region of residence, educational status, employment, poverty threshold, food security, U.S. citizenship status, and nativity status. Race/ethnicity was determined based on respondents' self-reported classification. For race, respondents were asked, "Which of these groups best describes you?" Persons who indicated that they were Asian were also asked to select the specific subgroup (Chinese, Filipino, and Asian Indian) that best described them. The second demographic characteristic was age (in years). Third, we included an indicator of sex, and recoded as female "1" and male "0." For marital status, we added three responses of respondents and coded as married, separated or widowed, or divorced, and never married. Fourth, we included a family type variable, and we created a dummy variable: the family who had children "1" or who had not any children "0". Finally, for the region of residence, we included four regions in the analysis: Northeast, Midwest/North Central, South, and West.

Our SES variables included educational status, employment, poverty threshold, and family food security status. First, we defined respondents' education as the highest level of education, categorized as less than high school graduate, high school graduate, some college or three years of college education, and college degree and graduate or

professional degrees. Second, we included an indicator of current employment status, which was recoded as employed, unemployed, and not in the labor force. These categories were defined according to standard groups by the U.S. Census Bureau (2019). Individuals not in the labor force included those retired, disabled, and others if they had not worked in the past 12 months or more. The unemployed category includes both the unemployed on layoff and those looking for work. Employed consists of those who were working during the interview. Third, we defined family income according to the U.S. Census Bureau's poverty threshold, which varies with the number of family members and is revised annually to account for inflation. We recoded poverty threshold variable and dichotomized into "1" if the reported family income figure was higher than the Bureau's poverty cutoff for families of that size and age composition, and "0" if the reported family income figure was less than the Bureau's poverty cutoff for families of that size and age composition (U.S. Census Bureau, 2019). Finally, we included an indicator of family-level food security status on the 30-day food security scale. In NHIS, there are four categories of a family-level food security status variable, including high food security (raw score 0), marginal food security (raw score 1-2), low food security (raw score 3-5), and very low food security (raw score 6-10). Food security status was defined as one if the individual's reported family food security status was high and 0 if his or her reported food security status was marginal, or low, or meager.

As a proxy measure of acculturation, we examined the respondents' citizenship status and nativity status (foreign-born versus U.S.-born). First, citizenship status was defined as "1" if the individual's reported citizenship status was the United States and "0" if his or her reported citizenship status was other than the United States. We used

information regarding citizenship status and nativity status in an attempt to more comprehensively apply the concept of acculturation (Lopez-Gonzalez et al., 2005; Luo & Wu, 2016). Acculturation variables are important markers capturing variations due to acculturation on smoking and alcohol consumption among Asian American subgroups. These measurement schemes of acculturation are similar to other population-based studies examining the association between acculturation and health behaviors using the NHIS dataset.

Second, nativity status was characterized by dichotomously (foreign-born versus U.S.-born) (John et al., 2012; Luo & Wu, 2016). We assessed the duration of stay in the U.S. as an indicator of foreign-born into two categories: duration of stay in the U.S. in two categories: had lived in the U.S. less than 15 years or lived in the U.S. for 15 years or more. We also expect individuals who report a longer duration of stay in the U.S. (≥ 15 years) to be more acculturated than those individuals who report a shorter duration (<15 years) (Kuerban, 2016; Maxwell et al., 2005; Singh & Miller, 2004). In this study, the U.S.-born individuals were considered to be the most acculturated category.

Statistical Analysis

We used STATA 15.1 for all statistical analyses (StataCorp, 2017). We first present descriptive studies of cigarette smoking and alcohol consumption by gender. The descriptive analyses provide characteristics of samples by using weighted frequencies for the categorical variables and mean for a continuous variable. Also, we tested for differences between two categories of cigarette smoking status and four categories of alcohol consumption across the three largest Asian American subgroups. We used the chi-square test for categorical variables and *t*-test for a continuous variable.

In addition to descriptive statistics, we performed multiple logistic regression analyses on two dependent variables on the full Asian American samples and each Asian American subpopulation. For all regression models (but with combinations specific to each model), independent variables included three sets of factors, such as demographic characteristics, SES, and acculturation. In Model 1, the odds ratios were adjusted for the basic demographic characteristics of race/ethnicity, age, sex, family type, marital status, and region of residence. In addition to these demographic controls, Model 2 estimated the odds ratios for SES. The second set of independent variables included educational status, employment, poverty threshold, and family food security. This set of factors attempt to capture characteristics that operate at the structural level (Le, 2007), and that may impact lifestyle-related behaviors. Finally, Model 3 was adjusted for acculturation variables, including U.S. citizenship status and duration of stay in the U.S. Both variables were proxies' measures of acculturation. These variables attempt to capture cultural elements of specific Asian ethnic groups that cannot otherwise be measured in our study (Le, 2007).

For the estimation of current smoking, we performed a series of binary logistic regression models. To determine whether there was an overall relationship between Asian ethnicity and reported current smoking, regression was first conducted for all three Asian American groups as a whole, and gender, SES, acculturation, and control variables were entered simultaneously. Subsequently, subpopulation syntax was used to isolate subgroups for separate analysis. Noncurrent cigarette smoking served as the reference category for current smoking.

For the estimation of alcohol consumption, we performed a series of multinomial logistic regression models. To determine whether there was an overall relationship between Asian ethnicity and reported alcohol consumption, regression was first conducted for all three Asian American groups as a whole, and gender, SES, acculturation, and control variables were entered simultaneously. Subsequently, subpopulation syntax was used to isolate subgroups for separate analysis. Abstainer alcohol consumption served as the reference category for alcohol consumption. The analyses excluded respondents who were missing on the dependent variables. All the data were appropriately weighted to adjust for the clustered sampling design and stratification used in the NHIS (Lynn et al., 2019). The variance inflation factor (VIF) scores were examined to rule out violations of multicollinearity assumption who crossed among independent variables. We provided the odds ratios (ORs) and 95% confidence intervals (CIs) for all regression analyses. Statistical significance was determined as $p < .01$ and $p < .05$.

RESULTS

The result section provides detailed sample characteristics, followed by multivariate regression analyses. In addition to examining Asian Americans in the aggregate, we run separate logistic regression analyses for each of the three Asian American subgroups. First, we present the detailed results that show the associations among the gender, SES, and acculturation variables and the current cigarette smoking behaviors. Second, we present the detailed results that show the associations among the

gender, SES, and acculturation variables and the alcohol consumption behaviors among three Asian American subgroups.

Sample Characteristics

Table 1 presents descriptive characteristics of three Asian Americans, and Tables 2-3 present descriptive characteristics of the three Asian American subgroups by sex. As displayed in Table 1, 8.43% of Asian Americans were current cigarette smokers. Among Asian American subgroups, Filipino Americans had the highest (11.70%) prevalence of current smoking followed by Chinese (6.29%) and Asian Indian Americans (5.16%). Regarding alcohol consumption, 26.51% of the Asian Americans were current light drinkers whereas only 13.35% of Asian Americans were moderate/heavy alcohol drinkers. Additionally, alcohol consumption behavior varied from the consumption category. For instance, light drinking consumption behavior was similar to that of the Chinese American and Asian Indian American subgroups (23.59% versus 23.04%), and moderate/heavy alcohol consumption behavior was identical to that of the Chinese American and Filipino American subgroups (16.25% versus 15.10%). In support of hypothesis 1 and consistent with previous studies (CDC, 2019; Gor et al., 2019; Gordon et al., 2019; Lee et al., 2013), the results of bivariate relationships for the samples of three Asian American subgroups showed differences in smoking and alcohol consumption patterns based on ethnic subgroups (see Table 1). A U.S. national population-based study examined the prevalence of alcohol consumption among six Asian American subgroups including Chinese-, Filipino-, and Asian Indian Americans, found that Filipino Americans reported the highest binge drinking prevalence (14.50%) (Lee et al., 2013). According to the National Survey on Drug Use and Health, the prevalence of cigarette

smoking among Asian Americans was: 7.60% among Chinese Americans, 12.60% among Filipino Americans, and 7.60% among Asian Indian Americans (CDC, 2019). Another recent study conducted in the Asian Indian American community in Houston, Texas found 7.00% (sample size=1,416) of the respondents admitted to smoking at least 100 cigarettes in their lifetime (Gor et al., 2019).

When stratified by sex (Tables 2 and 3), we found differences in both cigarette smoking and alcohol consumption among all three Asian American subgroups. Overall, Chinese-, Filipino-, and Asian Indian American men reported higher current smoking and alcohol consumption than women from the same ethnic subgroups. Male Filipino Americans reported the most top smoking and alcohol consumption behaviors. In contrast, compared with men of other Asian American subgroups, the men of the Asian Indian American subgroup reported the lowest smoking and alcohol consumption. Also, we found more extensive gender differences between being light drinkers and moderate/heavy drinkers among men in all ethnic subgroups; however, such difference was found to disappear in Asian Indian American women (5.96% versus 6.97%).

As a means of revealing the heterogeneity present within the Asian ethnic categories, our analysis shows smoking and alcohol consumption patterns by acculturation. This trend is consistent with previous studies (Lopez-Gonzalez et al., 2005; Ma et al., 2013) and U.S. national survey data (CDC, 2019). Overall, current smoking rates were higher among foreign-born respondents (7.70% overall, 5.20% among foreign-born, and 2.50% among U.S.-born) among Asian American subgroups. We found a similar pattern for Chinese American and Asian Indian American current smokers when we disaggregated data by subgroup: Foreign-born Chinese (5.10%) vs. U.S.-born Chinese

(1.20%), foreign-born Asian Indian American (4.70%) versus U.S.-born Asian Indian American (.50%). In the case of the Filipino American subgroup, current smoking behavior did not differ based on the nativity status (5.90% versus 5.80%). Similarly, current alcohol consumption was higher among foreign-born respondents (39.85% overall, 28.11% among foreign-born, and 11.70% among U.S.-born) among the three largest Asian American subgroups. We found a similar pattern for all Asian American current alcohol drinkers when we disaggregated data by race/ethnicity: Foreign-born Chinese (28.50%) versus U.S.-born Chinese (11.40%), foreign-born Filipinos (27.80%) versus US-born Filipinos (20.50%), and foreign-born Asian Indians (28.00%) versus U.S.-born Asian Indians (4.10%). In the case of the Asian Indian American subgroup, a wider gap of current alcohol consumption behavior exists between foreign-born and U.S.-born Asian Americans.

Table 1*Sample Characteristics of Three Asian American Subgroups: 2011-2015 National Health Interview Survey*

Variables	Asian American subgroups									All Asians (N=6,408)		P ^a
	Chinese (n=2,224)			Filipino (n=2,161)			Asian Indian (N=2,023)			N	%	
	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)			
Smoking status												
Current smokers	147	6.29	[5.11, 7.73]	269	11.70	[10.19,13.49]	124	5.16	[4.08,6.50]	540	8.43	0.000
Noncurrent smokers	2077	93.70	[96.26,98.58]	1892	88.30	[88.94,93.19]	1899	98.73	[97.37,99.39]	5868	91.57	
Alcohol consumption												
Abstainers	924	50.46	[47.42,53.49]	709	37.30	[34.26,40.36]	992	60.70	[57.95,63.38]	2625	49.81	0.000
Former drinkers	174	9.70	[8.101,11.59]	262	14.40	[12.3,16.77]	109	7.20	[5.699,9.081]	545	10.33	
Current light drinkers	459	23.59	[20.75,26.68]	546	33.30	[30.38,36.31]	456	23.04	[20.46,25.84]	1461	26.51	
Current moderate/heavy drinkers	283	16.25	[14.42,18.25]	251	15.10	[12.83,17.64]	153	9.05	[7.648,10.69]	687	13.35	
Demographic characteristics												
Age (years) ^b	44.5	(0.57)	(43.37-45.64)	46.9	(0.52)	(45.92-47.98)	40.9	(0.51)	(39.92-41.94)			
Family with children												
Marital status	1196	54.02	[51.43,56.59]	1298	57.60	[54.91,60.25]	922	48.15	[45.26,51.05]	3416	53.18	0.000
Married	1033	45.98	[43.41,48.57]	874	42.40	[39.75,45.09]	1108	51.85	[48.95,54.74]	3015	46.82	
Widowed/Divorced/Separated	588	33.66	[31.14,36.27]	759	40.60	[38.08,43.15]	819	47.86	[44.83,50.9]	2166	40.81	0.000
Never married												
Region of residence	1124	62.01	[58.86,65.07]	1099	59.80	[57.1,62.49]	1341	76.33	[73.87,78.62]	3564	66.22	0.000
Northeast	313	9.66	[8.319,11.21]	510	16.40	[14.94,17.92]	144	5.40	[4.368,6.677]	967	10.40	
Midwest	789	28.32	[25.56,31.25]	560	23.80	[21.48,26.29]	542	18.26	[16.18,20.55]	1891	23.38	
South												
West	519	25.83	[22.29,29.71]	235	13.20	[11.18,15.47]	452	23.19	[20.63,25.96]	1206	20.77	0.000
Socioeconomic status												
Education status	256	10.93	[9.021,13.17]	216	10.20	[8.515,12.11]	403	19.62	[16.63,23.01]	875	13.67	
Less than high school	311	13.93	[11.59,16.67]	413	20.80	[18.2,23.61]	635	31.51	[27.52,35.8]	1359	22.22	
High school or equivalent												
Some college												
College or more	246	11.33	[8.898,14.32]	171	6.19	[4.974,7.695]	91	5.66	[4.368,7.319]	508	7.69	0.000

Employment status	304	14.70	[13.05,16.51]	400	16.50	[14.57,18.69]	173	9.48	[7.818,11.5]	877	13.51	
Employed	413	17.28	[15.25,19.52]	684	32.40	[29.99,34.92]	216	11.3	[9.653,13.18]	1313	20.19	
Unemployed	1266	56.69	[53.33,59.99]	917	44.90	[41.69,48.08]	1550	73.54	[70.61,76.28]	3733	58.60	
Not in the labor force												
Above poverty	1304	61.03	[58.19,63.81]	1389	65.90	[63.53,68.19]	1407	68.38	[65.98,70.68]	4100	65.15	0.000
High food security	95	4.48	[3.533,5.67]	107	4.97	[3.98,6.212]	85	4.93	[3.714,6.531]	287	4.80	
Acculturation												
Citizenship status												
U.S. citizen												
Non-U.S. citizen	1738	78.17	[75.61,80.54]	1425	66.70	[63.27,69.94]	1831	91.49	[89.67,93.01]	4994	78.98	0.000
Nativity status												
Less than 15 years	831	67.67	[64.87,70.35]	464	83.20	[80.9,85.23]	1123	55.08	[50.97,59.11]	4202	68.42	0.000
15 years or more	893	32.33	[29.65,35.13]	945	16.80	[14.77,19.1]	705	44.92	[40.89,49.03]	2212	31.58	
U.S.-born	487	22.01	[19.67,24.55]	745	33.60	[30.34,37.08]	192	8.55	[7.028,10.38]	1427	21.17	

Note. ^a Significance test (*t*-tests for a continuous variable; Chi-square tests for categorical variables).

^b Continuous variable. Mean is shown for continuous variables such as age.

All sample sizes shown are unweighted, and all frequencies are weighted.

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

Table 2*Sample Characteristics of Three Asian American Subgroups by Sex: 2011-2015 National Health Interview Survey*

Variables	Women									All Asians (N=3,416)	P ^a	
	Chinese (n=1,196)			Filipino (n=1,298)			Asian Indian (n=922)					
	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)	N	%	
Smoking Status												
Current smokers	29	2.31	[1.42,3.741]	117	8.7	[6.812,11.06]	12	1.27	[.6099,2.625]	158	4.25	0.000
Noncurrent smokers	1164	97.69	[96.26,98.58]	1172	91.29	[88.94,93.19]	908	98.73	[97.37,99.39]	3244	95.75	
Alcohol consumption												
Abstainers	609	60.12	[55.82,64.28]	561	47.87	[43.71,52.05]	590	75.61	[72.03,78.87]	1760	60.79	0.000
Former drinkers	77	7.4	[5.537,9.828]	142	11.49	[9.251,14.19]	42	5.96	[4.244,8.317]	261	8.37	
Light drinkers	201	18.46	[15.28,22.13]	268	26.97	[23.62,30.6]	122	5.96	[9.124,14.28]	591	19.2	
Moderate/heavy drinkers	139	14.01	[11.56,16.89]	132	13.67	[11.26,16.5]	59	6.97	[5.231,9.242]	330	11.65	
Demographic characteristics												
Age (years) ^b	44.63	(0.73)	(43.19-46.08)	47.66	(0.55)	(46.58-48.75)	40.49	(0.67)	(39.17-41.82)			
Family with children	356	37.43	[34.02,40.98]	490	43.37	[39.52,47.3]	406	49.77	[45.42,54.12]	1252	43.38	0.000
Marital status												
Married	603	63.44	[59.81,66.91]	631	59.07	[55.3,62.74]	630	76.28	[72.59,79.61]	1864	65.89	0.000
Widowed/Divorced/Separated	229	13.19	[11.08,15.64]	396	22.34	[19.99,24.88]	95	8.09	[6.189,10.52]	720	14.85	
Never married	361	23.37	[20.46,26.55]	268	18.59	[15.83,21.7]	95	8.09	[12.81,18.92]	720	14.85	
Region of residence												
Northeast	257	23.11	[19.04,27.74]	132	12.35	[10.22,14.86]	202	23.25	[19.92,26.94]	591	19.33	0.000
Midwest	131	10.64	[8.363,13.44]	126	10.13	[7.877,12.93]	186	20.77	[16.94,25.22]	443	13.61	
South	176	14.82	[12.09,18.05]	256	23.05	[18.79,27.95]	287	30.6	[25.15,36.64]	719	22.66	
West	632	51.43	[46.14,56.69]	784	54.46	[49.56,59.28]	247	25.38	[21.54,29.64]	1663	44	
Socioeconomic status												
Education status												
Less than high school	163	13.79	[10.73,17.56]	107	6.44	[4.875,8.48]	55	7.21	[5.288,9.76]	325	9.13	0.000
High school or equivalent	156	13.94	[11.67,16.56]	224	15.44	[13,18.24]	97	11.17	[8.55,14.46]	477	13.61	
Some college	204	15.66	[12.93,18.84]	400	30.98	[27.86,34.29]	108	11.8	[9.469,14.62]	712	19.9	
College or more	673	56.61	[52.54,60.59]	567	47.13	[42.93,51.38]	662	69.82	[65.65,73.68]	1902	57.35	

Employment Status												
Employed	661	57.12	[53.64,60.53]	794	64.33	[60.59,67.91]	488	52.04	[48.15,55.9]	1943	58.1	0.000
Unemployed	47	4.22	[2.877,6.174]	52	3.49	[2.468,4.93]	49	6.38	[4.517,8.951]	148	4.64	
Not in the labor force	488	38.65	[34.99,42.46]	449	32.17	[28.78,35.76]	384	41.58	[37.77,45.49]	1321	37.26	
Above poverty	825	80.7	[76.89,84.01]	1083	92.43	[90.47,94.02]	759	90.35	[87.35,92.69]	2667	87.92	0.000
High food security	1104	93.57	[91.81,94.97]	1043	82.87	[80.13,85.31]	837	91.59	[89.09,93.55]	2984	89.15	0.000
Acculturation												
Citizenship status												
U.S. citizen	788	68.18	[64.45,71.68]	1040	82.45	[79.45,85.09]	483	55.37	[50.53,60.1]	2311	69.25	0.000
Non-U.S. citizen	407	31.82	[28.32,35.55]	255	17.55	[14.91,20.55]	437	44.63	[39.9,49.47]	1099	30.75	
Nativity status												
Less than 15 years	442	34.74	[31.41,38.22]	307	24.36	[20.87,28.23]	498	51.58	[46.64,56.48]	1247	36.32	0.000
15 years or more	495	45.53	[42,49.12]	576	43.6	[39.46,47.83]	333	40.28	[35.74,45]	1404	43.2	
U.S.-born	246	19.73	[17.06,22.7]	405	32.04	[27.47,36.98]	85	8.14	[6.202,10.62]	736	20.48	

Note. ^a Significance test (*t*-tests for a continuous variable; Chi-square tests for categorical variables).

^b Continuous variable. Mean is shown for continuous variables such as age.

All sample sizes shown are unweighted, and all frequencies are weighted.

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

Additionally, current smoking consumers were higher among those Asian adults who had U.S. citizenship (11.00% overall, 7.70% among U.S. citizens, and 3.30% among non-U.S. citizens) among three Asian American subgroups. We found a similar pattern for all Asian American current cigarette smokers when we disaggregated data by race/ethnicity: U.S. citizen Chinese (3.70%) versus non-U.S. citizen Chinese (2.60%), U.S. citizen Filipinos (9.90%) vs. non-U.S. citizen Filipinos (1.90%), and U.S. citizen Asian Indians (2.10%) versus non-U.S. citizen Asian Indians (3.00%). In the case of the Asian Indian American subgroup, non-U.S. citizen Asian Indians were more likely to be current smokers compared with their U.S. citizen counterparts. The same pattern was evident for all Asian American current cigarette smokers when the data were disaggregated by race/ethnicity: U.S. citizen Chinese (28.10%) versus non-U.S. citizen Chinese (11.80%), U.S. citizen Filipinos (41.90%) versus non-U.S. citizen Filipinos (6.30%), and U.S. citizen Asian Indians (18.00%) versus non-U.S. citizen Asian Indians (14.10%).

In the case of all three Asian subgroups, other than the Filipino subgroup, the duration of stay did not show a wider gap among current smoking behaviors. In the case of the Filipino American subgroup, current smokers were higher (4.10%) among those who lived in the U.S. for 15 or more years compared with those (1.70%) who lived in the U.S. for less than 15 years. The same pattern was evident for Filipino current alcohol drinkers, and the relationships were statistically significant ($p < .01$).

Our descriptive analysis confirms that smoking and alcohol consumption varies significantly across all Asian American subgroups by sex, citizenship status, and duration of living in the U.S. following a similar smoking and alcohol consumption pattern provided by national population surveys (Lee et al., 2013). These descriptive data point to

substantial differences in cigarette smoking and alcohol consumption by both gender and acculturation. However, the nativity differentials in these health-risk behaviors, which favor the foreign-born Asian Americans as expected, are much more pronounced for women in comparison to men. Foreign-born women, in particular, appear to exhibit very low levels of smoking and alcohol consumption.

Table 3*Sample Characteristics of Three Asian American Subgroups by Sex: 2011-2015 National Health Interview Survey*

Variables	Men									All Asians (N=3,015)		P ^a
	Chinese (n=1,033)			Filipino (n=874)			Asian Indian (n=1,108)			N	%	
	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)			
Smoking status												
Current smokers	118	10.98	[8.622,13.89]	152	15.85	[12.78,19.5]	112	8.79	[6.871,11.18]	382	11.59	0.001
Noncurrent smokers	913	89.02	[86.11,91.38]	720	84.15	[80.5,87.22]	991	91.21	[88.82,93.13]	2624	88.41	
Alcohol consumption												
Abstainers	315	38.22	[34.28,42.33]	148	21.37	[17.61,25.67]	402	45.65	[41.93,49.41]	865	36.28	0.000
Former drinkers	97	12.62	[9.821,16.08]	120	18.72	[14.91,23.24]	67	8.46	[6.346,11.21]	284	12.72	
Current light drinkers	258	30.08	[25.99,34.51]	278	42.72	[37.53,48.08]	334	34.73	[30.8,38.88]	870	35.52	
Current moderate/heavy drinkers	144	19.08	[15.98,22.61]	119	17.18	[13.13,22.18]	94	11.16	[8.881,13.93]	357	15.45	
Demographic characteristics												
Age (years) ^b	44.36	(0.57)	(42.79-45.93)	45.97	(0.95)	(44.09-47.86)	41.3	(0.55)	(40.24-42.43)			
Family with children	232	29.23	[25.97,32.71]	269	36.81	[32.87,40.94]	413	46.08	[41.95,50.26]	914	37.89	0.000
Marital status												
Married	521	60.35	[55.53,64.96]	468	60.84	[56.26,65.24]	711	76.37	[73.09,79.37]	1700	66.59	0.000
Widowed/Divorced/Separated	84	5.53	[4.248,7.174]	114	8.3	[6.321,10.83]	49	2.91	[2.105,4.02]	247	5.35	
Never married	428	34.12	[29.91,38.6]	292	30.86	[26.53,35.55]	347	20.71	[17.87,23.88]	1067	28.05	
Region of residence												
Northeast	262	29.03	[24.9,33.53]	103	14.29	[11.18,18.09]	250	23.13	[20.01,26.57]	615	22.4	0.000
Midwest	125	11.26	[8.543,14.71]	90	10.23	[8.105,12.83]	217	18.55	[15.06,22.64]	432	13.73	
South	135	12.89	[9.941,16.55]	157	17.68	[14.02,22.06]	348	32.36	[27.85,37.22]	640	21.72	
West	511	46.82	[42.09,51.6]	524	57.8	[52.52,62.91]	293	25.96	[22,30.37]	1328	42.14	
Socioeconomic status												
Education status												
Less than high school	83	8.43	[6.102,11.54]	64	5.87	[4.106,8.289]	36	4.23	[2.823,6.295]	183	6.06	0.000
High school or equivalent	148	15.59	[12.88,18.73]	176	18.01	[12.88,18.73]	76	7.94	[6.281,10.01]	400	13.4	
Some college	209	19.19	[15.99,22.87]	284	34.34	[29.85,39.13]	108	10.82	[8.686,13.41]	601	20.51	

College or more	593	56.79	[52.24,61.22]	350	41.79	[36.4,47.38]	888	77	[73.37,80.27]	1831	60.03	
Employment status												
Employed	643	65.63	[61.39,69.65]	595	68.02	[64.09,71.71]	919	83.56	[79.92,86.65]	2157	73.16	0.000
Unemployed	48	4.77	[3.382,6.714]	55	6.98	[5.223,9.29]	36	3.58	[2.149,5.934]	139	4.98	
Not in the labor force	341	29.59	[26.11,33.32]	224	24.99	[21.52,28.82]	152	12.85	[10.34,15.85]	717	21.86	
Above poverty	768	84.79	[81.87,87.31]	718	92.66	[90.18,94.55]	929	91.2	[88.72,93.17]	2415	89.56	0.000
High food security	964	94.09	[91.86,95.74]	717	84.21	[80.82,87.09]	1042	93.62	[91.57,95.19]	2723	90.97	0.000
Acculturation												
Citizenship status												
U.S. citizen	639	67.07	[63.36,70.58]	725	84.17	[79.87,87.68]	527	54.81	[49.68,59.83]	1891	67.48	0.000
Non-U.S. citizen	388	32.93	[29.42,36.64]	146	15.83	[12.32,20.13]	579	45.19	[40.17,50.32]	1113	32.52	
Nativity status												
Less than 15 years	389	33.29	[29.9,36.87]	157	16.82	[13.49,20.78]	625	49.28	[44.35,54.22]	1171	34.51	0.000
15 years or more	398	42.04	[38.58,45.59]	369	47.4	[42.25,52.61]	372	41.78	[37.29,46.42]	1139	43.53	
U.S.-born	241	24.66	[21.3,28.37]	341	35.78	[30.7,41.21]	108	8.93	[6.83,11.61]	690	21.96	

Note. ^a Significance test (*t*-tests for a continuous variable; Chi-square tests for categorical variables).

^b Continuous variable. Mean is shown for continuous variables such as age.

All sample sizes shown are unweighted, and all frequencies are weighted.

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

Multivariate Regression Analyses

We now turn to the regression model analyses of current smoking and alcohol consumption, which analyzes gender, SES, U.S. citizenship status and nativity status in the U.S., first aggregated all Asians into a single category and subsequently separated by subgroup. Tables 4-10 are set up to examine the associations among gender, SES, and acculturation variables, and the smoking and alcohol consumption of the three Asian American subgroups.

Factors Associated with Cigarette Smoking

First, we looked at current smoking using multiple logistic regression models to estimate the effects of selected independent variables on current cigarette smoking (Tables 4-6). Table 4 presents the results of logistic regression models by subgroups, including Chinese Americans, Filipino Americans, and Asian Indian Americans, with the Chinese as the reference category. Based on unadjusted estimates, Filipino Americans were more likely to be current smokers compared with the Chinese Americans (OR=1.98; 95% CI=1.48-2.65) (see Table 4). However, there was no significant difference in current smoking between the Asian Indians and Chinese Americans. After controlling for the demographic variables in Model 1, Filipino Americans were more likely to be current smokers compared with the Chinese Americans (OR=2.03; 95% CI=1.52-2.70). Asian Indian Americans were less likely to be current smokers compared with Chinese Americans (OR=0.69; 95% CI=0.49-0.97). The regression analyses in Table 4 showed that Filipino Americans consistently showed significantly greater odds of smoking than Chinese Americans across the models. However, the results did not show a consistent

relationship between Asian Indians and smoking. Asian American women had 72.00% lower odds (OR=0.28; 95% CI=.21-.36) of being current smokers compared with men counterparts. Thus, we found the main effects of gender on smoking among all three Asian American subgroups. Similarly, Asian adults who had widowed/divorced/separated had 168.00% higher odds (OR= 2.64; 95% CI=1.91-3.64) of being current smokers compared with their married counterparts. Asian adults who had never married had 48.00% higher odds (OR= 1.48; 95% CI=1.03-2.11) of being current smokers compared with their married counterparts. However, no difference was found between the region of residence and smoking in Model 1. In Model 2, education and food security status were significantly related to smoking. Similarly, Asian adults with college or higher education were less likely to be current smokers than those who had only less than high school education (OR=.33; 95% CI=.21-.52). In Model 3, after the addition of SES variables, the relationship between Asian Indians and smoking became nonsignificant; however, the significant relationship between Filipinos and smoking remained significant. Our analyses indicate that only college-level educational status was significantly related to smoking among Asian Americans. This finding of the study provides evidence to support the second hypothesis. Similarly, high food security status demonstrated a strong and stable negative relationship with smoking behavior across all models. After we adjusted for the acculturation variables, respondents who had U.S. citizenship status were 49.00% less likely to be current smokers (OR=.51; 95% CI=.34-.75) compared with non-U.S. citizen counterparts. Likewise, foreign-born status was significantly related to current smoking. Among foreign-born respondents, those who had lived in the U.S. less than 15 years were less likely to be current smokers (OR=.45; 95% CI=.28-.70) than U.S.-born

counterparts. Similarly, those who had lived in the U.S. 15 years or more were less likely to be current smokers than U.S.-born counterparts (OR=.61, 95% CI=.43-.86). These results suggest that foreign-born Asians have a lower prevalence of current smoking. Overall, these analyses, with adjustment for major demographic characteristics, SES, and acculturation variables, indicated that U.S. race/ethnicity, age, gender, marital status, education, food security, U.S. citizenship status, and nativity status were significantly associated with current smoking among Asian Americans.

Table 4*Factors Associated with Cigarette Smoking Among All Asian American Subgroups: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Filipino vs. Chinese	2.03**	(1.52 - 2.70)	1.52**	(1.12 - 2.07)	1.50*	(1.09 - 2.05)
Asian Indian vs. Chinese	0.69*	(0.49 - 0.97)	0.78	(0.55 - 1.09)	0.79	(0.55 - 1.13)
Demographic Characteristics						
Age (years)	0.98**	(0.97-0.99)	0.98**	(0.97-0.99)	0.98*	(0.97-0.99)
Female (vs. male)	0.28**	(0.21 - 0.36)	0.29**	(0.22 - 0.37)	0.31**	(0.24 - 0.41)
Family with children (vs. no children)	1.42*	(1.07 - 1.88)	1.32	(0.98 - 1.77)	1.28	(0.95 - 1.73)
Marital status (vs. married)						
Widowed/Divorced/Separated	2.64**	(1.91 - 3.64)	2.11**	(1.48 - 3.01)	1.94**	(1.32 - 2.84)
Never married	1.48*	(1.03 - 2.11)	1.29	(0.89 - 1.86)	1.15	(0.77 - 1.70)
Region (vs. Northeast)						
Midwest	0.70	(0.45 - 1.08)	0.76	(0.47 - 1.21)	0.74	(0.46 - 1.19)
South	1.01	(0.72 - 1.41)	0.94	(0.67 - 1.32)	1.01	(0.71 - 1.42)
West	0.76	(0.55 - 1.05)	0.77	(0.55 - 1.07)	0.8	(0.57 - 1.11)
Socioeconomic Status						
Education (vs.<high school)						
High school or equivalent			1.21	(0.73 - 1.99)	1.23	(0.73 - 2.10)
Some college			0.78	(0.49 - 1.23)	0.84	(0.52 - 1.37)
College or more			0.28**	(0.18 - 0.44)	0.30**	(0.19 - 0.48)
Employment (vs. employed)						
Unemployed			1.15	(0.66 - 2.00)	1.12	(0.63 - 1.98)
Not in the labor force			1.08	(0.75 - 1.56)	1.03	(0.70 - 1.51)
At or above poverty (vs. poor)			1.14	(0.83 - 1.55)	1.15	(0.83 - 1.60)
High food security (vs. low)			0.54**	(0.38 - 0.76)	0.57**	(0.39 - 0.83)
Acculturation Variables						
U.S. citizen (vs. non-U.S. citizen)					0.51**	(0.34 - 0.75)
Nativity status (vs. U.S.-born)						
Less than 15 years					0.45**	(0.28 - 0.70)
15 years or more					0.61**	(0.43 - 0.86)

Note. NHIS annual weights are used. The sample size is varied due to nonreporting of the dependent variable. OR odds ratio,

CI confidence interval; confidence intervals in parentheses.

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

Our analyses stratified by ethnic subgroup revealed some intriguing subgroup findings (Tables 5-7). As a further step, we estimated the effects of independent variables on current cigarette smoking disaggregating into the separate Asian American subgroups as displayed in Tables 5-7. Table 5 provides the main effects of various independent variables on current smoking status among Chinese Americans in a series of steps: an unadjusted model; model with demographic variables, added (Model 1), the model with SES variables added (Model 2), and model with acculturation variables added (Model 3). Significant main effects were found in Asian ethnic groups, age, sex, a specific category of marital status, and a particular type of educational attainment for the Chinese American subgroup. This subgroup had nearly 27.00% lower odds (OR=.74; 95% CI=.55-.97) of being current smokers in the unadjusted analysis (not shown). Based on unadjusted estimates, Chinese Americans were less likely to be current smokers. After we controlled for the demographic variables, being a woman was associated with 84.00% lower odds of being current smokers (OR=.16; 95% CI=.09-.30) compared with their male counterparts. As shown in Table 5, the results of the logistic regression analyses reveal a consistent pattern of the negative association between sex and current smoking behavior. After controlling for the SES variables, Chinese Americans who had college graduate or higher education had about 79.00% lower odds (OR=.26; 95% CI=.13-.56) to be current smokers compared with those who had less than high school education. The effect of higher education remained consistent throughout the models. Consistent with previous studies (Yu et al., 2002), our data confirm that less smoking was associated with higher education for the Chinese American subgroup. This study finding provides evidence to support hypothesis 3.1. These analyses, with adjustment for major

demographic characteristics, SES, and acculturation variables, demonstrated that age, gender, marital status, education, and food security status were significantly associated with current smoking among Chinese Americans. However, none of the acculturation variables were significantly related to current smoking.

Table 5*Factors Associated with Cigarette Smoking Behavior Among Chinese American Subgroup: 2011-2015
National Health Interview Survey*

Variables	Model 1		Model 2		Model 3	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic Characteristics						
Age (years)	0.97**	(0.95-0.98)	0.97*	(0.95 - 0.98)	0.97*	(0.95 - 0.99)
Female (vs. male)	0.16**	(0.09 - 0.30)	0.16*	(0.09 - 0.30)	0.07*	(0.03 - 0.16)
Family with children (vs. no children)	1.36	(0.88 - 2.09)	1.29	(0.84 - 1.97)	1.31	(0.85 - 2.03)
Marital status (vs. married)						
Widowed/Divorced/Separated	2.88**	(1.48 - 5.61)	2.70*	(1.38 - 5.29)	2.80*	(1.49 - 5.29)
Never married	0.87	(0.49 - 1.56)	0.52	(0.22 - 1.20)	0.56	(0.24 - 1.32)
Region (vs. Northeast)						
Midwest	0.51	(0.26 - 1.00)	0.70	(0.35 - 1.42)	0.66	(0.34 - 1.30)
South	0.55	(0.27 - 1.12)	0.64	(0.30 - 1.36)	0.54	(0.25 - 1.19)
West	0.77	(0.48 - 1.25)	0.86	(0.53 - 1.39)	0.81	(0.50 - 1.31)
Socioeconomic Status						
Education (vs.<high school)						
High school or equivalent			1.20	(0.55 - 2.63)	1.31	(0.56 - 3.03)
Some college			0.71	(0.31 - 1.63)	0.80	(0.34 - 1.84)
College or more			0.26*	(0.13 - 0.56)	0.28*	(0.13 - 0.59)
Employment (vs. employed)						
Unemployed			1.85	(0.66 - 5.17)	1.92	(0.71 - 5.22)
Not in the labor force			0.81	(0.38 - 1.73)	0.90	(0.41 - 1.97)
Above poverty (vs. poor)			1.09	(0.63 - 1.88)	1.22	(0.70 - 2.12)
High food security (vs. low)			1.47	(0.64-3.38)	1.22	(0.70-2.12)
Acculturation Variables						
U.S. citizen (vs. non-U.S. citizen)					0.57	(0.27 - 1.18)
Nativity status (vs. U.S.-born)						
Less than 15 years					1.25	(0.48 - 3.27)
15 years or more					1.27	(0.50 - 3.27)

Note. NHIS annual weights are used. The sample size is varied due to nonreporting of the dependent variable.

OR odds ratio, CI confidence interval; confidence intervals in parentheses.

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

Turning to the Filipino American subgroup, Table 6 shows logistic regression models in a series of steps. After controlling for the demographic variables included in Model 1, women had 57.00% lower odds (OR=.43; 95% CI=.29-.62) of being current smokers than their male counterparts. In Model 1, Filipino Americans who had widowed, divorced, or separated were about 133.00% greater odds (OR=2.33; 95% CI=1.45-3.73) of being current smokers compared to those who had currently married. No statistical differences were found between the Filipino American subgroup and their region of residence. Then, the socioeconomic variables were entered in Model 2. The effect of gender on smoking increased whereas the effect of marriage was decreased after the addition of the SES variables. In Model 3, Filipino Americans with the college of higher education were less likely to be current smokers (OR=.21; 95% CI=.10-.45) than those who had less than high school education. Our findings indicate that higher education was associated with a decrease in current smoking behavior among Filipino Americans supporting hypothesis 3.1. No difference was found between employment status and cigarette smoking in Model 2. After adding the acculturation variables in Model 3, we found a significant association between nativity status and current smoking. The employment variable, which was nonsignificant, became significant after the addition of acculturation variables in Model 3. Filipino Americans who had not been in the labor force were less likely to be current smokers than those who had employed. Similarly, the never married variable which was nonsignificant became significant after the addition of the acculturation variable. Filipino Americans who had never married were less likely to be current smokers compared with their married counterparts. Filipinos who had lived in the U.S. for less than 15 years had 61.00% lower odds (OR= 0.39; 95% CI=0.19-0.81) of

being current smokers compared with those who were U.S.-born. Similarly, Filipino Americans who had lived in the U.S. for 15 years or more had 51.00% lower odds (OR=0.49; 95% CI=0.32-0.76) of being current smokers compared with those who were U.S.-born. These results indicate that a longer duration of stay in the U.S. was more likely to be current smokers. This study finding provides evidence to support hypothesis 5.2.

Analyses revealed independent associations of the duration of stay in the U.S. to current smoking behaviors among Filipino Americans. For example, Filipino Americans who had lived in the U.S. for less than 15 years had 61.00% lower odds (OR=.39; 95% CI: .19-.81) of being current smokers than those who were US-born Filipinos. Living a longer duration (≥ 15 years) in the U.S. was associated with an increase in current smoking (OR=.49; 95% CI=.32-.76) compared to those who lived in the U.S. for less than 15 years. These regression analyses indicate that a longer duration of stay in the U.S. was associated with a higher prevalence of cigarette smoking among Filipinos. As we expected, only nativity status was significantly related to smoking behavior among Filipinos. No difference was found between U.S. citizenship status current smoking.

Overall, our results showed that age, gender, marital status, education, food security status, and duration of stay in the U.S. were significantly associated with current smoking among Filipino Americans.

Table 6

Factors Associated with Cigarette Smoking Among Filipino American Subgroup: 2011-2015 National Health Interview Survey

Variables	Model 1		Model 2		Model 3	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic Characteristics						
Age (years)	0.98**	(0.97 - 0.99)	0.98*	(0.97 - 1.00)	0.98*	(0.97 - 1.00)
Female (vs. male)	0.43**	(0.29 - 0.62)	0.54**	(0.37 - 0.81)	0.56**	(0.37 - 0.83)
Family with children (vs. no children)	1.51*	(1.01 - 2.26)	1.42	(0.94 - 2.14)	1.42	(0.93 - 2.15)
Marital status (vs. married)						
Widowed/Divorced/Separated	2.33**	(1.45 - 3.73)	1.77*	(1.04 - 3.04)	1.44	(0.86 - 2.41)
Never married	0.84	(0.51 - 1.39)	0.63	(0.38 - 1.05)	0.54*	(0.31 - 0.92)
Region (vs. Northeast)						
Midwest	0.99	(0.45 - 2.19)	0.75	(0.34 - 1.63)	0.74	(0.34 - 1.60)
South	1.32	(0.71 - 2.45)	0.93	(0.48 - 1.81)	0.96	(0.50 - 1.83)
West	0.86	(0.51 - 1.46)	0.62	(0.35 - 1.10)	0.68	(0.38 - 1.21)
Socioeconomic Status						
Education (vs. < high school)						
High school or equivalent			1.21	(0.62 - 2.36)	1.16	(0.60 - 2.26)
Some college			0.64	(0.34 - 1.21)	0.73	(0.38 - 1.39)
College or more			0.21**	(0.10 - 0.45)	0.26**	(0.12 - 0.57)
Employment (vs. employed)						
Unemployed			1.50	(0.66 - 3.39)	1.46	(0.65 - 3.28)
Not in the labor force			0.67	(0.44 - 1.03)	0.63*	(0.41 - 0.96)
High food security (vs. low)			0.51**	(0.34 - 0.78)	0.55*	(0.34 - 0.87)
Above poverty (vs. poor)			1.10	(0.64 - 1.89)	1.25	(0.71 - 2.18)
Acculturation Variables						
U.S. citizen (vs. non-U.S. citizen)					0.77	(0.36 - 1.63)
Nativity status (vs. U.S.-born)						
Less than 15 years					0.39*	(0.19 - 0.81)
15 years or more					0.49**	(0.32 - 0.76)

Note. NHIS annual weights are used. The sample size is varied due to nonreporting of the dependent variable.

OR odds ratio, CI confidence interval; confidence intervals in parentheses.

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

Turning to the Asian Indian American subgroup, Table 7 shows logistic regression models in a series of steps. After controlling for the demographic variables included in Model 1, Asian Indian American women had 86.50% lower odds (OR=.14; 95% CI=.06-.31) of being current smokers than male counterparts. Other demographic variables such as age, family type, marital status, and the region of residence were nonsignificant. In Model 2, the SES variables were entered. Unemployed Asian Indian Americans had about 87.00% lower odds (OR=.13; 95% CI=.03-.69) of being current smokers than those who had employed. These results indicate that unemployment is negatively associated with current smoking behavior. As we expected, unemployed Asian Indian Americans were less likely to be current smokers than their employed counterparts. This study finding provides evidence to support hypothesis 3.2. After adding the acculturation variables, we found that only citizenship status was associated with current smoking in Model 3. Asian Indian Americans who had U.S. citizenship status reported 77.00% lower odds (OR=.23; 95% CI: .11-.49) of being current smokers than those who had non-U.S. citizenship status. These regression analyses indicate that Asian Indian Americans who had U.S. citizenship status were less likely to be current smokers. This study finding provides evidence to support hypothesis 5.1. However, no difference was found between nativity status and current smoking among Asian Indians. Overall, these results demonstrated that gender, employment status, food security status, and U.S. citizenship status were important predictors of current smoking among Asian Indian Americans. Interestingly, a college education was related to smoking among Chinese- and Filipino Americans; however, there was no difference between educational status and smoking among Asian Indian Americans. Among Chinese Americans, high

food security status was not related to current smoking behaviors. However, high food security status was significantly associated with current smoking behaviors among Filipino- and Asian Indian Americans. The poverty status was not related to any of the Asian American subgroups. Hence, our results indicate that the effects of SES variables variable impact on smoking among Asian Indian Americans.

Table 7

*Factors Associated with Cigarette Smoking Among Asian Indian American Subgroup:
2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic Characteristics						
Age (years)	1.00	(0.98 - 1.03)	1.00	(0.98 - 1.03)	1.01	(0.98 - 1.04)
Female (vs. male)	0.14**	(0.06 - 0.31)	0.13**	(0.06 - 0.27)	0.12**	(0.06 - 0.26)
Family with children (vs. no children)	1.18	(0.55 - 2.51)	1.14	(0.55 - 2.34)	1.02	(0.47 - 2.24)
Marital status (vs. married)						
Widowed/Divorced/Separated	1.53	(0.54 - 4.30)	1.16	(0.46 - 2.91)	1.10	(0.39 - 3.10)
Never married	2.13	(0.84 - 5.44)	2.33	(0.88 - 6.15)	2.12	(0.74 - 6.06)
Region (vs. Northeast)						
Midwest	0.62	(0.31 - 1.22)	0.67	(0.29 - 1.52)	0.57	(0.26 - 1.24)
South	0.99	(0.50 - 1.96)	0.98	(0.48 - 2.02)	1.00	(0.51 - 1.97)
West	0.84	(0.42 - 1.68)	1.03	(0.50 - 2.09)	1.03	(0.51 - 2.06)
Socioeconomic Status						
Education (vs. < high school)						
High school or equivalent			0.97	(0.27 - 3.51)	1.54	(0.41 - 5.85)
Some college			1.02	(0.29 - 3.59)	1.36	(0.35 - 5.33)
College or more			0.46	(0.16 - 1.34)	0.67	(0.20 - 2.18)
Employment (vs. employed)						
Unemployed			0.13*	(0.03 - 0.69)	0.11**	(0.02 - 0.61)
Not in the labor force			0.82	(0.38 - 1.73)	0.91	(0.43 - 1.92)
High food security (vs. low)			0.22**	(0.11 - 0.47)	0.23***	(0.10 - 0.54)
At or above poverty (vs. poor)			1.75	(0.69 - 4.44)	1.94	(0.76 - 4.91)
Acculturation Variables						
U.S. citizen (vs. non-U.S. citizen)					0.23**	(0.11 - 0.49)
Nativity status (vs. U.S.-born)						
Less than 15 years					0.32	(0.07 - 1.48)
15 years or more					0.68	(0.15 - 3.03)

Note. NHIS annual weights are used. The sample size is varied due to nonreporting of the dependent variable.

OR odds ratio, CI confidence interval; confidence intervals in parentheses.

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

Factors Associated with Alcohol Consumption

We present analyses of alcohol consumption by gender, SES, and acculturation in Tables 8-11. As shown in Table 8, it is clear that Asian Indian Americans showed lower odds of being former or current alcohol drinkers than Chinese Americans. Filipino Americans reported higher odds of being former or current alcohol drinkers. This study finding provides evidence to support the first hypothesis. Age was significantly related to former and light drinkers but was nonsignificant with moderate/heavy drinkers. Asian American women showed lower odds of being former or current drinkers than their male counterparts. There was also an inconsistent relationship between marriage and alcohol consumption. The results also indicate that foreign-born individuals showed lower odds of being former or current drinkers than all U.S.-born Asians. For example, foreign-born Asians who had lived in the U.S. for less than 15 years showed 49.00% lower odds (OR=.51; 95% CI= .32-.80) of former drinkers, 77.00% lower odds (OR=.23; 95% CI=.17-.31) of current light drinkers and 63.00% lower odds of current moderate/heavy drinkers compared to U.S.-born Asian Americans. The relationships were statistically and substantially different, all showing lower levels of alcohol consumption among the foreign-born of all Asian American subgroups. Notably, immigrants who had lived in the U.S. less than 15 years were less likely to be former, current light, or current moderate/heavy drinkers. Conversely, increased duration of stay in the U.S. was associated with health-risk behaviors. Thus, for alcohol consumption, the most favorable health behavior is seen among the foreign-born Asians in comparison to the U.S.-born Asians and, within the foreign-born population, especially amongst individuals who had lived in the U.S. for less than 15 years compared to those Asians who had lived in the

U.S. for 15 or more years. Our findings provide strong support for the healthy immigrant effect hypothesis implicating that foreign-born Asian Americans demonstrate low health-risk behaviors. At the same time, citizenship status differences in alcohol consumption appeared to be nonsignificant. Overall, our results showed a strong relationship between nativity status and alcohol consumption. This study finding provides evidence to support hypothesis 5.

We now examine the association between acculturation and alcohol consumption separately for the Asian American subgroup. We modeled alcohol consumption for the separate Asian American subgroup, including Chinese-, Filipino-, and Asian Indian Americans (Tables 9-11).

Table 9 presents regression analyses of the main effects for the Chinese American subgroup with all independent variables. Age, family type, marital status, employment status, poverty threshold, and U.S. citizenship status were nonsignificant. In contrast, gender and duration of stay in the U.S. were negatively associated with higher odds of former or current light or current moderate to heavy alcohol consumption compared to abstainers. For example, compared with men, being a woman was associated with 67.00% lower odds (OR=.38; 95% CI=.28-.51) of being current light alcohol consumption or with 59.00% lower odds (OR=.42; 95% CI=.29-.62) of being moderate to heavy current alcohol consumption relative to being abstainers. Compared with Chinese Americans who had less than a high school, college or higher educated Chinese Americans had 183.00% greater odds (OR=2.83; 95% CI=1.28-6.28) of being former drinkers or with 811.00% greater odds (OR=9.11; 95% CI=4.05-20.46) of being light drinkers or with 269.00% greater odds (OR=3.69%; 95% CI=1.96-6.95) of being

moderate/heavy drinkers relative to being abstainers. This regression analysis indicates that highly educated Chinese Americans were more likely to be light drinkers relative to being abstainers providing evidence to support hypothesis 4.1. Compared to the U.S.-born Chinese Americans, foreign-born Chinese who had lived in the U.S. for less than 15 years had 63.00% lower odds (OR=.37; 95% CI=.15-.93) of being former drinkers relative to being abstainers. Similarly, compared to the U.S.-born Chinese Americans, foreign-born Chinese who had lived in the U.S. for 15 years or more had 71.00% lower odds (OR=.29; 95% CI=.14-.58) of being former drinkers relative to being abstainers. Likewise, compared to the U.S.-born Chinese Americans, foreign-born Chinese who had lived in the U.S. for less than 15 years had 58.00% lower odds (OR=.42 95% CI=.23-.74) of being current light drinkers relative to being abstainers. Additionally, those who had lived in the U.S. for 15 years or more had 56.00% lower odds (OR=.44; 95% CI=.27-.71) of being current light drinkers or with 59.00% lower odds (OR=.41; 95% CI=.25-.68) of being moderate to heavy drinkers relative to being abstainers. This regression analysis indicates that as the duration of stay in the U.S. increased, foreign-born Chinese Americans were more likely to be current light drinkers relative to being abstainers. This study finding provides evidence to support hypothesis 6.2.1.

Table 10 presents regression analyses of the main effects for the Filipino American subgroup with all independent variables. As Filipino Americans became older, they were more likely to be former drinkers than being abstainers. Similarly, Filipino women were less likely to have any levels of alcohol consumption in comparison to their male counterparts. Second, foreign-born individuals were less likely to have any levels of alcohol consumption compared with U.S.-born counterparts. However, we did not find a

statistical difference between U.S. citizenship status and alcohol consumption in the Filipino American subgroup. Compared to Filipino men, Filipino females were associated with 75.00% lower odds (OR=.25; 95% CI=.17-.38) of to be current light drinkers or with 71.00% lower odds (OR=.29; 95% CI=.21-.40) of to be moderate to heavy current drinkers relative to being abstainers. Among foreign-born Filipino Americans, those who had lived in the U.S. for less than 15 years had 84.00% lower odds (OR=.16; 95% CI=.09-.28) of to be current light drinkers or with 70.00% lower odds (OR=.30; 95% CI=.14-.64) of to be moderate to heavy drinkers relative to being abstainers. Additionally, those who had lived in the U.S. for 15 years or more had 58.00% lower odds (OR=.42; 95% CI=.25-.72) of being current light drinkers or 52.00% lower odds (OR=.48; 95% CI=.29-.81) of being moderate to heavy drinkers relative to being abstainers. These results indicated that foreign-born Filipino Americans were less likely to be alcohol consumers than their U.S.-born counterparts. However, as the duration of stay in the U.S. increased, they were more likely to be light drinkers relative to being abstainers. Similarly, as the duration of stay in the U.S. increased, Filipino Americans were more likely to be moderate/heavy drinkers relative to being abstainers. This study finding provides evidence to support hypothesis 6.2.3.

Turning to alcohol consumption among Asian Indian Americans, we found different patterns in the association between a series of independent variables and alcohol consumption (Table 11). More interestingly, the association between gender and alcohol consumption remained the same as the Chinese- or Filipino American subgroup. Respondents who were female had lower odds of reporting alcohol consumption. Compared to the U.S.-born Asian Indian Americans, foreign-born Asian Indian

Americans who lived in the U.S. for less than 15 years were less likely to be light drinkers relative to being abstainers. Among foreign-born Asian Indian Americans, as the duration of stay in the U.S. increased, they were more likely to be light drinkers relative to being abstainers. However, there was no significant relationship between moderate/heavy drinkers and the duration of stay in the U.S. These analyses indicate that foreign-born Asian Indian Americans were less likely to be former drinkers. However, the effect of duration of stay in the U.S. was not associated with either current light drinkers or moderate to heavy drinkers.

Compared to Asian Indian American men, Asian Indian American women were associated with 59.00% lower odds (OR=.41; 95% CI=.26-.66) of being former alcohol consumers, or with 79.00% lower odds (OR=.21; 95% CI=.15-.30) of being current light alcohol consumers or with 65.00% lower odds (OR=.35; 95% CI=.11-1.12) of being moderate to heavy current alcohol consumers relative to abstainers. Compared to Asian Indian Americans with less than high school education, Asian Indian Americans with a college or higher education had 546.00% greater odds (OR=6.46; 95% CI=1.20-34.75) of being former drinkers relative to be abstainers. This regression analysis indicates that highly educated Asian Indian Americans were more likely to be former drinkers providing evidence to support hypothesis 4.2. Likewise, those who had lived in the U.S. for less than 15 years had 78.00% lower odds (OR=.22; 95% CI=.10-.45) of being current light alcohol consumers relative to abstainers. Additionally, those who had lived in the U.S. for 15 years or more had 55.00% lower odds (OR=.45; 95% CI=.22-.94) of being current light alcohol consumers relative to abstainers. These regression analyses revealed that the likelihood of being light alcohol drinkers increased with the duration of staying in

the U.S. in the Asian Indian subgroup. This finding of the study provides evidence to support hypothesis 6.2.3. In contrast, our study did not reveal the significant difference between U.S. citizenship status and alcohol consumption among Asian Indian Americans. One potential explanation for the nonsignificant relationship may be that noncitizen Asian Indian Americans were less apt to be former, current light, or moderate/heavy drinkers in comparison to their U.S.-citizen counterparts. Regarding this point, the citizenship status seems to be a weaker predictor of Asian Indian American alcohol consumption behavior. Thus, there is a piece of clear evidence for the association between duration of stay in the U.S. and alcohol consumption in the Asian Indian American subgroup.

Table 8*Associations of Alcohol Consumption with Gender, SES, and Acculturation Variables Among Three Asian American Subgroups: 2011-2015 National Health Interview Survey*

Characteristics	Model 1: Former drinkers vs. abstainers		Model 2: Light drinkers vs. abstainers		Model 3: Moderate/heavy drinkers vs. abstainers	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Filipino vs. Chinese	2.00**	(1.49 - 2.68)	1.98**	(1.53 - 2.55)	1.24	(0.97 - 1.60)
Asian Indian vs. Chinese	0.53**	(0.39 - 0.74)	0.56**	(0.44 - 0.72)	0.34**	(0.26 - 0.46)
Demographic Characteristics						
Age (years)	1.01*	(1.00 - 1.02)	0.98**	(0.97 - 0.99)	1.00	(0.99 - 1.01)
Female (vs. male)	.31**	(0.24 - 0.41)	.30**	(0.25 - 0.36)	.41**	(0.32 - 0.52)
Family with children (vs. no children)	1.13	(0.85 - 1.51)	0.82*	(0.67 - 1.01)	0.83	(0.64 - 1.06)
Marital status (vs. married)						
Widowed/Divorced/Separated	1.11	(0.79 - 1.57)	1.49**	(1.11 - 1.99)	1.03	(0.74 - 1.45)
Never married	0.47**	(0.28 - 0.78)	1.32*	(1.03 - 1.70)	0.72*	(0.54 - 0.97)
Region (vs. Northeast)						
Midwest	1.01	(0.59 - 1.73)	1.12	(0.84 - 1.51)	1.40	(0.90 - 2.16)
South	1.40	(0.89 - 2.20)	0.98	(0.75 - 1.28)	1.65**	(1.20 - 2.27)
West	1.19	(0.78 - 1.81)	1.02	(0.81 - 1.28)	1.47*	(1.08 - 2.00)
Socioeconomic Status						
Education (vs. <high school)						
High school or equivalent	1.96*	(1.14 - 3.37)	1.63	(0.94 - 2.80)	1.30	(0.76 - 2.22)
Some college	2.13**	(1.24 - 3.66)	2.26**	(1.35 - 3.78)	1.99*	(1.17 - 3.37)
College or more	2.52**	(1.57 - 4.05)	2.66**	(1.63 - 4.34)	2.76**	(1.70 - 4.46)
Employment (vs. employed)						
Unemployed	0.95	(0.48 - 1.90)	0.87	(0.57 - 1.34)	0.78	(0.46 - 1.33)
Not in the labor force	1.24	(0.93 - 1.64)	0.42**	(0.33 - 0.54)	0.60**	(0.47 - 0.78)
Above poverty (vs. poor)	0.78	(0.53 - 1.16)	1.00	(0.73 - 1.37)	1.32	(0.95 - 1.83)
High food security (vs. low)	2.01**	(1.41 - 2.87)	2.01**	(1.48 - 2.73)	1.68**	(1.19 - 2.36)
Acculturation Variables						
U.S. citizen (vs. non-citizen)	1.04	(0.68 - 1.59)	0.84	(0.66 - 1.07)	0.82	(0.58 - 1.17)
Nativity status (vs. U.S.-born)						
Less than 15 years	0.51**	(0.32 - 0.80)	0.23**	(0.17 - 0.31)	0.38**	(0.24 - 0.59)
15 years or more	0.39**	(0.27 - 0.56)	0.37**	(0.28 - 0.48)	0.57**	(0.41 - 0.78)

Note. NHIS annual weights are used. The sample size is varied due to nonreporting of the dependent variable. OR odds ratio,

CI confidence interval; confidence intervals in parentheses.

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

Table 9

Associations of Alcohol Consumption with Gender, SES, and Acculturation Among Chinese American Subgroup: 2011-2015 National Health Interview Survey

Variables	Model 1: Former drinkers vs. abstainers		Model 2: Light drinkers vs. abstainers		Model 3: Moderate/heavy drinkers vs. abstainers	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic Characteristics						
Age (years)	1.01	(0.99 - 1.03)	0.97**	(0.96 - 0.98)	0.99	(0.98 - 1.00)
Female (vs. male)	0.33**	(0.21 - 0.53)	0.38**	(0.28 - 0.51)	0.42**	(0.29 - 0.62)
Family/with children (vs. no children)	1.42	(0.78 - 2.58)	0.90	(0.62 - 1.32)	0.93	(0.61 - 1.44)
Marital status (vs. married)						
Widowed/Divorced/Separated	0.98	(0.58 - 1.67)	1.28	(0.81 - 2.02)	0.78	(0.45 - 1.35)
Never married	0.63	(0.29 - 1.35)	1.13	(0.74 - 1.75)	0.58*	(0.34 - 0.99)
Region (vs. Northeast)						
Midwest	2.68*	(1.06 - 6.75)	1.32	(0.76 - 2.31)	2.38**	(1.28 - 4.42)
South	3.10**	(1.51 - 6.38)	1.30	(0.72 - 2.37)	2.40**	(1.45 - 3.98)
West	1.89	(0.96 - 3.72)	1.28	(0.78 - 2.10)	1.66**	(1.16 - 2.39)
Socioeconomic Status						
Education (vs. <high school)						
High school or equivalent	1.64	(0.65 - 4.12)	5.65**	(2.58 - 12.38)	1.86	(0.80 - 4.32)
Some college	1.79	(0.75 - 4.24)	7.80**	(3.19 - 19.09)	2.62**	(1.27 - 5.38)
College or more	2.83*	(1.28 - 6.28)	9.11**	(4.05 - 20.46)	3.69**	(1.96 - 6.95)
Employment (vs. employed)						
Unemployed	1.13	(0.31 - 4.04)	0.87	(0.38 - 2.00)	0.58	(0.28 - 1.17)
Not in the labor force	1.53	(0.90 - 2.60)	0.40**	(0.27 - 0.58)	0.58**	(0.39 - 0.87)
Above poverty (vs. poor)	0.75	(0.32 - 1.75)	1.23	(0.67 - 2.28)	1.53	(0.73 - 3.20)
High food security (vs. low)	2.65**	(1.50 - 4.68)	2.22**	(1.48 - 3.33)	1.56	(0.97 - 2.50)
Acculturation Variables						
U.S. citizen (vs. non-U.S. citizen)	0.67	(0.27 - 1.70)	0.86	(0.56 - 1.33)	1.05	(0.64 - 1.73)
Nativity status (vs. U.S.-born)						
Less than 15 years	0.37*	(0.15 - 0.93)	0.42**	(0.23 - 0.74)	0.57	(0.29 - 1.11)
15 years or more	0.29**	(0.14 - 0.58)	0.44**	(0.27 - 0.71)	0.41**	(0.25 - 0.68)

Note. NHIS annual weights are used. The sample size varied due to nonreporting of the dependent variable. OR odds ratio,

CI confidence interval; confidence intervals in parentheses.

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

Table 10

Associations of Alcohol Consumption with Gender, SES, and Acculturation Among Filipino American Subgroup: 2011-2015 National Health Interview Survey

Variables	Model 1: Former drinkers vs. abstainers		Model 2: Light drinkers vs. abstainers		Model 3: Moderate/heavy drinkers vs. abstainers	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic Characteristics						
Age (years)	1.01*	(1.00 - 1.03)	0.97**	(0.96 - 0.98)	0.99*	(0.97 - 1.00)
Female (vs. male)	0.25**	(0.17 - 0.38)	0.29**	(0.21 - 0.40)	0.35**	(0.23 - 0.54)
Family/with children (vs. no children)	1.20	(0.79 - 1.82)	1.03	(0.73 - 1.46)	0.83	(0.53 - 1.30)
Marital status (vs. married)						
Widowed/Divorced/Separated	0.96	(0.62 - 1.49)	0.98	(0.67 - 1.43)	0.75	(0.45 - 1.23)
Never married	0.36*	(0.16 - 0.80)	0.90	(0.60 - 1.35)	0.42**	(0.24 - 0.72)
Region (vs. Northeast)						
Midwest	0.65	(0.26 - 1.57)	0.95	(0.52 - 1.74)	1.14	(0.50 - 2.63)
South	0.66	(0.31 - 1.41)	0.50*	(0.30 - 0.83)	1.08	(0.52 - 2.22)
West	0.72	(0.37 - 1.41)	0.67	(0.44 - 1.02)	1.24	(0.63 - 2.42)
Socioeconomic Status						
Education (vs. <high school)						
High school or equivalent	2.17	(0.97 - 4.85)	1.21	(0.50 - 2.93)	0.99	(0.34 - 2.88)
Some college	1.64	(0.79 - 3.41)	1.46	(0.66 - 3.26)	1.93	(0.71 - 5.22)
College or more	1.38	(0.68 - 2.81)	1.28	(0.56 - 2.90)	2.35	(0.94 - 5.88)
Employment (vs. employed)						
Unemployed	1.13	(0.44 - 2.87)	1.57	(0.78 - 3.15)	1.70	(0.64 - 4.49)
Not in the labor force	1.28	(0.82 - 1.98)	0.46**	(0.28 - 0.73)	0.63	(0.38 - 1.03)
Above poverty (vs. poor)	0.93	(0.54 - 1.61)	1.23	(0.79 - 1.91)	1.30	(0.77 - 2.21)
High food security (vs. low)	1.22	(0.69 - 2.13)	1.76*	(1.04 - 2.97)	1.21	(0.57 - 2.56)
Acculturation Variables						
U.S. citizen (vs. non-U.S. citizen)	1.60	(0.87 - 2.94)	1.30	(0.77 - 2.19)	0.78	(0.39 - 1.54)
Nativity status (vs. U.S.-born)						
Less than 15 years	0.75	(0.36 - 1.54)	0.16**	(0.09 - 0.28)	0.30**	(0.14 - 0.64)
15 years or more	0.42**	(0.25 - 0.72)	0.30**	(0.20 - 0.45)	0.48**	(0.29 - 0.81)

Note. NHIS annual weights are used. The sample size varied due to nonreporting of the dependent variable. OR odds ratio,

CI confidence interval; confidence intervals in parentheses.

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

Table 11

Associations of Alcohol Consumption with Gender, SES, and Acculturation Among Asian Indian American Subgroup: 2011-2015 National Health Interview Survey

Variables	Model 1: Former drinkers		Model 2: Light drinkers		Model 3: Moderate/heavy drinkers vs. abstainers	
	vs. abstainers		vs. abstainers			
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Demographic Characteristics						
Age (years)	1.00	(0.99 - 1.02)	0.98**	(0.96 - 0.99)	1.02*	(1.00 - 1.03)
Female (vs. male)	0.41**	(0.26 - 0.66)	0.21**	(0.15 - 0.30)	0.43**	(0.27 - 0.67)
Family with children (vs. no children)	0.84	(0.59 - 1.64)	0.54**	(0.39 - 0.76)	0.77	(0.47 - 1.26)
Marital status (vs. married)						
Widowed/Divorced/Separated	2.43	(0.91 - 6.44)	2.89**	(1.37 - 6.09)	1.06	(0.43 - 2.63)
Never married	0.48	(0.16 - 1.42)	1.24	(0.72 - 2.15)	1.39	(0.70 - 2.76)
Region (vs. Northeast)						
Midwest	0.40*	(0.17 - 0.97)	1.15	(0.68 - 1.92)	1.11	(0.59 - 2.09)
South	0.80	(0.43 - 1.51)	1.06	(0.65 - 1.74)	1.46	(0.82 - 2.58)
West	0.84	(0.39 - 1.82)	1.16	(0.73 - 1.83)	1.47	(0.79 - 2.74)
Socioeconomic Status						
Education (vs. <high school)						
High school or equivalent	2.11	(0.29 - 15.17)	0.48	(0.16 - 1.39)	0.90	(0.30 - 2.70)
Some college	6.48*	(1.07 - 39.16)	1.03	(0.36 - 2.99)	0.79	(0.23 - 2.73)
College or more	6.46*	(1.20 - 34.75)	1.64	(0.74 - 3.65)	1.50	(0.58 - 3.90)
Employment (vs. employed)						
Unemployed	0.77	(0.20 - 2.94)	0.59	(0.24 - 1.43)	0.45	(0.10 - 1.96)
Not in the labor force	0.83	(0.44 - 1.58)	0.43**	(0.26 - 0.71)	0.74	(0.46 - 1.19)
At/above poverty (vs. poor)	0.53	(0.21 - 1.33)	0.63	(0.31 - 1.29)	3.24*	(1.08 - 9.71)
High food security (vs. low)	2.27	(0.93 - 5.52)	2.07*	(1.11 - 3.84)	3.42**	(1.37 - 8.53)
Acculturation Variables						
U.S. citizen (vs. non-U.S. citizen)						
Nativity status (vs. U.S.-born)	1.15	(0.54 - 2.47)	0.76	(0.49 - 1.16)	0.68	(0.35 - 1.33)
Less than 15 years						
Less than 15 years	0.41	(0.07 - 2.31)	0.22**	(0.10 - 0.45)	0.35	(0.11 - 1.12)
15 years or more						
15 years or more	0.44	(0.08 - 2.44)	0.45*	(0.22 - 0.94)	1.19	(0.43 - 3.28)

Note. NHIS annual weights are used. The sample size varies due to nonreporting of the dependent variable. OR odds ratio,

CI confidence interval; confidence intervals in parentheses.

** p<.01 and * p<.05.

DISCUSSION

The discussion section provides a series of sections including a summary of findings, comparative analysis, implications for public policies and practice, study limitations and implications for future, and conclusion.

Summary of Findings

Our results using data from the 2011-2015 NHIS are consistent with previous findings. However, our study is distinct from and adds to the literature by providing a conceptual framework that can be used in the assessment of health-risk behavior that has not been studied previously and looking at differences at the Asian ethnic levels. Unlike some other studies that focused on aggregated Asian Americans or a specific health-risk behavior (e.g., either smoking or alcohol consumption), we examined the associations among gender, socioeconomic characteristics, and acculturation in Chinese-, Filipino-, and Asian Indian American subgroups. Our results revealed that age and gender were significant predictors for both smoking and alcohol consumption across three Asian American subgroups and further reinforced the importance of considering the diversity of smoking and alcohol consumption patterns across Asian American subgroups. The results of this study demonstrated that SES factors were weak predictors of smoking and alcohol consumption. Our results showed that nativity status appeared to be a stronger predictor of smoking and alcohol consumption in Asian American populations. Taken together, the results of our study provide strong evidence for considering these predictors when addressing the health-risk behaviors among Asian Americans living in the United States.

Comparison with Previous Studies

The following six sub-sections provide a detailed comparison between our empirical analyses and the literature.

Ethnic variation in smoking and alcohol consumption

Consistent with the previous studies (Gordon et al., 2019; Lee et al., 2013; Ma et al., 2005; Martell et al., 2016; Saraiya et al., 2019), we found differences in current cigarette smoking and alcohol consumption across the three largest Asian American subgroups. This finding reveals that statistics aggregated across broad ethnic categories may mask important disparities between specific subpopulations – can lead to the misperception that Asian American health problems have already been adequately addressed (Ghosh, 2003; Martell et al., 2016).

Among the three Asian American subgroups, the Filipino American subgroup reported the highest prevalence of smoking and alcohol consumption. In contrast, the Asian Indian Americans reported the lowest prevalence of smoking and alcohol consumption supporting hypothesis 1. Our findings are consistent with published studies (Kim & Spencer, 2011; Lo et al., 2014; Martell et al., 2016; Woo et al., 2017). One potential explanation could be that Filipino Americans have acculturated to alcohol drinking behaviors seen in the US (Sullivan et al., 2017). In their culture, alcohol consumption is accepted and often encouraged for especially for Filipino men (Nadal, 2000). Another explanation could be related to increased levels of psychological distress among Filipino Americans. Filipino Americans experienced higher levels of psychological distress, which, in turn, led to heavy drinking (Woo et al., 2017). People use alcohol to get relief from psychological distress. Additionally, Jang et al.'s (2018)

study that examined the joint associations between perceived stress and alcohol use in a sample of Korean college students found a significant association between perceived stress and level of alcohol use. The psychological distress may be due to perceived discrimination experienced by Filipino Americans. Kim and Spencer (2011) examined associations between perceived discrimination and heavy drinking among Filipino Americans living in Honolulu and San Francisco. The authors found perceived discrimination as a significant risk factor for heavy drinking. Similarly, Lo and colleagues (2014), who examined alcohol consumption in a national sample of 3,574 Asian American adults demonstrated that Filipino Americans had the highest prevalence of heavy alcohol consumption. By U.S. norms, the alcohol consumption prevalence of Filipino Americans in our study is notable; it approaches the U.S. national age-adjusted alcohol consumption rate (11.70% versus 19.60%) (WHO, 2019).

Our study showed a lower smoking prevalence among Asian Indian Americans. In contrast, age-adjusted current cigarette smoking prevalence rates were 12.10% among the Indian males aged 15+ years; however, rates were only .50% among the Indian females of the same age group (WHO, 2019). Our bivariate analysis also demonstrated that foreign-born Asian Indian Americans had higher proportion of current smoking than U.S.-born counterparts (6.30% versus 4.74%). Therefore, smoking in Asian Indian Americans may be greatly underestimated if surveillance is limited to conventional tobacco products (Mukherjea et al., 2018; Patel et al., 2018). Patel and colleagues (2018) examined contextual factors related to traditional tobacco use among Asian Indian immigrants and they found that 65.00% of the sample ($N=3,228$) had ever used traditional tobacco products (*paan masala, gutka, bidis*). Similarly, Mukherjea and

colleagues (2018) examined prevalence and factors associated with smokeless tobacco product use, and they found that the current smokeless tobacco use prevalence was 13.00%. In contrast, the prevalence of current cigarette use was 5.50%. Therefore, future research is needed to examine how Asian Americans' smoking prevalence differs by the type of smoking products.

On the other hand, our findings confirmed the past research showing lower rates of alcohol consumption in the Asian Indian American subgroup (Lee et al., 2013; Lo et al., 2014; Saraiya et al., 2019). Asian Indian Americans have relatively lower rates, and thus they seem to be better protected. Saraiya and colleagues (2019) identified a higher prevalence of alcohol consumption among Chinese Americans compared with Asian Indian Americans. However, contrary to our findings, Asian Indian college students are not far behind the alcohol consumption rates of college students from other ethnic races (Hrywna et al., 2016). A recent study that examined heavy drinking status among 1,336 Asian Indian college students studying at two large Midwestern universities found that about 27.00% of the respondents reported binge drinking (>5 drinks for males and >4 drinks for females also referred to as heavy drinking) which seems to be higher than those of the white and black college students. The higher rate of alcohol consumption among young adults may provide valuable insight to support increased levels of alcohol consumption behaviors among the young population in the United States (McKetta & Keyes, 2019). Along the same line of thought, we expect that Asian Indian Americans who were current light drinkers would be expected to be moderate/heavy alcohol consumers. Since the proportions of current light alcohol consumers are similar for these

two subgroups, so our expectations based on their alcohol consumption behavior potentially draw attention to future research.

On the other hand, it is crucial to understand that the low smoking and alcohol consumption rates among Asian Americans are an artifact of relatively low rates among most Asian American women; these gendered-patterned rates contribute to lowering the combined estimate for males and females (Maxwell et al., 2005). Hence, the study confirms that the reporting statistics for aggregated Asian population masks meaningful differences in Asian American subgroups' health-risk behaviors. Therefore, our findings suggest the need to develop Asian ethnic-specific smoking cessation and alcohol prevention interventions.

Gender variation in smoking and alcohol consumption

We showed that although the prevalence of smoking and alcohol consumption among Asian American women was found lower than that of the Asian American men, intragroup differences remained consistently high and constituted a public health problem of concern. This study finding provides evidence to support hypothesis 2. Consistent with the findings of previous studies looking at gender discrepancies (An et al., 2008; Gordon et al., 2019; Kim & Spencer, 2011; Kuerban, 2016; Lo et al., 2014; Saraiya et al., 2019), Asian American women smoke at a much lower rate than their male counterparts. Compared within three Asian American subgroups, Asian Indian American women were less likely to smoke, while Filipino American women were more likely to smoke supporting hypothesis 2.1. Compared to the Asian Indian American women, Chinese American women reported slightly higher cigarette smoking. Asian Indian smoking culture seems to be stricter on gendered-patterned whereas Chinese smoking culture

tends to be permissible for both men and women. The results of this study indicate that gender demonstrated a direct effect on the association between smoking and race/ethnicity in Asian American populations.

Overall, our findings indicate gender and ethnic differences in cigarette smoking among the three largest Asian American subgroups. Women's current smoking prevalence were uniformly lower than men's, reflecting Asian cultural norms that likely pose more restricted expectations for women's health-risk behaviors (Yeramaneni & Sharma, 2009). Given the lack of in-depth research on cultural differences in the measurement of health-risk behavior (Tran et al., 2013), the probability of cigarette smoking based on gender differences and Asian culture requires further investigation.

Another important predictor of smoking and alcohol consumption is acculturation that might influence in changing lifestyle-related health-risk behaviors. Previous studies suggested that gender differences in health-risk behavior might be explained by acculturation. For example, a study that examined the association between social capital and smoking among Asian American men found that the longer the Filipino- and Chinese American men lived in the U.S., the lower their odds were of smoking (Li & Delva, 2012). Along the same line of thought, Ma and colleagues (2004) found that the more acculturated Asians males were less likely to smoke, while the more acculturated Asians females were more likely to smoke. Future study is needed to identify the factors that are accountable for gender differences in smoking behavior of Asian Americans.

Our results show that Asian American women were less likely to be alcohol drinkers which is consistent with past studies (Becerra et al., 2013; Kim & Spencer, 2011). For example, Kim and Spencer (2011) found that being male was significantly and

positively associated with higher odds (more than a 30-fold increase) of being categorized as a heavy drinker. Our analyses indicate a different pattern of alcohol consumption within the subgroup. The gender gap in each of the categories of the former alcohol consumption and the moderate/heavy alcohol consumption reduced in the Asian Indian subgroup than in the Chinese- and Filipino American subgroups. The smaller gender gap indicates that Asian Indian American women tend to be associated with a higher risk of alcohol consumption. Surprisingly, a wider gender gap remained among Filipino Americans. This pattern of alcohol consumption indicates that Asian Indian American women were more likely to be moderate/heavy drinkers as the length of their stay in the U.S. increased. This study finding provides evidence to support hypothesis 2.2. The results of our study are consistent with previous studies on acculturation and alcohol consumption. For example, McKetta and Keyes (2019) examined national trends in heavy alcohol drinking stratified by age, gender, and parenting status using 2006-2018 waves of the NHIS and they found that women in the United States have experienced increased drinking over the past decade. Becerra et al. (2013) evaluated the association between acculturation and alcohol consumption among six Asian American subgroups. The same study demonstrated that Asian American women, including Asian Indian Americans, were more likely to be heavy alcohol drinkers. However, similar trends among Chinese Americans and Filipino Americans were not observed in the same study, regardless of the higher abstinence rate than the U.S. If behavior, such as heavy alcohol consumption, is likely to be high in the host nation, an acculturated immigrant is expected to increase such behavior among immigrants. One plausible explanation related to higher alcohol consumption among Asian Indian Americans could be an increased level of

posttraumatic stress experienced by Asian Indians in the United States than those in India (Nilaweera et al., 2014). Such posttraumatic stress symptoms may be associated with an increased level of alcohol consumption among Asian Indian women (Saraiya et al., 2019). It is not uncommon to drink alcohol among Asian Indians to reduce pain (Girish et al., 2010). Another explanation for increased heavy alcohol consumption among Asian Indian women is related to their ways of integrating into the host societies. When Asian Indian women come to the U.S., they may maintain or acquire the mainstream host American way of life which may precipitate alcohol consumption (Becerra et al., 2013). Shifts in health-risk behaviors have been associated with adaptation to U.S. culture and social structures (Shelley et al., 2004).

Prior research has proposed the influence of ethnic drinking culture may be conditioned by the degree of integration into the ethnic cultures (Cook et al., 2012). The acculturation hypothesis assumes that immigrants tend to merge with the mainstream American culture of heavy drinking behavior (Lopez-Gonzalez et al., 2005). Since highly educated Asian Indian Americans are well integrated into the mainstream host society, they might violate traditional cultural expectations of restricted ethnic drinking behaviors (Becerra et al., 2013). A growing drinking tradition in the workplace has increased the permissibility of social drinking among women (Girish et al., 2010). Additionally, it has become common and accepted to consume alcohol on social occasions like festivals, parties, or functions in Asian Indian communities. Prior research has compared Asian drinking culture and noted significant differences in attitudes, norms, and behavior (Becerra et al., 2013; Dong et al., 2011; Park et al., 2014). The basic premise of ethnic drinking culture is that immigrants often maintain the connection with drinking practices

in their countries of origin and maintain heritage culture so that the drinking practices in their countries of origin still influence their alcohol consumption in the host country. In India, alcohol consumption is related to social stigma, mainly directed at women who drink. Though not attempted in the present study due to a lack of data, future research might explore how alcohol-related values and norms in specific Asian ethnic cultures affect female alcohol consumption behavior due to differences in their job type. Future studies should further explore the ways in which ethnic drinking and smoking culture differently influences current cigarette smoking and alcohol consumption behavior between men and women among Asian Americans.

Effects of SES factors in smoking

Past studies suggest inconsistent findings for the results between smoking and SES (Gor et al., 2019; Lee et al., 2013; Li & Delva, 2012; Singh & Miller, 2004). Our study showed that SES factors are important predictors of smoking among Chinese- and Filipino American subgroups: those who had graduated college were less likely to be current cigarette smokers than those who had less than high school education supporting hypothesis 3.1. Ro et al. (2016) found that Chinese Americans showed a significant association between educational status and health outcomes. Similarly, Li and Delva (2012) found that Chinese Americans who had a university education or higher were related to the low prevalence of smoking than those who had a high school education. A plausible explanation might be that the cigarette smoking behavior of Chinese Americans might be related to the increased smoking quit rates (An et al., 2008). Highly educated individuals might be interested in quitting smoking due to their increased level of awareness of the harmful effect of smoking behavior. There might also be a cultural

factor that could affect a lower prevalence of smoking among Chinese Americans. Cigarette smoking behavior of Chinese Americans may be rooted in cultural norms (Maffini et al., 2015). Their religion discourages smoking and encourages Chinese Americans to quit (Tong et al., 2010).

However, our study did not reveal a significant association between smoking and education among Asian Indian Americans. Gor and colleagues (2019) also found that socioeconomic advantage was not consistently related with desired health behaviors among Asian Indian Americans. Therefore, we speculate that other factors, including cultural beliefs may also impact health-risk behaviors. For Asian Indian Americans, there is a weak relationship between educational status and health outcomes suggesting an attenuated relationship between education and health outcomes (Ro et al., 2016). Therefore, education must be contextualized within social circumstances. For example, cigarette smoking rates in India seems to be increased with educational status and financial resources (Mukherjea et al., 2018; Patel et al., 2018). Higher educational status and financial resources may lead to greater participation in social settings and environments that facilitate socially acceptable tobacco use behaviors in India (Patel et al., 2018). Future research could use binational data to better measure sending country characteristics of educational status to identify potential suppressors of higher educational status.

However, employment status is an important predictor of smoking among unemployed Asian Indian Americans. Our study showed that unemployed Asian Indian Americans were less likely to be current smokers than their employed counterparts. This study finding provides evidence to support hypothesis 3.2. One plausible explanation

could be related to social bias. Sullivan et al. (2017) found that Asian Americans including Asian Indian smokers might not disclose their smoking status contributing to lower prevalence of current smoking status. Another possible explanation is that unemployed Asian Indian Americans might use other forms of smoking such as cultural smokeless tobacco products. Mukherjea et al. (2018) examined prevalence and factors associated with smokeless tobacco product use and found that the current smokeless tobacco use prevalence was 13.00%. In contrast, the prevalence of current cigarette use was 5.50%. Furthermore, Mukherjea and colleagues (2018) found that the higher prevalence of smokeless tobacco was related to a lower SES status. In the United States, modern smoking products are relatively expensive than traditional tobacco products. However, there is no information on the use of traditional smokeless tobacco products in the NHIS. Future research is needed to examine tobacco use behaviors among Asian Indian Americans.

Effects of SES factors in alcohol consumption

In contrast to the trends with smoking and educational status, we found positive associations between higher educational status and alcohol consumption; however, the association varied by Asian ethnic groups. There was a significant relationship between higher educational status and higher levels of alcohol consumption among Chinese Americans whereas no significant difference was found among Filipino Americans. The regression analysis showed that as the educational level increased, Chinese Americans were more likely to be current light drinkers than to be abstainers supporting hypothesis 4.1. Furthermore, Chinese Americans were also more likely to be moderate/heavy drinkers, but the effect of higher educational status was lower than it was on current light

drinkers. Similarly, highly educated Asian Indian Americans were more likely to be former drinkers than abstainers supporting hypothesis 4.2. Consistent with the literature on the association between SES and health-risk behaviors among Asian American subgroups (Becerra et al., 2013), higher SES factors had positive relationships with increased smoking and alcohol consumption. Likely, health-risk behaviors were not protected by the higher educational status of Chinese- and Asian Indian Americans supporting the idea that the Asian model minority stereotype is only myth. Thus, the findings of our study replicate existing knowledge that the Asian American stereotype is misguided (Becerra et al. 2013, Mukherjea et al., 2018) and add to this literature by demonstrating that Asian Americans' socioeconomic advantage does not exist in maintaining healthy lifestyle behaviors (Gor et al., 2019). Surprisingly, the present study did not find the protective effect of higher educational status as seen in previous studies (Yoon et al., 2006) among Asian Indian Americans.

Effects of acculturation in smoking

Turning to the connection between acculturation variables and smoking among three Asian American subgroups, results again point to important ethnic differences. Our findings indicated that acculturation had an effect on smoking, which is consistent with previous studies (An et al., 2008; Kaubern, 2016; Kim & Spencer, 2011; Koya & Egede, 2007; Lee et al., 2013; Singh et al., 2013; Vaeth et al., 2017). We found some interesting differences in the associations between acculturation and smoking across three Asian American subgroups. Our results suggest that U.S. citizenship status had a strong negative association with smoking among Asian Indian Americans. This study finding provides evidence to support hypothesis 5.1 indicating the comparative advantage of the

healthy lifestyle of being U.S. citizens. Past studies indicated higher odds of smoking among non-U.S. citizen Asian Americans. For example, Singh et al. (2013) found lower rates of current smoking prevalence among U.S.-born Asian Indians (4.40% versus 5.60%). No statistical differences were observed either in the Chinese American subgroup or in the Filipino American subgroup.

Our findings also showed that the duration of stay in the U.S. had a strong association with cigarette smoking in Filipino Americans supporting hypothesis 5.2. Consistent with the previous studies on the association between duration of stay in the U.S. and smoking (An et al., 2008; Koya & Egede, 2007; Kuerban 2016; Lopez-Gonzalez et al., 2005), the longer the Filipino Americans stayed in the United States, the more likely they were to become current smokers. An and colleagues (2008) found that increasing years lived in the U.S. was associated with a higher smoking prevalence among Filipino Americans. Another study that examined the relationship between the duration of stay in the U.S. and smoking found that odds of smoking were greater for immigrant women with the increasing duration of stay in the U.S. (Ma et al., 2004). The duration of stay in the U.S. might play a significant role in influencing the lifestyles of Filipino Americans, which generally leads to a decline in their health advantage over time (Singh et al., 2013). Consistent with past studies (Ma et al., 2004), our study also found no significant differences between duration of stay in the U.S. and smoking among Chinese- and the Asian Indian Americans. One potential explanation for this nonsignificant effect of acculturation on smoking might be caused by the relatively small portion of U.S.-born Chinese and Asian Indian respondents. Overall, only 8.55% of

Asian Indian respondents were born in the U.S.; 22.01% of Chinese respondents were U.S.-born; 33.60% of Filipino respondents were U.S.-born.

Effects of acculturation in alcohol consumption

Turning to the connection between the acculturation variable and alcohol consumption among Asian American subgroups, our analyses provided mixed results. There was no significant difference between U.S. citizenship status and alcohol consumption among three Asian American subgroups. This study finding does not provide evidence to support hypothesis 6.1. However, the nativity status showed statistically significant relationships with alcohol consumption among Asian American subgroups. Consistent with previous studies (Cook et al., 2012; Kim & Spencer, 2011; Lee et al., 2013), our findings found a significant relationship between nativity status and alcohol consumption across three Asian American subgroups confirming hypothesis 6.2. All foreign-born Asian Americans were less likely to consume alcohol compared with their U.S.-born counterparts. Among U.S.-born Asian Americans, the influence of their drinking cultures may be conditioned by the degree of integration into the ethnic cultures (Cook et al., 2012). According to Kim and Spencer (2011), U.S.-born Filipino Americans had more than twice the odds of being categorized as heavy drinkers than those in the foreign-born group. Similarly, Lee and colleagues (2013) found a lower risk of alcohol use among foreign-born Asian Americans, including Chinese, Filipinos, and Asian Indians. Foreign-born Asian Americans' alcohol consumption was lower than that of the U.S.-born individuals. The longer the foreign-born Chinese Americans stayed in the U.S., the more likely they were to be light drinkers supporting hypothesis 6.2.1. Similarly, the longer the foreign-born Filipino Americans stayed in the U.S., the more likely they were

to be moderate/heavy drinkers supporting hypothesis 6.2.2. As the duration of stay in the U.S. increased, attitude about drinking behavior largely reflects the attitude of the mainstream drinking culture in which the respondents were living (Makimoto, 1998). Thus, the drinking practices of Filipino Americans were more likely to reflect the predominant attitudes of U.S. culture than the cultural attitudes of their ancestors. However, the longer the foreign-born Asian Indian Americans stayed in the U.S., the more likely they were to be current light drinkers supporting hypothesis 6.2.3. One important factor that could be related to higher alcohol consumption among Filipino Americans is a sociocultural factor, i.e., generational status. Second generation (i.e., individual was born in the U.S., and parents were born outside the U.S.) According to Kenji Iwamoto et al. (2012), Asian Americans were more likely to consume alcohol compared to those less acculturated individuals. In our study, Filipinos had been living in the U.S. for multiple generations compared to the other groups. Therefore, Filipino Americans may be more acculturated and their different ethnicity parents may have attitudes that are more reflective of American culture. As the duration of stay in the U.S. increases, attitude about drinking behavior largely reflects the attitude of the mainstream drinking culture (Makimoto, 1998). Thus, the drinking practices of Filipino Americans were more likely to reflect the attitudes of U.S. drinking culture than their heritage drinking culture.

Drinking practices of Asian Indian Americans might not be largely influenced by the predominant attitudes of U.S. drinking culture. The majority of them recently arrived in the United States; therefore, they may be influenced by their cultural attitudes of socially unacceptable drinking behavior. Our results indicate that Chinese- and Filipino

Americans were more likely to be moderate/heavy drinkers over time. While relationships between duration of stay in the U.S. and alcohol consumption were consistent and stable among Chinese Americans and Filipino Americans, the relationship was inconsistent among Asian Indian Americans. In the Asian Indian American subgroup, the current light drinking level status was significantly related to the duration of stay in the U.S. Asian Indian Americans were more likely to become light drinkers as they lived longer in the U.S., validating the descriptive statistics (23.04% of the respondents reported current light drinkers). Among Asian Indian Americans, there were no significant relationships between former and alcohol abstainers with a longer duration of stay in the U.S. However, one common hypothesis is that the longer an immigrant lives in a host culture, the more likely the person will adopt the host culture's social norms and language (An et al., 2008; Singh & Siahpush, 2002). It would be worth exploring in future research how other factors of the host culture (for example, frequent interaction with non-ethnic members) might moderate the effect of drinking cultures.

The finding of the nonsignificant differences between U.S. citizenship status and alcohol consumption among three Asian American subgroups is consistent with the view that alcohol consumption is mostly related to Asian cultural characteristics than the citizenship status. Different acculturation conditions, including unique cultural attributes of their home countries, may contribute to the inconsistent impact on alcohol consumption behaviors in specific ethnic subgroups. Thus, American acculturation, as reflected by citizenship status, may be less relevant as a proxy for acculturation in these subgroups even though it is highly useful as a marker for acculturation in other ethnic minorities.

Implications for Public Policies and Practice

There can be a number of implications for public policies and practice. First, the results of this research provide a more precise comparison of statistics for the most populous Asian American subgroups with the disaggregated Asian ethnic group, suggesting disproportionate health-risk behavior in Asian American populations. This result disagrees with the model minority stereotype that all Asians are healthier than other U.S. populations. Thus, our findings have implications for the targeted public policies for specific Asian ethnic groups.

Policymakers and health care professionals should be aware that the health-risk behaviors of Asian Americans are elevated and are equivalent to non-Hispanic whites (Huang et al., 2013). They should receive the same attention while formulating policies for smoking cessation and alcohol reduction as other minority groups like Hispanics and African Americans. Once policymakers understand the disproportionate health-risk behaviors, they have the opportunity to formulate policies and legislation that will more accurately represent the experiences of specific Asian American subgroups so that targeted public services can be more productive.

Second, there is a growing interest among policymakers on the health-risk behaviors of Asian Americans as their proportion in terms of the overall U.S. population has increased dramatically in recent years. However, information regarding their health-risk behavior is still minimal. This study developed a conceptual modality highlighting gendered-norms, SES, and acculturation dimensions on Asian Americans' cigarette smoking and alcohol consumption behaviors. Our study suggests a need of alcohol prevention program for foreign-born Asian Americans since the duration of stay in the

United States increased the likelihood of being alcohol drinkers among foreign-born Asian Americans.

Third, while most health disparities research and policy have focused on the health-risk behaviors of African Americans and Hispanics compared to non-Hispanic whites, our study results suggest that Asian American subgroups should also be considered higher risk groups (Gordon et al., 2019). We thus recommend that Asian Americans never be grouped as a single Asian group for estimating current cigarette smoking and alcohol consumption prevalence in policy research as this will conceal the higher prevalence among Filipino Americans. That information about the Asian American subgroup not to be extrapolated to formulate the policy for a specific Asian ethnic group.

Finally, one of the policies might be related to increasing the prices of tobacco products coupled with evidence-based cessation services, comprehensive smoke-free policies, media campaigns, and promotion of cessation treatment in clinical settings (Martell et al., 2016).

In addition to policy implications, our findings have important implications for implementing tobacco control and anti-alcohol drinking programs. An understanding of the relationship between age, food security, employment, and educational status, and acculturation and smoking and alcohol consumption in the Asian American population is an important step toward constructing more useful and relevant prevention, intervention, and cessation programs. First, future smoking cessation programs in the United States need to focus on higher-risk Asian American subgroups such as Filipino Americans. The cessation interventions should be specific to the Filipino ethnic group so that sustained

abstinence can be achieved and maintained. Tong et al. (2010) reported that the co-ethnic language used in social media for tobacco control among Vietnamese Americans was found effective in California. Second, the anti-alcohol consumption of social norms should be strengthened in all Asian ethnic subgroups. Third, culturally competent strategies especially for less acculturated Asian Americans (such as Asian Indian Americans) who tend to believe in traditional and cultural health care practices (Ai et al., 2008). Additionally, multilingual, culturally tailored smoking cessation and excessive alcohol consumption prevention health communication materials are needed to distribute in the Asian American communities. Fourth, the provision of health care providers who can understand the unique experiences and needs of specific Asian ethnic groups can help to deliver their outreach efforts and services better to reduce health disparities among ethnically diverse Asian American populations.

In sum, the public health importance of Asian Americans will continue to grow as they are the fastest-growing ethnic minority populations in the United States. Hence, exploring the health-risk behaviors of Asian Americans based on their sex, SES characteristics, and acculturation are essential markers when reaching out to the most diverse Asian American population across the nation.

Study Limitations and Implications for Future Research

The strengths of our study include assessing the current cigarette smoking and alcohol consumption among three subgroups of Asian Americans and providing nationally representative data on health-risk behaviors. Nevertheless, we note several limitations to our analyses.

First, the sample size for U.S.-born Asian Indian Americans was relatively small, which is not a problem for aggregate analyses but might have resulted in decreased statistical power in the subgroup analysis, leaving some of the estimates insignificant. Further studies with larger samples of U.S.-born Asian Indian Americans are needed to confirm or disprove our findings. However, the intragroup difference of Asian American subgroups from unique ethnic backgrounds does exist and should be explored when possible (Kuerban, 2016). However, this study is an essential first step in describing potential risk factors for cigarette smoking and alcohol consumption for the three largest Asian American subgroups. It leads the way for future studies with more statistical power to examine the association between nativity status and health-risk behaviors stratified by gender and ethnicity.

Second, while cross-sectional studies do not allow for determining causality, the relationship between health-risk behavior and duration of stay in the U.S. is likely bidirectional make them incapable of disentangling the temporal effects of duration on smoking and alcohol consumption.

Third, future studies could use the English proficiency measure while examining the association between acculturation and health-risk behavior. The ability to speak English is a commonly used important marker of acculturation (Shi et al., 2015). However, our NHIS data do not have a language variable. Rather, our study looked at a whole range of alcohol consumption from abstinence to heavy drinking, which, in turn, led to a better assessment of the stage of alcohol consumption (Park et al., 2014).

Fourth, this study relies on self-reported current cigarette smoking and alcohol consumption, which might underestimate the actual prevalence of smoking and alcohol

consumption (Gor et al., 2019; Ma et al., 2004). The self-reported data may have the potential impact of social desirability.

Fifth, the NHIS does not survey homeless or institutionalized groups which are known to have a higher prevalence of smoking (Tam et al., 2016). Thus, our analyses might misestimate the real impact of cigarette smoking due to the exclusion of these groups, particularly those in psychiatric institutions.

Finally, current cigarette smoking and alcohol consumption estimate might differ from results from other surveillance systems. For example, current cigarette smoking prevalence estimates from the National Survey on Drug and Use and Health (NSDUH) tend to be consistently higher than those estimated by the NHIS. Differences in prevalence between the NHIS and NSDUH can be partially explained by differing survey methodologies, types of surveys administered, and definitions of current smoking and alcohol consumption; however, trends in prevalence are comparable across surveys (Martell et al., 2016).

Despite a few exceptions, these findings corroborate and extend the existing literature on the effects of gender, SES, and acculturation variables on current cigarette smoking and alcohol consumption in the three largest Asian American subgroups. This study highlights the need to disaggregate separate ethnic groups out of a single monolithic category. The aggregated data conceal potentially significant gender-patterned and acculturation differences among Asian American subgroups and to confound the ultimate generalizability of any results and their practical application of the Asian American population.

This study has several implications for future research and practice. First, future studies should consider investigations of factors related to the ethnic enclave and health-risk behavior, such as social network and ethnic concentration. Additionally, as indicated by our findings, it makes it increasingly clear that efforts be directed to remove model minority stereotype to increase the public attention towards Asian ethnic-specific study focusing on their cultural factors, including gendered-pattern smoking and alcohol consumption. Lastly, possible factors perceived racial discrimination, and acculturative stress needs to be explored to understand and improve Asian American access to smoking cessation and alcohol prevention program. Racial discrimination and acculturative stress are closely related to an increased likelihood of alcohol consumption among immigrants (Szaflarski et al., 2011). Previous research found that alcohol-related prevention and treatment efforts may be more effective when the efforts are designed considering contextual circumstances on which people live, play, and work (Botvin & Jantor, 2000). Furthermore, Asian Americans tend to utilize personal and traditional resources rather than professional help to address their health-risk problems, but some strategies considering contextual circumstances have been proposed to overcome this issue (Huang et al., 2013).

More importantly, this study recommends future researchers consider subgroup differences in early adolescence, which may be able to assist with early prevention efforts for subgroups at the highest risk for initiating health-risk behaviors. A recent study that examined differences in substance use and substance use risk factors by Asian American subgroups (including Chinese, Filipino, Asian Indians) found that Filipino adolescents reported the highest prevalence of health-risk behaviors among Asian American

subgroups (Shi et al., 2015). Our data also indicates that Filipino American adults reported the highest prevalence of cigarette smoking and alcohol consumption among the three most populous Asian American subgroups. This prevalence suggests that the initiation of cigarette smoking and alcohol consumption among specific Asian American subgroups may increase substantially throughout adolescence and into adulthood. Given that the highest smoking and alcohol consumption among Filipino youth is associated with a higher risk for smoking and alcohol consumption in adulthood, it may be particularly beneficial for targeting prevention efforts specifically to the Filipino American community.

Conclusion

Our results provide an answer to our most important research question around the prevalence of smoking and alcohol consumption by Asian American subgroups. Related to this, we found that Filipino Americans were more likely to be current smokers and alcohol consumers whereas Asian Indian Americans were at the lowest end of both smoking and alcohol consumption. However, our results indicate intragroup differences in smoking and alcohol consumption. More importantly, we show that Asian Americans' health-risk behaviors are partly explained by SES measures. Race/ethnicity and gender have become more important measures of smoking and alcohol consumption among Chinese-, Filipino-, and Asian Indian Americans. Additionally, our study finds that U.S. citizenship status and nativity status partly capture the heterogeneity of these risk behaviors in selected Asian American subgroups. These findings imply that there is a shift in alcohol consumption behavior among Asian Americans that have been associated with adaptation to the American drinking culture. In sum, there overall remain important

and unexplored areas for continued research specifically on the Asian cultural norms on alcohol consumption.

Additionally, our study demonstrated heterogeneity in the prevalence of current cigarette smoking and alcohol consumption among the three Asian American subgroups. In line with such results, our study suggests the need to consider how to best focus prevention efforts for those at the highest risk of smoking and alcohol consumption especially Asian women across the three subgroups. Hence, a multisectoral approach is needed to tackle changing healthy lifestyles among Asian Americans targeting by gender.

While Asian Americans are a heterogeneous group to gender, ethnicity, age, income, education, and acculturation, it is essential to reduce the potential for Asian American disparities in health-risk behaviors from adolescence through adulthood. It is important to highlight the prevention strategies from the early uptake in cigarette smoking because the early initiation of smoking is a strong predictor of future cigarette smoking (Yu et al., 2010, 2017). However, Asian Americans are typically underrepresented in nationally recognized evidence-based prevention programs. The underrepresentation is due to the fact that part of the problem has stemmed from the twin stereotypes that Asian Americans are all the same and that all Asian Americans are foreigners, and, by implication, outsiders.

In conclusion, our study advances the literature by providing a more comprehensive understanding of how gender, SES characteristics, and acculturation contribute to explain variations on smoking and alcohol consumption among a nationally representative sample of Asian Americans. There are marked gender and racial/ethnic disparities in smoking and alcohol consumption in Asian American populations. Most

importantly, the survey allows us to generalize the findings to Asian Americans living in the United States, thereby providing nationally relevant information that may provide benefits to Asian Americans.

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Chapter 4

EXAMINING EFFECTS OF PREDISPOSING, ENABLING, NEED, AND ACCULTURATION VARIABLES ASSOCIATED WITH HEALTH CARE ACCESS AMONG CHINESE, FILIPINO, ASIAN INDIAN AMERICAN SUBGROUPS

When comparing all Asians with other race groups, 17.50% of Asian Americans did not have a usual source of health care, which was slightly higher than those of African Americans (17.20%) in 2015 (NCHS, 2018). However, the non-Hispanic Whites were more likely than Asian Americans to have a usual source of care during the same period. Having such a usual poor source of health care, or the degree to which individuals have access to link appropriate health services to their needs affects people's overall health conditions (Chang & Chan, 2016).

The relationship between having a usual source of care and better health outcomes has been well established (Frisbie et al., 2001; Salant & Lauderdale, 2003). Several positive health outcomes are lower cost, timely and appropriate utilization of preventive care services, improved chronic disease management, increased satisfaction with care, and decreased emergency department visits. On the other hand, lack of health insurance, unemployment, minority status, or age are social conditions often associated with inadequate health care service coverage (Andersen et al., 1983).

Particularly relevant for the current study purpose is the possibility that Asian Americans may be especially underserved despite their advantageous socioeconomic statuses. Furthermore, immigrants encounter nonfinancial health care barriers (Ku & Matani, 2001). For example, many Asian Americans are not comfortable speaking in

English and they express difficulty in communicating with physicians (Lee et al., 2010; Ponce et al., 2009). Similarly, ethnic networks are important factors in health care access (Choi, 2009). Immigrants in ethnic networks seldom reach beyond their ethnic communities to obtain health care. Thus, the increase of co-ethnic friend networks is related to lower access to health care because the networks may cut off immigrants from more diverse knowledge and information about available and affordable health care services (Choi, 2009). As a result, most Asian Americans use alternative medicine to manage a diversity of illnesses (Lee et al., 2010). For example, the Chinese use traditional medicine which is ingrained in their culture and they may not try to go see the doctor.

Usual Source of Care

Having a usual source of care is a measure of access to health care that is associated with use of preventive services and timely and appropriate medical care (Corbie-Smith et al., 2002). Alternatively, usual source of care is an essential marker of access. The concept of health care access has been conceptualized and understood from the perspective of individuals' ability to get health care needs on time (Institute of Medicine, 2006). The appropriate use of service is related to the right to health wherein people are getting to the right services at the right time to enhance improved health outcomes (World Health Organization [WHO], 2007). According to the United Nations Declaration of Human Rights 1948, health has been considered a fundamental human right for all regardless of socioeconomic status, gender, sex, or ethnic group origin (United Nations, 1948). These characteristics are the determinants of entry into the health care system and the use of resources by those who need health care. Known determinants

of health care access have not been examined for the three largest Asian American subgroups including Chinese-, Filipino-, and Asian Indian Americans.

Conceptual Framework

To conceptualize and examine Asian Americans' usual source of care in this study, we employed the Andersen's Behavioral Model of Health Service Use (ABM), which characterizes the determinants of use as need, enabling, and predisposing factors (Andersen, 1995; Aday & Andersen, 1974). Andersen's conceptual framework specifies the role of predisposing, enabling, and need factors as individual determinants of health care access (see Figure 1) (Andersen, 1995; Andersen & Newman, 1973; Babitsch et al., 2012). Predisposing characteristics (e.g., ethnicity, age, gender, family type, and marital status) influence individuals' likelihood of using health care services. Enabling resources (e.g., education, employment, poverty threshold, and health coverage) can either facilitate or impede the use of health care services. Finally, the need factor (e.g., perceived health status) describes how an individual understands his/her general state of health and determines the need for health care (Bradley et al., 2002; Chang & Chan, 2016; Yang & Hwang, 2016). Overall, these factors are potential predictors that can help in explaining variations in health care access among three Asian American subgroups.

The model has become the most often cited theoretical framework in the health services research literature (Carreon & Baumeister, 2015; Chang et al., 2015; Gil-Gonzalez et al., 2015; Hong et al., 2019; Shi et al., 2009; Simo et al., 2018). Additionally, the model has shown a robust explanatory power when applied to empirical studies of race/ethnicity and health care use (Bradley et al., 2002). Furthermore, the model has explained approximately 88.00% of health care access and utilization differences due to

observed heterogeneity (Vargas Bustamante et al., 2012). Addition of acculturation variables to the model.

However, even when using three sets of theoretical variables, studies are still not able to explain variations in health care access among Asian American subgroups. Previous studies have suggested that incorporating acculturation variables into Andersen's model may better explain patterns of a usual source of care (Chang et al., 2015; Kim et al., 2010; Ku & Matani 2001; Lee et al., 2010; Shon & Townsend, 2019). First, variation in behavior to access health care among immigrants has been attributed to the lack of familiarity and comfort with the U.S. health care system (Kim et al., 2010; Salant & Lauderdale, 2003). The knowledge of the U.S. health care system might be influenced by the duration of stay in the U.S. and U.S. citizenship status (Luo & Wu, 2016). Immigration status is an important factor in racial and ethnic disparities in access to care (Ku & Matani, 2001). For example, native-born citizen adults were more likely to have a usual source of care than noncitizens suggesting that immigrants' health care use increases as they acculturate (Ku & Matani, 2001). Second, given the high percentage of immigrants among Asian Americans, studies of Asian Americans should consider the cultural factor related to the countries of origin and acculturation (Frisbie et al., 2001; Salant & Lauderdale, 2003; Song et al., 2010). Therefore, we chose to categorize acculturation as a separate variable, placing it in the different categories as the other three theoretical set of variables. A combination of the nativity, duration, and/or English language proficiency is largely focused on health services research (Kao, 2009).

In this study, we identified four primary determinants of an individual's access to health care and then entered into a sequential model-building process. The sequential

model-building process can be helpful to determine at which point some effects are explained away by other effects in predicting access to health care among the three Asian American subgroups. Based on this conceptual framework, we estimated the usual source of health care by a series of logistic regression models to obtain a more comprehensive understanding of the factors predicting the usual source of health care.

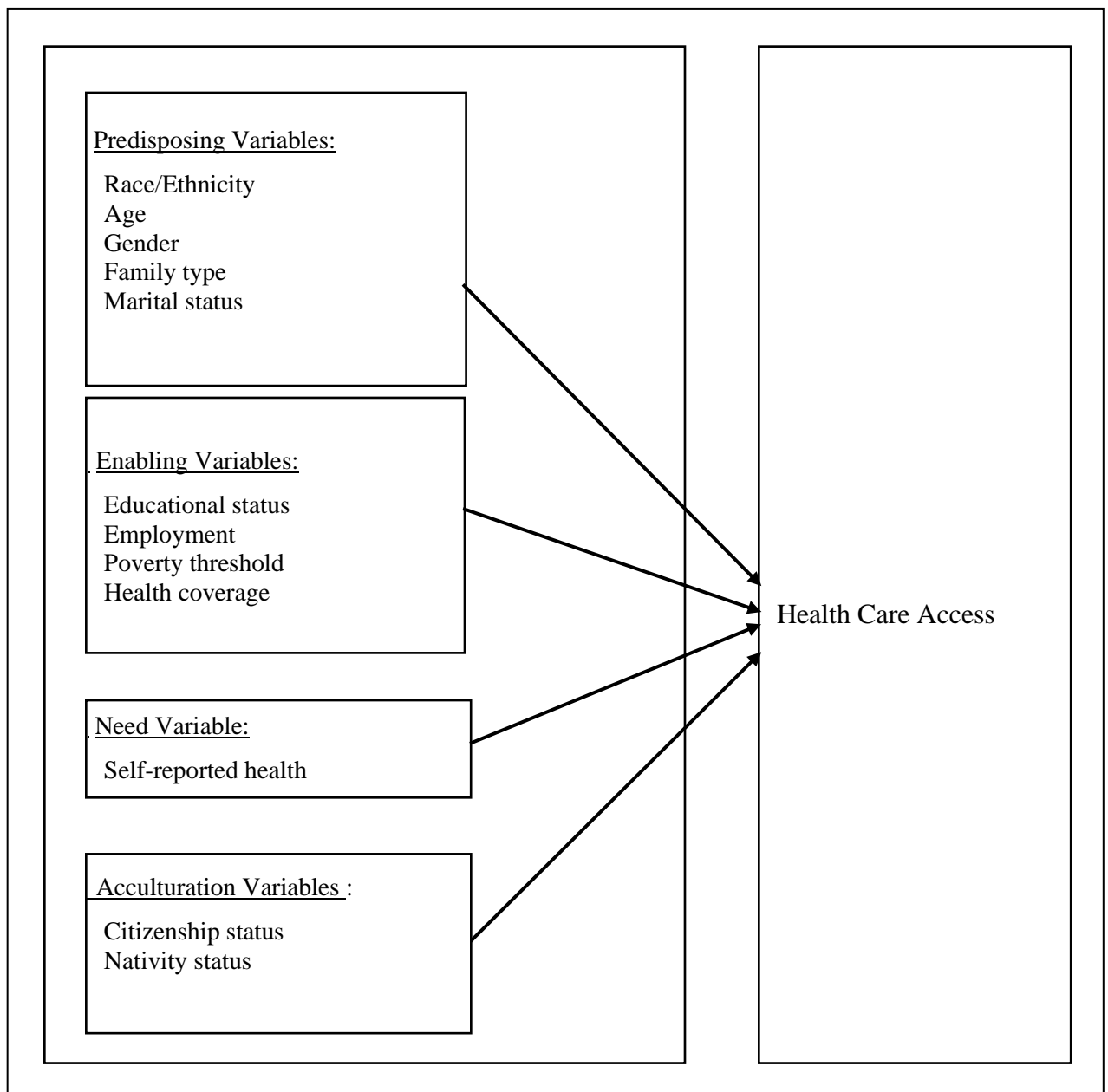


Figure 1. Conceptual Model of Health Care Access (Adapted from Andersen, 1995)

Following Andersen's behavioral model, the study aims to examine ethnic variation in the predictors of health care access across the most populous three Asian American subgroups, including the Chinese-, Filipino-, and Asian Indian American subgroups.

Predisposing Factors

Predisposing factors include race and ethnicity, age, sex, family type, and current marital status. Previous studies (Chang et al., 2015; Choi, 2011; Frisbie et al., 2001; Lee et al., 2010; Ray-Mazumder, 2001) have documented a great diversity of Asian Americans in these predisposing factors. The heterogeneity can explain some of the variations in access to health care across Asian American subgroups.

Disparities in access to health care have been extensively documented suggesting that Asian Americans were significantly less likely than non-Hispanic whites to receive health care treatment (Andersen et al., 2002; Blackwell et al., 2009; Gelberg et al., 2000; Lee et al., 2010). According to Blackwell and colleagues (2009), income and insurance coverage were associated with doctor contacts or visits. The authors found that adults with less education and lower-income were less likely to have contacted a doctor than the well-educated or adults with the highest incomes. Similarly, lacking insurance coverage was strongly associated with not contacting a doctor (Lee et al., 2010). In addition, Lee and colleagues (2010) identified that the high cost of medical expenses, insurance co-payments, and the cost of prescription medication are often decisive factors of whether to seek or medical care or not. One of the important disparities in access to health care is cultural attitudes about health and health care. Most Asian Americans go to the physician regularly for routine checkups and preventive care when they are very ill. The receiving

routine checkups and regular preventive care is not a cultural norm (Lee et al., 2010). This cultural practice associated with a lack of awareness or preventive care is even seen among Asians who have a relatively good command English language. More specifically, “Asians have difficulty in describing symptoms, understanding the physician’s explanation and treatments, and reading prescription labels” (Lee et al., 2010, p. 26).

Among predisposing factors, race/ethnicity and sex are common social determinants of health care access. Ray-Mazumder (2001) examined the relationship of gender to health beliefs and health care access. The author found that females were more likely to have a usual source of care (USC) compared with their male counterparts. Similarly, another study that examined gender differences in health care among U.S. populations indicated that males were less likely to seek care or believe in preventive health measures than females (Courtenay, 2000). Along with these significant and independent associations between gender and having a USC, gender is particularly meaningful in the Asian population in which there are particular gender roles and expectations based on gender differences. Better health care access among females is associated with an increased level of health concern (Ray-Mazumder, 2001). Based on the previous literature, we expected that Asian American women would have better health care access compared with their male counterparts.

Enabling Factors

Enabling resource factors are considered to serve as conditions enabling health care access (Andersen, 1995; Andersen & Newman, 1973; Babitsch et al., 2012; Blackwell et al., 2009; Chang et al., 2015; Hong et al., 2019; Zhou et al., 2019). The most often-studied enabling factors are education, income, employment, health insurance, and

food insecurity because these factors indicate individuals' abilities to use resources to deal with their health problems.

One of the enabling factors is educational status. Several past studies demonstrated that education had a strong and consistent positive influence on health care access (Andersen et al., 2002; Blackwell et al., 2009; Shi et al., 2009) with few exceptions (Chang et al., 2015; Wu et al., 2012). For example, one study found that U.S. adults with less income and education had less contact with doctors than their counterparts (Blackwell et al., 2009). Similarly, a sample of low-income Asian adults with less education was found to be more likely to have less access to medical care (Andersen et al., 2002). Shi and colleagues (2009) examined the effects of education on health care access among Asian Americans using the NHIS dataset, and they found that higher educational status was associated with greater odds of having a health care visit. One of the possible explanations for the positive effects of education on access is that educated individuals are more likely to be insured, and higher education encourages most types of information acquisition and health maintenance behaviors. The knowledge acquired through education will assist in the processing of health information that is necessary to maintain continuity of care (Hong et al., 2019). In contrast with the significant positive effects of education in access, Chan and colleagues (2015) found that all education levels, except those with less than a high school diploma, had 41.00% to 51.00% lower odds of having a USC than those with some graduate school. More importantly, the effect of diverse values and beliefs on differential patterns in health care access may attenuate the positive impact of educational status in having a USC (Chang et al., 2015). Wu and colleagues (2012) found that although more than half of Asian Indian

participants had college or higher education, 52.00% reported for not have health insurance and 40.00% reported not having a primary care doctor. Asian Indian Americans might not prioritize using health care services regularly and they might only go to doctors as last resort when there would be a problem or would never go.

Another enabling factor is household income. The associations identified between income and health care access varied in the previous studies (Blackwell et al., 2009; Chang et al., 2015; Dhingra et al., 2010; Lee et al., 2010). For instance, one study found that U.S. adults with lower incomes had lower likelihoods of doctor contacts (Blackwell et al., 2009). Similarly, Lee and colleagues (2010) found the positive impact of higher income on the likelihood of access to preventive care. Contrary to these findings, Chang and colleagues (2015) found no differences in having a usual source of care by income stratum. Another study found that persons with annual household incomes less than \$50,000 were more likely to receive psychiatric treatment than those with incomes of \$75,000 or higher (Dhingra et al., 2010). The inconsistent findings suggest that income alone does not adequately explain the observed differences in health care access for Asian American populations.

Besides socioeconomic factors that influenced health care access, there are cultural factors like religiosity and underutilization of preventive services (Bharmal et al., 2013; Mehrotra et al., 2012; Wu et al., 2012). Hence, the variability in the conclusions of different literature highlights the need to examine the education and income variable along with cultural factors. Both citizenship status and duration of stay in the U.S. can serve proxy acculturation measures that help to capture cultural differences in health outcomes (Szaflarski et al., 2017).

Health insurance is another well-established determinant of health care access, and several studies found that being insured significantly increased the likelihood of access to health care or decreased the delay of health care in different population groups (Blackwell et al., 2009; Dhingra et al., 2010; Gil-Gonzalez et al., 2015; Hong et al., 2019; Ku & Matani, 2001; Office of Minority Health, 2019). According to the 2015 census data, the insurance coverage among Asian Americans was 68.80% compared to 75.80% for the non-Hispanic white population (Office of Minority Health, 2019). However, the rates of health insurance coverage vary by Asian ethnicities and citizenship status (Ku & Matani, 2001). For example, Ku and Matani (2001) found that noncitizen adults were less likely to have a usual source of care because they also had a low level of insurance coverage. In 2017, the census data reported that the private insurance coverage rate was 78.40% for Filipino Americans, whereas it was only 71.80% for Chinese Americans. The literature supports the positive role of being employed in having a USC through health coverage.

Need Factor

Need factor includes the perceived self-reported health status indicating that how people view and experience their general health, functional state, and illness symptoms (Andersen et al., 2002). Self-reported health status is a well-accepted measure of the overall health status of individuals. Several studies reported significant associations between self-reported health status and health care access (Blackwell et al., 2009; Dhingra et al., 2010; Misra & Hunte, 2016). For example, Dhingra and colleagues (2010) found that respondents who rated their health status as less-than-excellent were significantly more likely to receive treatment than those with excellent self-rated health.

According to Blackwell et al. (2009), adults in fair or poor health were significantly more likely to be hospitalized whereas adults in very good, good, fair, or poor health were more likely to have contacted a doctor than adults in excellent health.

Acculturation

Acculturation factors are key drivers of disparities in health care access among Asian Americans. However, studies demonstrated an inconsistent relationship between acculturation and access to care (Chang et al., 2015; Kandula et al., 2006; Lee & Choi, 2009; Lee et al., 2017). According to Lee and colleagues (2017), Asian Americans who had a bicultural value system were less likely to have a USC compared to those who were highly acculturated. For example, acculturated Asian Americans were more likely to have physical exams, dental exams, eye exams.

Well-documented literature demonstrated that the duration of stay in the U.S. is one of the key enabling factors of health care access (Chang et al., 2015; Frisbie et al., 2001; Kao, 2009; Lebrun, 2012). Chang and colleagues (2015) examined the effect of acculturation (duration of stay in the U.S. and English language proficiency) on variations in having a USC among 7,566 Asian Americans, and they found that Asian Americans lived for a short time in the U.S. (<5 years) were significantly associated with not having a USC. The authors noted the significance of enabling resources after adding acculturation variables in their regression models. Similarly, Lee and colleagues (2017) examined the association between acculturation and health examination among Asian Americans, and they found that increased acculturation (length of stay in the U.S.) was associated with greater receipt of preventive services. These studies demonstrated that a longer duration of stay to be positively associated with health care access. In this

instance, at least, we could say that the more extended duration of stay in the U.S. can be considered as an advantage rather than a disadvantage because the longer stay is positively associated with the increased level of knowledge of complexities of the US health care system. Overall, previous literature suggests that the duration of stay in the U.S. has an impact on having a USC. Contrary to these findings, Asians may also encounter stigma and unfamiliarity with the disease can be a barrier when trying to seek the health care system in the United States, especially among recently arrived immigrants (Cheng & Lok, 2017; Lee et al., 2010). Therefore, the significant relationship between a more prolonged duration of stay in the U.S. and having a USC may be indirectly attenuated by Asian culture. Furthermore, health care access is positively related to individuals' nativity status (Carreon & Baumesiter, 2015). For example, foreign-born Filipinos were 15.00% less likely to have an annual checkup compared to foreign-born Chinese (Carreon & Baumesiter, 2015).

To date, few studies have comprehensively examined issues related to health care access in diverse Asian Americans (Ye et al., 2012), which is further exacerbated by some limitations. First, past studies focused on health care access used either the state-level data (Chang et al., 2015) or small samples (Choi, 2009) or qualitative study design (Lee et al., 2010) or single measure of acculturation (Ye et al., 2012), or examined this matter in one or a few subgroups of Asian Americans that have a larger population (Jang, 2016). These studies have provided strong evidence of variations in health care access among Asian American subsamples. Second, past research has relied on aggregated data, concealing essential differences in access to health care services among different Asian American subgroups (Holland & Palaniappan, 2012). Disaggregating Asian American

data in the study of health care access is relatively new, and it remains to be entirely determined (Fang, 2018; Nguyen & Trivedi, 2019). Third, previous literature on Asian Americans that used Andersen's model to frame their work on health care access did not extensively include acculturation. However, acculturation variables for health care access are necessary to capture variations on health outcomes (Cho et al., 2004; Yoo et al., 2009). Our study fills this gap in the existing literature by examining health care access among the three largest Asian American subgroups.

Research Questions and Hypotheses

Based on the literature review and the conceptual framework of Andersen's behavioral model, the current study provided answers to the following research questions:

Research question 1. What percent of the Asian American sample has a usual source of healthcare? Is there a difference in health care access across the three Asian American subgroups?

- Hypothesis 1-- Among Asian American subgroups, Asian Indian Americans will have lower health care access than Chinese- and Filipino Americans.

Research question 2. Is there a gender difference in health care access across three Asian American subgroups?

- Hypothesis 2-- Compared with Asian American men, Asian American women will be more likely to have a USC across three Asian American subgroups. However, compared with Chinese American and Filipino American women, there will be a weak relationship between Asian Indian American women and having a USC.

Research question 3. Is there any relationship between the U.S. citizenship status and health care access across the three Asian American subgroups?

- Hypothesis 3 -- U.S. citizenship status will be significantly related to having a USC among Chinese Americans. However, there will be no relationship between having a USC and Filipino Americans and Asian Indian Americans.

Research question 4. How does the duration of stay in the U.S. (nativity status) is associated with health care access across the three Asian American subgroups?

- Hypothesis 4 – Foreign-born Filipino Americans who have lived in the U.S. for less than five years will be less likely to have a USC compared with their U.S.-born counterparts. The relationship will be stronger among Filipino Americans than among Chinese Americans and Asian Indian Americans.

Research question 5. What are the relative impacts of predisposing, enabling, need, and acculturation variables on having a USC across the three Asian American subgroups?

- Hypothesis 5 --While predisposing, enabling, need variables are associated with having a USC, acculturation variables will still explain variations in having a USC across three Asian American subgroups.

DATA AND METHOD

Research Subjects

For this study, NHIS data from 2011 to 2015 were combined to ensure an adequate sample size among three Asian American subgroups. There were a total of 820,479 adult respondents ages 18 to 64 across all years examined. Respondents above the age of 64 were not included because they are entitled to receive public benefits (such as Medicare), which can impact health care access. Exclusions were also made for any respondents who selected the Asian subgroup as their ethnicity ($n=72$). The sample size for analysis thus consisted of 5,400 adult Asian Americans. Asian ethnic subgroups in this study included Chinese Americans ($n=1,849$), Filipino Americans ($n=1,681$), and Asian Indian Americans ($n=1,870$). The all-Asian group includes aggregated data for the three Asian American subgroups.

The NHIS, conducted continuously since 1957, is an annual cross-sectional, nationally representative survey of the U.S. institutionalized civilian population that uses a multistage area probability sampling design (NCHS, 2019). It is conducted continuously throughout each survey year by the National Center for Health Statistics of the Centers for Disease Control and Prevention. The NHIS is redesigned every ten years, and the major revisions to the survey questionnaires were made in 1982. Our pooled datasets followed the same survey design allowing consistencies in self-reported responses of the survey participants.

The Sample Adult Questionnaire contains questions on the usual source of care. The questions were administered to one randomly selected adult aged 18 or older from each household (Lynn et al., 2019).

Measures

The variables described in this section were organized by the domains of ABM that were thought to influence Asians' usual source of care: predisposing, enabling, and need factors.

Dependent Variable

The dependent variable was a self-reported usual source of care (USC), a commonly used measure in the literature to examine health care access in Asian American population using the NHIS data (Manuel, 2018; Shi et al., 2009; Vargas Bustamante et al., 2009; Witt et al., 2009; Ye et al., 2012). We dichotomized the dependent variable whether respondents had a USC or not.

To determine if they had an appropriate USC, the NHIS asked respondents two questions, "Is there a place that you usually go when you are sick, or you need advice about your health?" and if yes, "What kind of place is it - a clinic, doctor's office, emergency room, or some other place?" Respondents were classified as having a USC if they responded yes to the first question and who reported their usual place of health care other than an emergency room visit. Respondents were classified as not having a USC if: 1) they responded that they have a place that they usually go for care, or 2) said "yes," they have a USC but reported that they obtained this care in the emergency room. If participants responded positively to the emergency room visits, they were not considered to have a USC. Participants who visited the emergency room only as their USC do not have a specific service provider for better coordinated and continued health care services (Chang et al., 2014; Manuel, 2018; Pitts et al., 2010). Past studies that used another

population-based survey (i.e., California Health Interview Survey) examined health care access asking similar questions to the respondents (Ponce et al., 2006).

Independent Variables

The Andersen behavioral model is a conceptual framework that conceives access to health care as a function of three main factors: predisposing factors, enabling characteristics, and a need factor. Based on the Andersen behavioral model, independent variables that are potentially related to having a usual source of health care were selected and grouped into predisposing, enabling, and need factors. We used two acculturation measures, which are social or structural determinants of health care access, integrated into the model as crucial drivers of differences in having a usual source of care among Asian American subgroups (Chang & Chan, 2016; Chang et al., 2015).

Predisposing Variables

The first set of variables from the ABM are predisposing factors, including race/ethnicity, age, gender, family type, and marital status. We restricted our adult sample to be below 65 years old (U.S. Department of Health & Human Services [DHHS], 2020). Medicare is available for people age 65 or older; therefore, we did not include those respondents who may have better access due to government-sponsored health benefits. Age was measured in consecutive years. The family type was classified into two categories: family with children and family without children. Marital status was classified into three categories: married, never married, or formerly married (widowed, separated, or divorced).

Enabling Variables

The second set of ABM variables were predisposing factors, including educational status, poverty threshold, employment, health coverage, and food security. The educational status was classified as: less than high school graduate/GED recipient, high school graduate/GED recipient, some college degree, or four-year bachelor or an advanced degree. The poverty status of a family group was assigned to each member of the family, thus, including total family income, the number of children in the family, and the age of the family adults. Therefore, the poverty status indicates whether family income was above or below the poverty threshold level. We captured current employment using three categories, including currently employed, unemployed, or not in the labor force. Health coverage (uninsured versus some type of insurance) was derived from responses to the question on the kind of current health coverage sources. The type of coverage included Medicare, employment-based, privately purchased and other public insurance. Those respondents who reported not having any health insurance were categorized as being uninsured.

Need Variable

The need variable was self-rated physical health. We assessed self-rated health conditions of an individual by asking a question, “Would you say that [person’s] health, in general, is excellent, very good, good, fair, or poor?” We created a binary variable by recoding “excellent/very good/good” as “0” and “fair/poor” as “1”. We would consider an individual to be in poor health if their reported health status was fair or poor. In NHIS, a usual source of care was collected only for one randomly selected adult within a sampled household.

Acculturation-related Variables

Acculturation variables were citizenship status and duration of stay in the US. Citizenship status was indicated by a dummy variable coded “1” for those who had U.S. citizenship status and “0” for non-U.S. citizenship status. We also controlled for the nativity. Nativity was defined as whether or not the respondent was born in the United States. Individuals born in a U.S. territory were included in the foreign-born category (Mui et al., 2018). Among the foreign-born Asians, we categorized the duration of stay in the U.S. as “living less than 5 years in the U.S.,” “living in the U.S. for 5-14 years,” and “living 15 years or more in the U.S.” Previous studies classified the duration of stay in the U.S. into four categories: recent immigrants, mid-tenure immigrants, and long-tenured immigrants (Chang & Chan, 2016; Chang et al., 2014). In multivariate models, U.S.-born was treated as the referent group because the association between log odds of USC and the four categories was approximately linear. We used it as a 15-year cut-off for two reasons. First, we like to ensure more balanced sample sizes. The sensitivity analyses using the 10-year cut-off did not reveal significant differences in the results. Second, we assume that a 15-year cut-off could help to capture an increased level of exposure to mainstream cultures. Both U.S. citizenship status and duration of stay in the U.S. could serve as proxy measures of acculturation (Lopez-Gonzalez et al., 2005).

Passage of the 1996 Personal and Work Opportunity Reconciliation Act has put a restriction on immigrants’ access to many public benefits, including (Medicare) (Kaiser Family Foundation, 2000). The law makes a provision of a 5-year duration in which undocumented immigrants and legal immigrants are restricted from receiving any public benefits. Therefore, we consider the lowest cut-off as a 5-year duration in our study.

Statistical Analysis

We first computed weighted frequency distributions to describe the characteristics of all variables. Then, we performed a series of multivariate logistic regression analyses to examine the predictors of having a usual source of health care. To compare the sample characteristics by Asian American subgroups, chi-square tests were conducted for all the categorical variables. The bivariate analysis was stratified by gender. Then, we looked at the effects of the predisposing, enabling, need, and acculturation variables on USC in a series of logistic regression analyses: the model with predisposing variables added (Model 1), the model with enabling variables added (Model 2), the model with need variable added (Model 3), and model with acculturation variables added (Model 4). The logistic regression models were conducted for aggregated all-Asians into a single category. Then, separate logistic regression models were conducted for each Asian American subgroup to understand better unique predictors of having a USC within each subgroup. For the logistic regression models, we assessed the odds ratios (ORs) and 95% confidence intervals (CIs). Data were analyzed using STATA 15.1 and we used *svy* procedures to account for sample stratification and clustering (StataCorp, 2017). We assessed for statistical significance at the .01 and .05 level of significance.

RESULTS

The result section provides detailed sample characteristics, followed by multivariate regression analyses. In addition to examining Asian Americans in the aggregate, we run separate logistic regression analyses for each of the three Asian American subgroups. We present the detailed results that show the associations among the predisposing-, enabling-, need- and acculturation variables and health care access across three Asian American subgroups.

Sample Characteristics

We report weighted descriptive characteristics for the Chinese American, Filipino American, and Asian Indian American subgroups by sex (Tables 1 and 2). Significance tests were based on chi-square and *t*-tests. The participant sample ($N=5,422$) was composed of 1,854 Chinese Americans, 1,877 Asian Indian Americans, and 1,691 Filipino Americans. Table 1 shows that females were more likely to have a USC compared to males across all Asian American subgroups. As summarized in Tables 1 and 2, there were significant differences found in many behavioral model variables across three subgroups. For example, among those (83.40%) who had a USC, almost 46.00% were women, and 37.00% were men. In other words, 16.60% of Asian Americans had no USC. Among those who had no USC, 7.11% were Asian Indian Americans, attributing to the most significant proportion among three subgroups (Chinese, 5.20%, Filipino, 4.40%). This bivariate analysis provides evidence to support the first hypothesis of this study. The average age for both men and women was about 38.46 years old, and Asian Indians were the youngest in the sample population.

Table 1

Weighted Descriptive Statistics for the ABM and Acculturation Variables of Asian American Women: 2011-2015 National Health Interview Survey

Characteristics	Chinese (N=989)			Filipinos (N=980)			Asian Indians (N=842)			P ^a
	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)	
Having a USC	840	87.19	[84.78, 89.27]	847	88.35	[85.12, 90.95]	673	82.36	[78.79, 85.45]	0.011
Had no USC	12.81	12.81	[10.73, 15.22]	133	11.65	[9.05, 14.88]	169	17.64	[14.55, 21.21]	
Predisposing Factors										
Age (years) ^b	994	38.87	12.64	990	41.79	12.44	849	36.14	11.14	0.001
Family with children	342	41.6	[37.7,45.63]	461	50.29	[45.96,54.63]	396	52.21	[47.79,56.6]	
Marital status										
Married	524	65.18	[61.29,68.88]	519	62.15	[57.78,66.34]	592	77.14	[73.07,80.76]	0.000
Widowed/Separated/Divorced	116	8.48	[6.742,10.61]	218	16.25	[13.72,19.15]	65	6.08	[4.326,8.505]	
Never married	351	26.34	[23.26,29.67]	250	21.59	[18.22,25.39]	190	16.77	[13.75,20.29]	
Enabling Factors										
Educational status										
Less than high school	91	11.61	[8.755,15.24]	43	4.33	[2.86,6.532]	34	5.11	[3.35,7.747]	0.000
High school graduate	115	12.8	[10.53,15.48]	158	14.62	[11.98,17.73]	97	11.61	[9.143,14.64]	
Some college degree	177	15.79	[12.76,19.39]	342	34.12	[30.55,37.87]	97	11.61	[9.143,14.64]	
Bachelor's or above	611	59.80	[55.5,63.95]	447	46.92	[42.42,51.47]	635	72.65	[68.4,76.52]	
Employment status										
Employed	642	64.26	[60.61,67.74]	728	73.37	[69.04,77.29]	480	55.97	[51.86,60.00]	0.000
Unemployed	46	4.83	[3.287,7.058]	49	4.21	[2.987,5.922]	47	6.64	[4.669,9.379]	
Not in labor force	306	30.91	[27.24,34.83]	210	22.42	[18.81,26.48]	321	37.38	[33.46,41.48]	
At or above poverty	713	82.56	[78.88,85.7]	845	92.83	[90.52,94.62]	703	90.44	[87.34,92.85]	0.000
Had health coverage	876	88.04	[85.21,90.39]	834	88.28	[85.94,90.27]	754	88.07	[84.69,90.79]	0.989

Need Factor										
Good health status	947	95.65	[94.16,96.78]	908	93.25	[90.96,94.98]	812	94.83	[92.48,96.48]	0.146
Acculturation Factors										
U.S. citizenship status	612	65.40	[61.31,69.28]	771	80.77	[77.12,83.95]	423	46.22	[48.66,58.82]	0.000
Nativity Status										
Less than 5 years	171	13.74	[11.24,16.70]	70	5.67	[4.17,7.64]	221	23.19	[19.16,27.76]	0.000
5-14 years	243	24.29	[21,27.91]	209	21.74	[18.02,26]	266	30.85	[26.94,35.06]	
15 years or more	354	41.3	[37.41,45.31]	388	39.97	[35.36,44.78]	271	37.08	[32.42,42.01]	
U.S.-born	214	20.67	[17.55,24.17]	315	32.63	[27.43,38.26]	85	8.88	[6.744,11.61]	

Note. ^a Denotes significance tests are based on chi-square tests for categorical variables. Results for categorical variables are reported as a proportion of the variable values.

^b Denotes average value of age.

All statistics use NHIS annual weights. Sample sizes are unweighted but percentages are weighted.

** p <.01 and * p <.05.

About 53.10% of Asian American adults were women, similar to U.S. Census estimates (53.40%) (Figure 2) (US Census Bureau, 2019). However, Asian Indians had a higher proportion of men (51.80%). Also, compared with their older men, older women were more likely to be married, insured, and at or above the poverty threshold level. Women were also relatively less likely to have a higher educational status, and they were also less likely to be employed than their male counterparts.

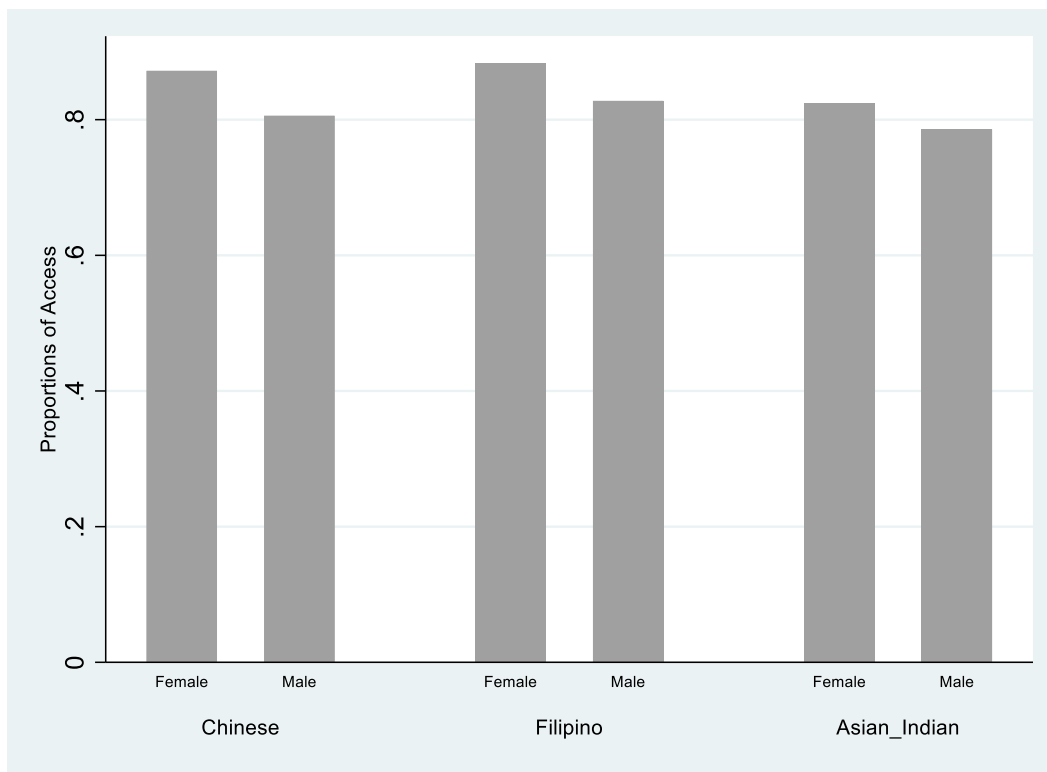


Figure 2. Proportions of a USC among three Asian American subgroups by sex

Table 2

Weighted Descriptive Statistics for the ABM and Acculturation Variables of Asian American Men: 2011-2015 National Health Interview Survey

Characteristics	Chinese (N=860)			Filipino (N=701)			Asian Indian (N=1,028)			P ^a
	n	%	(95% CI)	n	%	(95% CI)	n	%	(95% CI)	
Having a USC	648	80.57	[77.5,83.32]	543	82.78	[79.09,85.93]	743	78.57	[75.47,81.38]	0.173
Having no USC	204	19.43	[16.68, 22.50]	152	17.22	[14.07, 20.91]	277	21.43	[18.62, 24.53]	
Predisposing Variables										
Age (years) ^b	860	37.19	13.39	701	40.41	12.36	1028	36.50	10.75	
Family with children	217	32.52	[28.63,36.67]	251	41.14	[36.74,45.70]	405	49.04	[44.82,53.26]	0.000
Marital status										
Married	397	56.11	[51.10,61.00]	343	56.64	[51.85,61.30]	647	75.3	[71.60,78.67]	0.000
Widowed/Separated/Divorced	45	4.21	[2.96,5.94]	80	8.01	[5.81,10.95]	37	2.5	[1.67,3.71]	
Never married	418	363.97	[34.99,44.55]	278	35.35	[30.71,40.28]	343	22.19	[19.08,25.65]	
Enabling Variables										
Education										
Less than high school	47	7.01	[4.654,10.44]	43	5.51	[3.70,8.13]	33	4.13	[2.72,6.22]	0.000
High school graduate	100	13.67	[10.69,17.33]	140	18.03	[15.06,21.00]	67	7.71	[5.96,9.91]	
Some college	189	20.72	[17.04,24.96]	241	35.66	[31.06,40.54]	103	11.35	[9.00,14.20]	
Bachelor or above	524	58.59	[53.65,63.37]	277	40.8	[35.50,46.32]	825	76.81	[72.97,80.25]	
Employment										
Employed	619	74.24	[69.69,78.32]	549	77.04	[72.80,80.80]	887	87.61	[83.91,90.56]	0.000
Unemployed	47	5.50	[3.839,7.829]	55	8.42	[6.40,11.00]	35	3.84	[2.28,6.40]	
Not in labor force	193	20.26	[16.67,24.39]	97	14.53	[11.19,18.66]	105	8.54	[6.278,11.52]	
At or above poverty	661	85.98	[83.04,88.48]	576	91.99	[89.16,94.13]	858	91.09	[88.46,93.16]	0.001
Had health coverage	747	88.12	[85.06,90.63]	591	87.43	[84.28,90.02]	922	88.8	[86.37,90.84]	0.762
Need Variable										
Good health status	815	94.23	[92.31,95.69]	637	91.02	[87.64,93.55]	985	96.24	[94.63,97.39]	0.000
Acculturation Variables										
U.S. citizenship status	487	63.57	[59.38,67.57]	571	83.98	[80.05,87.26]	456	51.69	[46.55,56.79]	0.000
Nativity status										
Less than 5 years	180	13.59	[10.87,16.85]	41	4.59	[3.05,6.85]	266	18.79	[15.54,22.53]	0.000
5-14 years	192	23.49	[20.31,27.00]	95	12.54	[9.695,16.07]	349	33.83	[29.98,37.92]	

15 years or more	273	35.86	[32.38,39.50]	271	45.54	[39.85,51.36]	303	37.69	[33.33,42.27]
U.S.-born	212	27.06	[23.29,31.19]	289	37.33	[31.81,43.19]	107	9.68	[7.376,12.62]

Note. ^a Denotes significance tests are based on chi-square tests for categorical variables. Results for categorical variables are reported as a proportion of the variable values.

^b Denotes average value of age. All statistics use NHIS annual weights. Sample sizes are unweighted, but percentages are weighted.

** p <.01 and * p <.05.

When stratified by citizenship status, Figure 4 showed that the majority of U.S.-citizens had a USC in all Asian subgroups. Nearly 66.00% had U.S. citizenship (men 30.30%, women 35.40%), and the remaining respondents were non-U.S. citizens (men 16.60%, women 17.60%).

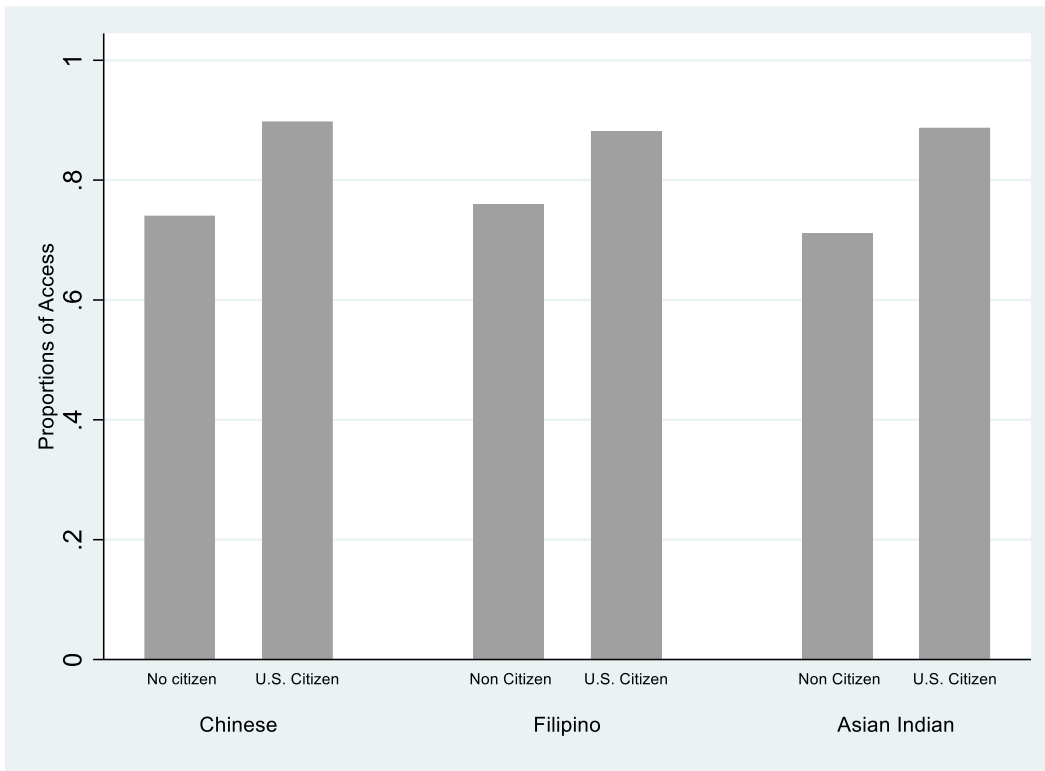


Figure 3. Proportions of a USC among three Asian American subgroups by citizenship status

When stratified by nativity, there were associations between having a USC and place of birth between U.S.-born and foreign-born participants except for health coverage, self-reported health, and psychological distress. Of the total sample, 78.10% of respondents were foreign-born, and the remaining were U.S.-born. Significantly, regardless of nativity status, Asian Indian Americans had lower proportions of a USC compared to their Chinese and Filipino counterparts (Figure 4). Concerning the poverty status of the total sample, the majority (69.70%) of them were foreign-born and also were

at or above the poverty threshold level compared to only 19.40% were U.S.-born and were below the poverty threshold level.

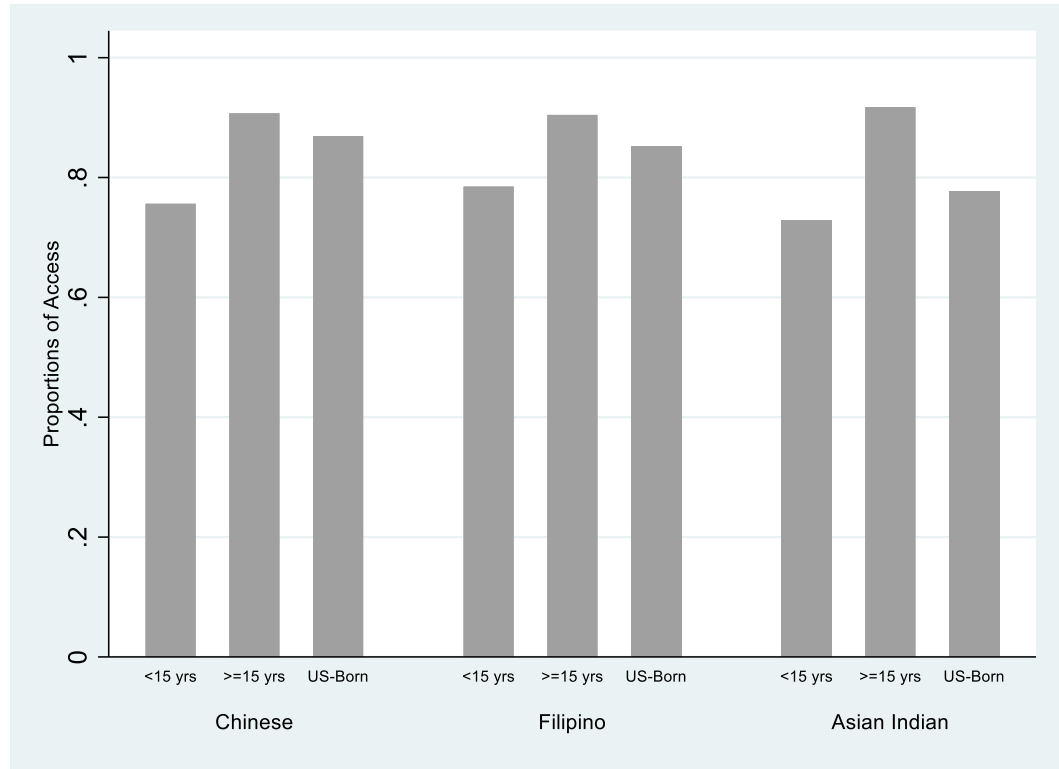


Figure 4. Proportions of a USC among three Asian American subgroups by nativity status

Multivariate Regression Analyses

We now turn to the regression analyses of health care access, first combining three Asian American subgroups and subsequently separated by subgroup. Tables 3-7 show logistic regression models examining the main effects of the ABM and acculturation variables on health care access.

Factors Associated with Usual Source of Care

After ensuring that multicollinearity did not exist, a series of tables show the results of logistic regressions in which predisposing, enabling, need, and acculturation variables were entered into models simultaneously for three subgroups independently. Table 3 presents results from logistic regression models that compared having a USC by aggregating three Asians into a single category, with the Chinese as the reference group. Based on unadjusted estimates, Asian Indian Americans were less likely to have health care access than Chinese and Filipino Americans supporting hypothesis 1. Our bivariate analyses also indicate that Asian Indian Americans had the lowest proportions of having a USC. After we controlled for the ABM and acculturation variables, being an Asian Indian American was associated with 22.40% lower odds of having a USC (OR=.78; 95% CI= .61-.99, $p<.05$) when compared with Chinese Americans. Older Asian Americans were more likely to have a USC (OR= 1.05; 95% CI=1.04-1.07) compared with younger counterparts. Asian American women were at 50.20% greater odds of having a USC (OR=1.49; 95% CI=1.23-1.81) compared to male counterparts.

Similarly, families with children was associated with 56.10% greater odds of having a USC (OR=1.56; 95% CI=1.11-2.18) compared with families who had no children. Unsurprisingly, being insured was associated with a positively increased odds of having a USC compared with uninsured Asian Americans after controlling for the ABM and acculturation variables in Model 3. Having health coverage was associated with much better access to care for all Asian American subgroups. Finally, U.S. citizenship was found to be a positive predictor of having a USC. U.S. citizenship was associated with 58.20% greater odds (OR=1.58; 95% CI=1.11-2.25) of having a USC

compared to those who had no U.S. citizenship after controlling for the ABM and acculturation variables. Shorter duration of stay in the U.S. was found significantly associated with having poor health care access among Asian Americans. Among Asian Americans who had lived in the U.S. for less than five years had 55.30% lower odds (OR=0.45; 95% CI=0.28-0.72) of having a USC compared with those who lived longer in the U.S. supporting hypothesis 4.

Table 3*Factors Associated with Health Care Access Among Three Asian American Subgroups: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3		Model 4	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Predisposing Variables								
Ethnic group (vs. Chinese)								
Filipino	1.03	(0.83 - 1.29)	0.93	(0.72 - 1.20)	0.93	(0.72 - 1.20)	0.84	(0.64 - 1.09)
Asian Indian	0.72**	(0.58 - 0.89)	0.70**	(0.55 - 0.90)	0.70**	(0.55 - 0.90)	0.78*	(0.61 - 0.99)
Age (years)	1.05**	(1.04 - 1.07)	1.06**	(1.05 - 1.07)	1.06**	(1.05 - 1.07)	1.04**	(1.03 - 1.06)
Female (vs. male)	1.39**	(1.19 - 1.62)	1.49**	(1.23 - 1.80)	1.50**	(1.24 - 1.81)	1.49**	(1.23 - 1.81)
Family with children (vs. no children)	2.04**	(1.52 - 2.75)	1.52*	(1.08 - 2.12)	1.51*	(1.08 - 2.12)	1.56*	(1.11 - 2.18)
Marital status (vs. married)								
Widowed/Separated/Divorced	0.53**	(0.38 - 0.73)	0.9	(0.62 - 1.31)	0.89	(0.61 - 1.30)	0.76	(0.51 - 1.11)
Never married	0.79	(0.63 - 1.00)	0.89	(0.67 - 1.17)	0.89	(0.67 - 1.17)	0.75*	(0.57 - 0.99)
Enabling Variables								
Education (vs. < high school)								
High school or equivalent			1.23	(0.77 - 2.01)	1.29	(0.78 - 2.14)	1.11	(0.67 - 1.83)
Some college			1.16	(0.73 - 1.89)	1.2	(0.74 - 1.94)	0.98	(0.61 - 1.58)
College or more			0.88	(0.60 - 1.36)	0.95	(0.61 - 1.50)	0.91	(0.58 - 1.43)
Employment (vs. employed)								
Unemployed			0.63	(0.39 - 1.03)	0.63	(0.38 - 1.03)	0.61*	(0.38 - 0.98)
Not in the labor force			0.85	(0.68 - 1.07)	0.84	(0.67 - 1.05)	0.92	(0.73 - 1.15)
At or above poverty (vs. poor)			1.47**	(1.11 - 1.94)	1.47**	(1.12 - 1.95)	1.30	(0.99 - 1.72)
Had health insurance (vs. no)			9.91**	(7.50 - 13.08)	9.91**	(7.50 - 13.1)	9.06**	(6.89 - 11.91)
Need Variable								
Poor health (vs. good)					1.27	(0.78 - 2.06)	1.13	(0.69 - 1.85)
Acculturation Variables								
U.S. citizen (vs. non-U.S. citizen)							2.05**	(1.50 - 2.82)
Nativity status (vs. U.S.-born)								
Less than 5 years							0.45**	(0.28 - 0.72)
5-14 years							0.92	(0.61 - 1.39)
15 years or more							1.17	(0.82 - 1.67)

Note. Model 1 controls for the predisposing factors; Model 2 controls for the enabling factors; Model 3 controls for the need factor;

Model 4 controls for the acculturation variables. All models are appropriately weighted.

The sample sizes vary due to nonreporting of the dependent variable.

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

Tables 4-6 show the results of the logistic regression models. In each subgroup, we conducted logistic regression analyses for each of the ABM and acculturation variables in four different steps. Starting with the Chinese American subgroup, regression analyses demonstrated that age, gender, family type, poverty threshold level, health coverage, and citizenship status variables had significant relationships with having a USC as shown in Table 4. All of these significant variables had strong positive relationships with USC. After controlling for the predisposing factors in Model 1, older Chinese Americans were more likely to have a USC compared to younger Chinese Americans. Similarly, female Chinese Americans were over one and a half times more likely to have a USC than male counterparts (OR=1.57; 95% CI=1.20-2.05). Among the Chinese Americans who had children had higher odds (OR=1.83; 95% CI=1.08-3.09) of having a USC compared to their families who had no children. However, we found a negative association between marital status and having USC. With regards to marital status, only the widowed or separated or divorced category significantly differed ($p=.007$), and they had 45.00% lower odds (OR=.55; 95% CI=.28-1.11) of having a USC compared to their married counterparts. We did not find a significant difference between marital status and USC. After adjusting for enabling factors, significant relationships remained for age, gender, poverty label, and health coverage in Model 2. After adding a need variable, earlier significant relationships remained significant. Health coverage, indicative of health care access, was a robust considerable predictor for a USC for Chinese Americans because we found the strongest main effect of being insured on health care access across the models (Table 4). Finally, after adding acculturation variables in Model 4, the U.S. citizenship variable was associated with 129.50% greater odds (OR=2.29; 95% CI=1.46-

3.58) of having a USC compared with those who did not have U.S. citizenship status. Our regression analyses revealed an independent association of U.S. citizenship status with USC among Chinese Americans supporting hypothesis 3. However, the duration of stay in the U.S. was not significantly related to health care access. Since there was a significant relationship between U.S. citizenship status and USC, we looked at the interaction effects of these variables. The multivariate analyses revealed that Chinese American women had consistently better health care access compared with their men counterparts. This finding provides evidence to support the second hypothesis of this study.

Table 4*Factors Associated with Health Care Access Among Chinese American Subgroup: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3		Model 4	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Predisposing Variables								
Age (years)	1.05**	(1.04 - 1.07)	1.06**	(1.04 - 1.08)	1.06**	(1.04 - 1.09)	1.05**	(1.02 - 1.07)
Female (vs. male)	1.57**	(1.20-2.05)	1.72**	(1.24 - 2.38)	1.72**	(1.24 - 2.38)	1.65**	(1.20 - 2.29)
Family with children (vs. no children)	1.83*	(1.08-3.09)	1.35	(0.77 - 2.38)	1.36	(0.78 - 2.39)	1.55	(0.88 - 2.73)
Marital status (vs. married)								
Widowed/Separated/Divorced	0.55	(0.28-1.11)	0.84	(0.42 - 1.68)	0.82	(0.41 - 1.64)	0.63	(0.30 - 1.33)
Never married	0.93	(0.64-1.36)	1.09	(0.64 - 1.84)	1.09	(0.65 - 1.84)	0.91	(0.55 - 1.50)
Enabling Variables								
Education (vs. <high school)								
High school or equivalent			1.24	(0.56 - 2.72)	1.25	(0.57 - 2.72)	1.03	(0.48 - 2.24)
Some college			1.29	(0.66 - 2.50)	1.28	(0.66 - 2.48)	0.98	(0.51 - 1.86)
College or more			0.88	(0.49 - 1.56)	0.88	(0.49 - 1.58)	0.75	(0.42 - 1.34)
Employment status (vs. employed)								
Unemployed			0.52	(0.20 - 1.30)	0.52	(0.21 - 1.30)	0.53	(0.22 - 1.27)
Not in the labor force			0.80	(0.53 - 1.20)	0.79	(0.52 - 1.20)	0.89	(0.59 - 1.34)
At or above poverty (vs. poor)			1.82**	(1.19 - 2.79)	1.81**	(1.18 - 2.79)	1.54*	(1.00 - 2.35)
Had health coverage (vs. no)			12.13***	(7.53 - 19.56)	12.16**	(7.52 - 19.64)	11.88**	(7.48- 18.87)
Need Variable								
Poor health (vs. good)					1.25	(0.54 - 2.92)	1.11	(0.45 - 2.74)
Acculturation Variables								
U.S. citizen (vs. non-U.S. citizen)							2.29**	(1.46 - 3.58)
Nativity status (vs. U.S.-born)								
Less than 5 years							0.51	(0.26 - 1.01)
5-14 years							0.94	(0.47 - 1.89)
15 years or more							1.04	(0.54 - 2.02)

Note. Model 1 controls for the predisposing factors; Model 2 controls for the enabling factors; Model 3 controls for the need factor; Model 4

controls for the acculturation variables. All models are appropriately weighted. The sample sizes vary due to nonreporting of the dependent

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

Turning to the Filipino American subgroup, regression analyses demonstrated that age, gender, marital status, and health coverage had significant relationships with USC as shown in Table 5. Nativity status was significantly associated with having a USC among Filipino Americans. Filipinos who had lived for less than five years in the U.S. were less likely to have a USC compared with their U.S.-born counterparts. However, no difference was found between U.S. citizenship and having a USC.

Our regression analyses demonstrated the main effects of the ABM and acculturation variables regarding the Filipino American subgroup. After adjusting for predisposing variables, as age increased, access to health care also increased among Filipino Americans, suggesting that young adult Filipino Americans were less likely to have better access (OR=1.04, 95% CI=1.02-1.06). Relating to gender difference, Filipino women had 58.00% greater odds (OR=1.58; 95% CI=1.06-2.35) of having a USC than Filipino men. In the marital status variable, women who were widowed or separated or divorced had 62.00% lower odds (OR=0.38; 95% CI=0.22-0.65) of having a USC compared to married counterparts. Similarly, women who were never married had 44.10% lower odds (OR=0.56 95% CI=0.34-0.92) of having a USC compared to their married counterparts. After entering a set of enabling variables, significant relationships remained in Model 2 as well. Among enabling variables, being insured had a strong relationship with having a USC. For example, Filipino Americans, who had health coverage had 989.20% greater odds (OR=10.80; 95% CI=7.08-16.47) of having a USC than those who were uninsured. In Model 3, poor health status was not significant, and the model did not improve the relationships between a set of variables and USC. Finally, we added acculturation variables in Model 4. The model did not improve the

relationships between a set of ABM variables and having a USC. We found mixed results as we entered acculturation variables. For example, U.S. citizenship status was nonsignificant, whereas the duration of stay in the U.S. demonstrated a significant relationship with having a USC.

The regression analyses showed that acculturation variables were not strong enough to explain variations in having a USC among Filipino Americans. Among Filipino Americans who had lived in the U.S. less than five years were less likely to have a USC than those individuals who were U.S.-born (OR=0.32; 95% CI=0.12-0.84). However, our analyses did not reveal significant associations of the other categories of duration of stay in the U.S. with having a USC. Looking across the regression analyses, age, gender, health insurance coverage, and duration of stay in the U.S. showed significant relationships with health care access. The results showed that the enabling domain of the ABM framework has weak predictors of health care access whereas the predisposing domain has relatively better predictors of health care access among Filipino Americans. As we expected, there was a gender difference in health care access. Filipino women consistently had better health care access than Filipino men supporting hypothesis 2. As we expected, the regression analyses demonstrated that there was an association between the duration of stay in the U.S. and health care access among Filipino Americans. Those who had lived in the U.S. for less than five were less likely to have a USC compared with U.S.-born counterparts. Such a relationship did not find in the other two Asian subgroups supporting hypothesis 4.

Table 5*Factors Associated with Access to Health Care Among Filipino American Subgroup: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3		Model 4	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Predisposing Variables								
Age (years)	1.04**	(1.02 - 1.06)	1.05**	(1.02 - 1.07)	1.05**	(1.02 - 1.07)	1.05**	(1.02 - 1.07)
Female (vs. male)	1.58*	(1.06 - 2.35)	1.65*	(1.05 - 2.60)	1.66*	(1.05 - 2.63)	1.77*	(1.12 - 2.79)
Family with children (vs. no children)	0.93	(0.58 - 1.51)	0.87	(0.48 - 1.57)	0.87	(0.48 - 1.57)	0.85	(0.47 - 1.55)
Marital status (vs. married)								
Widowed/Separated/Divorced	0.38**	(0.22 - 0.65)	0.57	(0.35 - 1.28)	0.57	(0.35 - 1.05)	0.53	(0.33 - 1.19)
Never married	0.56*	(0.34 - 0.92)	0.7	(0.37 - 1.30)	0.71	(0.37 - 1.24)	0.62	(0.31 - 1.13)
Enabling Variables								
Education (vs. <high school)								
High school or equivalent			1.34	(0.51 - 3.50)	1.37	(0.54- 3.49)	1.41	(0.56 - 3.53)
Some college			1.1	(0.48 - 2.55)	1.14	(0.52 - 2.49)	1.23	(0.56 - 2.70)
College or more			1.63	(0.68 - 3.93)	1.69	(0.73 - 3.89)	1.95	(0.87 - 4.37)
Employment (vs. employed)								
Unemployed			1.08	(0.52 - 2.23)	1.07	(0.52 - 2.21)	0.98	(0.48 - 2.03)
Not in the labor force			1.37	(0.81 - 2.32)	1.36	(0.80 - 2.29)	1.43	(0.83 - 2.45)
At or above poverty (vs. poor)			0.68	(0.36 - 1.28)	0.69	(0.37- 1.29)	0.7	(0.37 - 1.31)
Had health coverage (vs. no)			10.80**	(7.08 - 16.47)	10.77**	(7.08-6.40)	9.24**	(6.00- 14.23)
Need Variable								
Poor health (vs. good)					1.19	(0.51 - 2.79)	1.10	(0.46 - 2.64)
Acculturation Variables								
U.S. citizen (vs. non-U.S. citizen)								
Nativity status (vs. U.S.-born)								
Less than 5 years							0.32*	(0.12-0.84)
5-14 years							0.81	(0.37-1.79)
15 years or more							0.88	(0.53-1.45)

Note. All statistics use NHIS annual weights. All models are appropriately weighted. The sample sizes vary due to nonreporting of the dependent variable. Model 1 controls for the predisposing factors; Model 2 controls for the enabling factors; Model 3 controls for the need factor; Model 4 controls for the acculturation variables.

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

Turning to the Asian Indian American subgroup, regression analyses demonstrated that age, gender, family type, employment status, poverty status, and health coverage variables had significant relationships with having a USC, as shown in Table 6. Some predisposing variables showed significant relationships with having a USC. As we expected, our results indicated that the association between Asian Indian American women and having a USC was inconsistent and weak. This result provides evidence to support the second hypothesis of this study. Among enabling variables, except the educational status variable, all variables demonstrated significant associations with having a USC. Overall, acculturation variables showed mixed and unstable relationships with a USC among Asian Indian Americans.

After adjusting for predisposing factors, older Asian Indian Americans were more likely to have USC compared to young adults (OR=1.06; 95% CI=1.05-1.08). Similarly, Asian Indian Americans who had children were over three times more likely (OR=3.25; 95% CI=2.21-4.77) to have a USC compared with those families who did not have children. After adjusting for enabling factors, significant relationships were found among age, gender, family type, poverty level, and health coverage in Model 2. The nonsignificant gender variable in the previous model became significant after adding enabling factors. For example, Asian Indian women had 54.60% greater odds (OR=1.46; 95% CI= 1.04-2.05) of having a USC than men counterparts. In addition, Asian Indians who were at or above the poverty threshold label had 84.00% greater odds (OR=1.84; 95% CI=1.08-3.12) of having a USC compared to those who were below the poverty threshold. The significant variables in the previous models remained significant in Model 3 (Table 6). In Model 4, after the addition of acculturation variables, several changes

were noticed. The significant association between gender and access became nonsignificant. Similarly, the significant relationships between poverty threshold and employment status and access disappeared. None of the acculturation variables were significant in Model 4.

Table 6*Factors Associated with Access to Health Care Among Asian Indian American Subgroup: 2011-2015 National Health Interview Survey*

Variables	Model 1		Model 2		Model 3		Model 4	
	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)	OR	(95% CI)
Predisposing Variables								
Age (years)	1.06**	(1.05 - 1.08)	1.06**	(1.04 - 1.09)	1.06**	(1.04 - 1.09)	1.03*	(1.00 - 1.06)
Female (vs. male)	1.22	(0.93 - 1.60)	1.46*	(1.04 - 2.05)	1.46*	(1.04 - 2.06)	1.39	(0.97 - 2.00)
Family with children (vs. no)	3.25**	(2.21 - 4.77)	2.69**	(1.81 - 3.99)	2.69**	(1.80 - 4.00)	2.38**	(1.58 - 3.58)
Marital status (vs. married)								
Widow/Separated/Divorced	1.13	(0.56 - 2.26)	2.04	(0.83 - 5.01)	2.03	(0.83 - 4.97)	1.63	(0.68 - 3.95)
Never married	0.86	(0.56 - 1.33)	0.83	(0.53 - 1.30)	0.83	(0.53 - 1.30)	0.73	(0.47 - 1.12)
Enabling Variables								
Education (vs. <high school)								
High school or equivalent			1.41	(0.47 - 4.25)	1.41	(0.46 - 4.25)	0.95	(0.32 - 2.84)
Some college			1.75	(0.58 - 5.33)	1.77	(0.58 - 5.42)	0.93	(0.30 - 2.85)
College or more			0.69	(0.25 - 1.92)	0.70	(0.25 - 1.94)	0.51	(0.17 - 1.49)
Employment (vs. employed)								
Unemployed			0.52	(0.22 - 1.21)	0.51	(0.22 - 1.22)	0.48	(0.20 - 1.13)
Not in the labor force			0.65*	(0.44 - 0.96)	0.65*	(0.44 - 0.96)	0.72	(0.49 - 1.06)
At or above poverty (vs. poor)			1.84*	(1.08 - 3.12)	1.85*	(1.09 - 3.15)	1.59	(0.92 - 2.74)
Had health coverage (vs. no)			8.38**	(5.01 - 14.01)	8.40**	(5.02 - 14.05)	8.47**	(5.07 - 14.83)
Need Variable								
Poor health (vs. good)					1.16	(0.51 - 2.65)	1.18	(0.53 - 2.61)
Acculturation Variables								
U.S. citizen (vs. noncitizen)							1.59	(0.89 - 2.84)
Nativity status (vs. U.S.-born)								
Less than 5 years							0.57	(0.25 - 1.33)
5-14 years							1.08	(0.49 - 2.36)
15 years or more							1.99	(0.90 - 4.39)

Note. All statistics use NHIS annual weights. All models are appropriately weighted. The sample sizes vary due to nonreporting of the dependent variable. The sample sizes vary due to nonreporting of the dependent variable.

Model 1 controls for the predisposing factors; Model 2 controls for the enabling factors; Model 3 controls for the need factor; Model 4 controls for the acculturation variables. All models are appropriately weighted.

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

DISCUSSION

The discussion section provides a series of sections including a summary of findings, comparative analysis, implications for public policies and practice, study limitations and implications for future, and the conclusion.

Summary of Findings

Using a large, population-based survey, we examined the extent to which three Asian American subgroups have health care access. Having a USC among these three subgroups was predicted by predisposing factors, enabling characteristics, a need factor, and acculturation variables. Among predisposing factors, age and gender were strong predictors of access to care across three subgroups. Among enabling variables, only health coverage was found to be a strong predictor of health care access across three Asian American subgroups. No difference was found between need variable and health care access in any of the three Asian subgroups. By adding acculturation variables to the Andersen model, the analyses showed inconsistent and mixed results. While the U.S. citizenship status had a strong positive relationship with health care access, the nativity status had a negative relationship with health care access. Furthermore, only a shorter duration of stay in the U.S. was related to health care access. No difference was found between longer duration (more than five years in the U.S.) and health care access when we aggregated all Asian Americans together. When we disaggregated data into three subgroups, there were inconsistent relationships between predictors and health care access. Age, gender, poverty threshold, health coverage, and U.S. citizenship status were significant predictors of health care access among Chinese Americans. Similarly, age,

gender, health coverage, and nativity status were significant predictors of having a USC among Filipino Americans. Among Asian Indian Americans, age, gender, family type, employment status, poverty threshold, and health coverage were significant predictors of having a USC. None of the acculturation variables were related to USC which was related to among Chinese and Filipino Americans. Family with children and employment status were significantly associated with health care access among Asian Indians which were nonsignificant among Chinese and Filipinos. Out of two acculturation variables, U.S. citizenship status was related to USC among Chinese Americans whereas nativity status was related to USC among Filipino Americans.

These findings provide evidence to partially support the fifth hypothesis of this study that age, gender, family type, employment status, poverty threshold, and health coverage were significantly associated with health care access, U.S. citizenship status and nativity status also partially explained variations in access across three Asian subgroups. However, the associations were different for specific Asian subgroups. Nevertheless, our results support the application of the Andersen behavioral model in explaining variations in USC and demonstrating heterogeneity in the patterns of ethnic-specific factors associated with USC in different Asian American subgroups. Investigations that focus on the health care access of Asian subgroups should consider the unique experiences of different ethnic groups that have typically been absent in past investigations on USC. The fact that a large number of Asian immigrants are foreign-born and non-U.S. citizens with Asian heritage also suggests that such studies should consider cultures of countries of origin in addition to gendered roles.

Comparison with Previous Studies

The following six sub-sections provide a detailed comparison between our empirical analyses and the literature.

Ethnic variation in health care access

As hypothesized, our findings demonstrated patterns of associations for having a USC varied by Asian American subgroups, validating the importance of disaggregating Asian Americans to examine health care access. The results of the bivariate analysis also support the variations in having a USC by Asian American subgroups. Consistent with the previous studies (Chang et al., 2014; Lee et al., 2014; Luo & Wu, 2016), we found differences in having a USC across Asian American subgroups. This study finding provides evidence to support hypothesis 1. Among the three Asian American subgroups, the Asian Indian Americans had the lowest prevalence of health care access. Unlike Asian Indian and Chinese Americans, Filipino Americans had no significant relationship with USC, indicating that there may be unmeasured factors that should be explored in future research. As observed in the bivariate analysis, Asian Indian Americans (19.61%) were much more likely to not have a USC than their Chinese- and Filipino American counterparts (15.82% and 14.03%, respectively). Luo and Wu (2016) found that Asian Indian Americans had significantly lower dental service utilization than Filipinos ($p < .05$). The same study showed that Filipinos (OR=1.61, 95% CI=1.14, 2.28) were more likely to have a dental visit than Chinese adults. The low proportion of having a USC among Asian Indian Americans may indicate an ethnic variation in having a USC between Chinese American and Asian Indian American subgroups.

Some important explanations come to mind in response to the finding that the Asian Indian American subgroup was associated with poor USC. One possible explanation for low USC among Asian Americans might be their social stigma and traditional health beliefs (Chang & Moon, 2016). It is possible that Asian Indian Americans are reluctant to use healthcare services in the U.S. because they are concerned about the lack of cultural understanding of Asians by service providers (Shon & Townsend, 2019). The perceived cultural insensitivity of the health care system may be a barrier to having a USC. Consequently, many Asian Indian Americans who have strong traditional health beliefs (Tran et al., 2018) may look for help from a variety of sources, including self-care, traditional medicine, and biomedical approaches (Misra & Hunte, 2016; Misra & Gupta, 2004). Traditional treatment may not need a regular source of health care that may lessen to having a USC. According to Chang and Moon (2016), Asians with limited English proficiency may also not seek help from formal services, thus avoiding the embarrassment of communication difficulties when in need, which means that culture profoundly influences the understanding of modern health care services. Another study that examined linguistic disparities in USC found that limited-English proficient adults had worse access to health and health status compared with those who had spoken English only (Ponce et al., 2006). Similarly, Shi et al.'s (2009) study examined the impact of English language proficiency on access to medical care, accounting for health and SES using nationally representative data. The same study found a significant relationship between limited English proficiency and health care visits. Health care visits might also vary depending on immigration patterns. For example, those who immigrated for educational opportunities or because of technical skills might have a

different perspective on health-seeking behavior than those who immigrated to the United States based on family reunification (Gor et al., 2019). Further study is needed to investigate the type of barriers to seeking health care services experienced by Asian Indian Americans based on their immigration status. However, there is a limited national population-based survey that disaggregated the Asian Indian subgroup. The California Health Interview Survey (CHIS), the nation's largest state health survey on various racial and ethnic groups, puts Asian Indians under a "South Asian" category (UCLA Center for Health Policy Research, 2020).

Another potential explanation of having a lower USC among Asian Indians could be racial discrimination while seeking health care services. The majority of them are foreign-born who may be more responsive to discrimination (Misra & Hunte, 2016). Our bivariate data analyses showed that the majority of the Asian Indians are foreign-born and younger than Chinese and Filipino Americans. Misra and Hunte (2016) found that young Asian Indian Americans perceived more significant discrimination in the health care system compared to older counterparts. Consequently, it may be that younger Asian Indian immigrants could be less likely to interact with the American health care system, in turn, leading to the underutilization of health services. Thus, it is essential to focus on the potential consequences of perceived discrimination in health care settings because perceived health care discrimination can increase the likelihood of chronic illness.

Similarly, low health care access among Asian Indian Americans might be related to the higher number of recently arrived Asian Indian immigrants in the United States. Our data demonstrated that nearly 46.00% of the Asian Indian Americans had lived in the U.S. for less than five years. It is possible that the recently arrived immigrants might have

experienced difficulty obtaining health care access due to a lack of knowledge of the U.S. health care system (Cheng et al., 2017). In addition, the 1996 Personal and Work Opportunity Reconciliation Act has put a restriction on access to health care services to immigrants. According to the 1996 Act, if foreign-born individuals could not reach a provision of the 5-year residency requirement in the United States, they are not entitled to get government-sponsored health care benefits (Khullar & Chokshi, 2019). Thus, future research is needed to examine how such policy influences USC among Asian immigrants in the United States.

Gender differences in health care access

Our results corroborate previous research in the significant and positive association between gender and having a USC, indicating that females have better health care access, even after controlling for the potential effects of the ABM and acculturation variables. The gender patterns that we examined across all American subgroups were significantly associated with having better health care access supporting hypothesis 2. Similar to other studies (Manuel, 2018; Merzel, 2000; Ray-Mazumder, 2001; Vaidya et al., 2012; Ye et al., 2012), results from our multivariable analyses suggest that females had better access to health care services than male counterparts. The same relationship was found among the general U.S. population as well (Vaidya et al., 2012). The same study found that men had lower odds of using blood pressure checks, cholesterol checks, dental checks, and flu shots. The same study reported that women used more preventive care utilization than men. Another study that examined health care access using the 2006-2014 National Health Interview Survey data identified that Asian men had the lowest rate of mental health visits than any other group (Manuel, 2018). Along the same line of

thought, Ray-Mazumder (2001) found that female Chinese were more likely to seek preventive care and to get regular check-ups than their male counterparts. Similarly, Ye et al. (2012) examined USC among Asian Americans using the NHIS dataset, and they found that women were more likely to report having access to routine (OR=1.62; 95% CI=1.34-2.26) or sick care (OR=1.62; 95% CI=1.24-2.11) than men. Gender differences in health care access may be related to reproductive biology and health conditions specific to one's gender (Manuel, 2018; Ye et al., 2012). Ye and colleagues (2012) found that the increased amount of the use of health care services by women was mostly due to seeking pregnancy and child-bearing care. Additionally, Asian American women demonstrated their willingness to seek care for sickness and prevention than men (Lasser et al., 2006; Merzel, 2000).

Effects of citizenship status in health care access

Previous literature regarding associations between acculturation-related factors and having a USC is mixed (Lebrun, 2012; Lee et al., 2014; Ye et al., 2012). Our results demonstrated that the U.S. citizenship status and nativity had the opposite effect on having a USC. While the U.S. citizenship status had a strong positive relationship with having a USC, the nativity status had a negative relationship to access. When we aggregated all Asians together, we found that U.S. citizens had over two times higher odds of having a USC than non-U.S. citizen counterparts, which is consistent with previous studies (Chang et al., 2015; Ku & Matani, 2001; Shon & Townsend, 2019; Yu et al., 2004). Ku and Matani (2001) found that noncitizen adults were less likely to have a usual source of care than native citizens were. The native citizens were more likely to have Medicaid coverage, job-based insurance coverage compared with noncitizens.

Another study that examined the relationship between acculturation and health care access identified that U.S. citizens had better health care access among the aggregated Asian American sample (Chang et al., 2015). Additionally, Chang and colleagues (2015) found better health among Chinese Americans who had U.S. citizenship status. Consistent with the previous studies, our analysis demonstrated that Chinese Americans who had U.S. citizenship status had frequent USC. The finding provides evidence to support hypothesis 3. One possible explanation could be related to health status of individuals. We speculate that Chinese Americans who had U.S. citizenship status might have poor health status. According to Ye and colleagues (2012), individuals in poorer health were more likely to use different kinds of health care services. However, we did not find statistically significant relationships among Filipino American and Asian Indian American subgroups and health care access. Shon and Townsend (2019) found that noncitizens who had two and a half times higher odds of never having a mammogram than U.S. citizens, suggesting a lack of familiarity with the U.S. health care system. Even after controlling for poverty status, educational status, English proficiency, and a number of years lived in the U.S., the same study reported a significant effect of non-U.S. citizenship on never having a mammogram among Asian Americans. Many noncitizens have a lack of knowledge about the U.S. healthcare system. Since only 21.17% of our sample was U.S.-born, and 68.42% of the foreign-born sample lived in the U.S. for less than fifteen years, the data suggest that most Asian Americans in our study may not be familiar with the U.S. health care system and may have experienced a lack of available public health benefits due to the enactment of a five-year ban. The five-year ban has posed restrictions to many poor Asian families receiving health care benefits. (Khullar &

Chokshi, 2019). In efforts to close a gap in having a USC, based on immigration status, more attention should be directed at the policy level. It appears to be essential to uncover the underlying factors that can cause the vulnerability of noncitizens to having a USC.

Effects of nativity status in health care access

Consistent with the previous findings (Chang et al., 2015; Frisbie et al., 2001; Lebrun, 2012; Luo & Wu, 2016; Nguyen, 2012; Thamer et al., 1997; Ye et al., 2012), the multivariate regression analyses revealed that shorter duration of stay in the U.S. had poor USC compared to U.S.-born counterparts. Among three Asian American subgroups, Filipino Americans who had lived in the U.S. for less than 5 years had less frequent USC compared to their U.S.-born counterparts. The finding of our study provides evidence to support hypothesis 4. According to Nicdao et al. (2015), U.S.-born Filipinos were more likely to seek help. A plausible explanation could be that U.S.-born Filipinos may not stick strongly to Asian cultural norms and their increased level of acculturation may lead them to consider seeking health care services (Kim, 2007; Salant & Lauderdale, 2003). Another possible explanation could be related to discrimination. According to Nicdao and colleagues (2015), recently arrived Filipinos who experienced high levels of discrimination based on phenotype or skin color may be less likely to seek help out of fear that they might experience discrimination in the health care setting.

However, there was no significant relationship between nativity status and having USC among Chinese- and Asian Indian Americans. A longer duration of stay in the U.S. was not significantly different from USC. Chang et al. (2015) found that shorter duration in the U.S. (less than five years) was significantly associated with not having a USC for Asian American adults living in California. The authors utilized an ABM framework to

examine associations between the acculturation factors and key enabling and predisposing factors. Past studies that examined USC among Asian Americans found a nonsignificant relationship between the length of stay in the U.S. and having a USC (Lee et al., 2014). One study that examined health care access using a National Health Interview Survey found that the foreign-born individuals who had lived in the U.S. for less than 15 years were 1.5 to 4.7 times more likely to be uninsured than were U.S.-born individuals (Thamer et al., 1997). One possible explanation of this result is the existence of ethnic enclaves that might facilitate frequent USC (Lee et al., 2004). Future research is needed to examine the effects of neighborhood characteristics and social networks on having a USC among different Asian American subgroups.

Luo and Wu (2016) used data from the 2013-2014 National Health Interview Surveys to examine the associations between acculturation and having a dental visit among Asian immigrants (i.e., Chinese, Filipinos, Asian Indians, and other Asians). The authors found that a longer length of stay in the U.S. could improve immigrants' familiarity with the U.S. healthcare system and increase their health literacy and social support network. Similarly, Frisbie et al. (2001) and Nguyen (2012) found that Asian Americans residing in the U.S. for less than ten years had lower odds of having a USC than did U.S.-born Asian Americans. The lower access to health care among new immigrants who may not know the full array of health services available to them (Wu & Raghunathan, 2019). Similarly, Lebrun (2012) found that a shorter length of stay (less than ten years) had lower rates of access compared with longer duration of stay (10 years or more). Foreign-born Asians reported less use of health care services including office visits, seen/talked to a general doctor, and seen/talked to a medical specialist during the

past year (Thamer et al., 1997; Ye et al., 2012). Additionally, they also prefer to use their traditional treatments such as herbal medicine. Foreign-born Asian Americans are less likely to visit a regular source of medical care because of a perception of little need for Western medicine and health care services (Carreon & Baumeister, 2015; Ye et al., 2012). For example, foreign-born Filipinos, Vietnamese, and other Asians were found to report fewer checkups compared to Chinese immigrants (Carreon & Baumeister, 2015). Thus, addressing these knowledge gaps with useful strategies is vital to reduce disparities in having a usual source of care. Future research should explore whether immigration status influences having a USC among Asian Americans. Length of stay in the U.S. likely represents knowledge of the health care system and other cultural norms. Recently arrived immigrants may mainly be vulnerable because five years must elapse for coverage eligibility for some health programs (i.e., Medicaid) and U.S. citizenship (Frisbie et al., 2001; Thamer et al., 1997). The persistence of disparities in health care suggests considering differences in such barriers, indicating the different policy interventions to address inequities in access to care based on nativity place of birth.

Effect of the ABM and acculturation variables in health care access

Our results showed that the magnitude and significance of the associations among predisposing-, enabling-, need-, and acculturation variables and having a USC varied among Asian American subgroups. Our study found a consistent and significant relationship between age and health care access indicating that the older Asian Americans were more likely to have a USC than their younger counterparts across three Asian American subgroups. Consistent with the previous findings (Shon & Townsend, 2019), young-old respondents had lower odds of never having a mammogram screening than

their older counterparts. Age is an important predisposing variable in an examination of health care access of Asian Americans. To more accurately identify the effect of age on health care access, the life stage when a person migrates to the U.S. seems to play an important role in having a USC (Kao, 2009).

One interesting finding in this study was that families with children were a predictor of better health care access among Asian Indian Americans, but this relationship was not found among Chinese- and Filipino- Americans. Yu et al. (2012) found that Filipino children were more likely not to have had a well-child visit within the past 12 months. One possible explanation for this result may be that Asian Indian Americans had made more doctor visits for their children (Yu et al., 2010). Given that the highest proportions of families with children (40.34%) in Asian Indian Americans, those families need to go for regular doctor visits during pregnancy and child-rearing phase (Ye et al., 2012). Additionally, those with children may seek help from formal services, including regular child wellness visits, immunizations, and other purposes. More research is needed to explore the relationship between family characteristics and USC in Asian Americans.

Overall, we found a weaker contribution of enabling factors to explain variations in having a USC among Asian Americans. Consistent with previous studies (Chang et al., 2015; Chang & Chan, 2016), our results found no differences in having a USC by educational level. In contrast to our previous literature (Shi et al., 2009) that examined the association between SES and health care access among Asian Americans, using the NHIS data, found that higher educational status was associated with greater odds of having a health care visit. Another study that examined the relationship between

educational attainment and health care found that high SES individuals maintained their health advantage due to their knowledge of preventive measures even in the period of recession (Burgard & Hawkins (2014). Along the same line of thought, but to a lesser degree, individuals who were at or above the poverty threshold level had more USC. The literature on economic return suggests that Asian Americans have a lower return of education on income compared with Whites (Chang & Chan, 2016). Therefore, recent Asian immigrants may experience an earning disadvantage despite comparable education levels due to limited U.S. work experience, foreign educational credentials, and limited English proficiency. Therefore, the association normally observed between higher income and having a USC was unexpectedly nonsignificant among Asian Americans in our study. Additionally, past studies have also found similar relationships between income and having a USC (Chang et al., 2014; Ryu et al., 2002). Therefore, SES measures are less critical to having a USC among Asian Americans than in other populations. Instead, the influence of non-financial barriers on having a USC among Asian Americans may warrant closer examination. Further research is needed to examine the association between higher income and not having a USC.

In contrast, the Filipino American subgroup did not have a significant relationship between the poverty threshold and having a USC. Past studies also identified similar findings suggesting that income alone does not adequately explain the observed differences in health care access among Asian Americans (Dhingra et al., 2010). In general, human capital resources, including education and income and health care access, seem to enable individuals to have a broad range of the sources and be actively engaged in information-seeking behaviors (Jang et al., 2018). However, the results from our

multivariate models did not support the independent associations of SES factors and health care access. Interestingly, these resources did not have a positive effect on access among Asian American subgroups. It is important to conduct future research using longitudinal data to examine the effects of SES factors in having a USC among Asian Americans.

Consistent with previous studies (Chang & Chan, 2016; Chang et al., 2015), our results found the positive association between health coverage having a USC among all Asian American subgroups. The association was the most influential association within each model across three Asian American subgroups. Given the significant role of health insurance, we found in this study, the expansion of coverage under the Patient Protection and Affordable Care Act (ACA) should help reduce the persistent disparities in having a USC among Asian Americans (Chang et al., 2015; Yu & Raghunathan, 2019). The main goal of ACA is to provide better access to care, despite race and ethnicity, to those who historically have experienced lower coverage rates and having a USC. However, some studies' results indicate that even though the percentage of insured Asian Americans increased significantly, health care utilization and chronic disease burden did not change significantly (Yu & Raghunathan, 2019). Among enabling variables, only having health coverage had a strong and consistent positive impact on most frequent access to health care across three Asian American subgroups. Although health coverage and having a USC are strongly associated with strongly for all Asian American subgroups, these factors explain only in part the lower rates of having a USC among Asian Indian Americans. Considering the effects of Asian cultures and English language proficiency in health care access among Asian ethnicities (Kandula et al., 2006; Pourat et al., 2010; Ryu

et al., 2002), future research should examine the effects of Asian cultures and health beliefs in having a USC.

Similar to previous studies (Chang et al., 2014; Lebrun, 2012; Ye et al., 2012), the need variable was not associated with having a USC among Asian American subgroups. The lack of association between need and USC has been found in Chang et al.'s (2014) study and suggests that need may not influence having a USC in Asian Americans. Yu et al. (2010) argued that self-reported health status might be affected by different perceptions of health rooted in culture and language specific to Asian ethnicities.

In sum, our investigation was guided by Andersen's health behavioral model which outlines the predisposing, enabling, and need factors that influence Asian Americans' ability to have a USC. Among predisposing variables, race/ethnicity, older age, and female gender are the predictors that influence Asian Americans' likelihood of having more frequent USC across three Asian subgroups. Families with children is another predisposing variable that positively influences the likelihood of having more frequent USC among Asian Indian Americans only. Marriage does not have any significant influence on the likelihood of having a USC in any of the three subgroups. Another domain of the ABM framework consists of a set of enabling resources (e.g., educational status, employment, poverty status, and health coverage) which are the resources/means available to help Asian Americans get access to health care services. However, the results of this study show weak relationships of enabling resources and having a USC. Only health coverage appears to be a strong enabling resource that is available to the majority of Asian Americans to help them having a USC. None of the other enabling resources provide USC among Filipino Americans. However, being at or

above the poverty threshold status allows individuals to have USC among Chinese- and Asian Indian Americans. Employment status is one of the enabling resources which appears to be related to Asian Indian Americans' USC. Asian Indian Americans who had not been in the labor force have less frequent USC. This result indicates that Asian Indian Americans who are actively searching for a job have less frequent USC. The third domain of the ABM framework is the need factor describing the health status of Asian Americans that drive the use of health care services. We added two acculturation variables as a fourth domain to the existing ABM framework to examine how acculturation influences USC across three Asian American subgroups. Our results suggest that the addition of acculturation variables to the ABM framework partly explains the relationship between Asian American subgroups and USC. Both acculturation variables showed strong impacts on health care access when we aggregated all Asians into a single category; however, the disaggregated analyses did not hold a strong impact on USC across three Asian American subgroups. U.S. citizenship positively influenced Chinese Americans' likelihood of having a USC. In contrast, nativity status (who had lived in the U.S. for less than five years) negatively influenced Filipino Americans' likelihood of having a USC. The addition of the acculturation variables in the regression analyses still holds the significantly associated predisposing (gender and age) and enabling variables (poverty threshold and health coverage) in the models. This finding provides evidence to support the fifth hypothesis of our study.

Implications for Public Policies and Practice

Our study holds a number of implications for public policies and practices. The results indicate the importance of disaggregation of Asian Americans into specific ethnic

subgroups. Additionally, this study demonstrates that Asian Americans have heterogeneous USC implicating the need for targeted outreach based on ethnicity and gender. Nevertheless, there is a shortage of disaggregated data, which obscures differences in having a USC among Asian Americans of various national origins. Future policies should consider culturally- and socially- tailored interventions and campaigns to improve USC and improve the health condition and well-being of Asian Americans (Yang et al., 2020), particularly those with the highest prevalence. Thus, the results of our study refine our existing knowledge base to guide policies and strategies while acknowledging the heterogeneity within Asian Americans to reduce health disparities in having a USC.

This study synthesized new evidence that Asian Indian Americans are associated with lower USC, dispelling the model minority stereotype. The model minority stereotypes are beliefs about specific individuals that are based upon the characteristics of the group that the individual belongs to (Lee, 1994). The stereotypes assume Asians achieve universal and unparalleled academic and occupational success (Yi & Museus, 2011). The findings suggest policymakers ought to consider the disproportionate burden of lower USC among Asian Indian Americans carefully indicating that they might be at risk of chronic diseases such as diabetes and heart disease. The majority of them are less likely to improve their lifestyle behaviors unless health service providers reach out to Asian Indian communities with public health education and outreach programs (Misra & Gupta, 2004; Yang et al., 2020). Thus, Asian Indian American communities need to improve their accessibility for prevention and early detection of risk factors and disease prevention. Therefore, social workers and researchers who are working with Asian Indian

communities need to consider the role of culture and traditional health care beliefs. Additionally, it is important to consider the provision of language assistance services to non-English speakers and the promotion of regular training to health care providers who work in doctors' offices. Bilingual community health workers can play a critical role in achieving the goal (Lee et al., 2014; Wu & Raghunathan, 2019) to ensure that they are receiving health services by providing language-appropriate and culturally sensitive education about the importance and availability of having a USC. This practice is an important way by which health care systems could reduce linguistic barriers and improve access to care for vulnerable populations (Ponce et al., 2006).

Our study underscores the importance of gender disparity in having a USC across three Asian American subgroups. This finding may reflect cultural and historical variations in healthcare-seeking behavior (Yu et al., 2010). The differential patterns observed across all Asian American subgroups suggest that health care outreach to Asian ethnic groups should be customized according to their sex. Additionally, efforts aimed at increasing the number of males having a USC should target those with facing cultural barriers to having regular medical services. Thus, it is important to broaden the cultural competency of the health care service providers and social workers who directly serve the local communities. Also, collaborations are also needed among a wide range of stakeholders within the community to reach and educate more people currently without a USC. Therefore, policymakers may speculate that future health care access promotion programs would gear toward ethnic-specific intervention stratified by gender.

The findings also suggest that the higher SES resources of Asian Americans do not demonstrate a positive effect on better access. This finding is not in line of thought

with established research amongst Asian Americans, which provides counterargument for the positive model minority stereotype. The positive stereotype assumes that all Asians have education gradient effects on their health (Ibaraki et al., 2014). It is essential to consider the fact that all Asians are not the same, and the higher educational status may not be advantageous in having a USC. Hence, positive stereotypes are damaging because they base the admired quality solely on group membership instead of individual characteristics (Ibaraki et al., 2014). Policymakers should be cautious with assumptions of positive stereotypes to understand how these stereotypes influence decision making, and then to develop interventions to reduce the impact of these biases.

Another implication of this study is that compared to recent immigrants (i.e., those with low acculturation), earlier immigrants (i.e., those with high acculturation) appear to have a higher prevalence of smoking and alcohol consumption. This suggests that length of residence (a proxy for acculturation) is associated with increased odds of health risk behavior among foreign-born Asian Americans. It is important to identify acculturation factors that have negative impacts on smoking and alcohol consumption in the large and the fastest-growing U.S. immigrant population. Prospective studies are needed to understand better how acculturation influences smoking and alcohol consumption across three Asian American subgroups. Also, public health intervention studies that test tailored strategies to improve lifestyle behaviors across three Asian American subgroups are needed.

Study Limitations and Implications for Future Research

The current study has strengths and limitations that need to be highlighted. The findings of the present study should be considered in the context of several limitations.

First, our study used cross-sectional data, which has limited ability to demonstrate a causal relationship.

Second, the self-reported data used in this study for the assessment of having a USC must be considered a limitation. The accuracy of self-report data may vary by nativity and race/ethnicity (Kandula et al., 2006). However, given the lack of research on this ethnic-specific group, this study makes an essential contribution to USC literature on the Asian American population.

Third, these data rely on respondents' ability to accurately recall their health care service history (Manuel, 2018). Respondents might forget their USC taken in the past.

Fourth, our analysis lacks detailed information about the immigration statuses and geography variables. Thus, naturalized citizens, legal permanent residents, illegal immigrants and nonimmigrants (students, visitors, guest workers, etc.) were all included in the category of foreign-born. Undocumented immigrants may be likely to have more severe needs for health care access (Yu et al., 2010); however, we are unsure how adequately the NHIS represents the conditions of millions of immigrants having this immigration status. According to the Pew Research Center (2019), the number of undocumented immigrants rose from the Asia region from 1,300,000 in 2007 to 1,450,000 in 2017. Furthermore, public health services have eligibility requirements based on immigration status. Therefore, it is essential to consider immigration statuses while researching USC among immigrants.

Fifth, Asian Americans live in different geographic locations of the United States, and each state has its public policy that governs social services to its residents (Agrawal & Venkatesh, 2016). Variation of states' Medicaid expansion and Health Insurance

marketplace Exchange programs are likely to have major impacts on having a USC for low-income Asian Americans (Chen et al., 2016). Future research is needed to include a state identifier as a proxy for the state policy variable to gain a broader perspective on how state policy influences on USC among Asian Americans.

Sixth, a usual source of health care is a crude measure of use and it does not capture visits based on necessity. In addition, unmet health care need is narrowly defined in terms of cost. Other barriers to USC (e.g., social stigma, perceived benefit, transportation, cultural fit) were not included.

Finally, the survey is available only in English and Spanish. Given that our study population was Asian Americans, these data may not fully reflect the experiences of members of this community whose primary or preferred language is not English or Spanish. Using citizenship status and duration of stay in the U.S. as proxies for acculturation may be limited given the various ways to measure the concept (Kim, 2007). Therefore, our results may be conservative, given that language incompetency is a barrier to USC (Yang et al., 2020). The study that used Asian-language versions of the questionnaire can offer an optimal opportunity to reflect the target Asians' linguistic and cultural diversities (Jang et al., 2018). It is equally important to consider previous literature that talks about the measurement of language skills which would be reliable and valid scales but was rarely done due to lack of feasible, standardized assessment tools (Shi et al., 2009).

Despite these limitations, our study adds to the existing literature by examining the relationship between the ABM and acculturation variables and USC in a nationally representative sample. The insights from the current study yield information about the

assessment of how the disparity in having a USC among three Asian American subgroups using the ABM framework partly affected by the addition of acculturation variables. We found racial disparities in having a USC to be significantly related to age, gender, type of family, employment status, poverty threshold, U.S. citizenship status, and duration of stay in the U.S. However, the significant relationships varied by Asian subgroups. These findings suggest that studies examining the USC among Asian Americans should incorporate acculturation factors because they may explain some observed disparities (Chang et al., 2015). More interestingly, we did not find a strong impact of higher SES resources achieved by Asian Indians in having better access to health care. This notion of lower USC among Asian Indians reflects the importance of their health care seeking behaviors and the associated cultural values that affect the rate of the use of health care services.

Conclusion

This study is among the first to examine the usual source of care among the three Asian American subgroups using a population-based nationally representative Asian American population. The study shows existing disparities in USC that persist in the United States. More specifically, the results demonstrate the low health care access rate among Asian Indian Americans and that health disparity is not related to their higher levels of socioeconomic characteristics. Their socioeconomic advantages might not necessarily practice desired health-seeking behaviors associated with better health outcomes. Further reduction in having a USC may impact preventive measures and chronic disease management, which, in turn, may worsen the overall health burden of Asian Americans in the United States. Particularly, given that chronic health conditions

are relatively high among Asian Indian Americans, this study highlights the need to consider Asian Indian Americans in future research that examines the impact of their cultural norms and health belief system. Our study sheds important findings that the cultural context is an important factor that contributes to the low levels of having a USC among Asian Indian Americans. Therefore, we urge public health practitioners to understand health seeking behaviors in diverse cultural contexts among Asian Indian Americans.

Sex, age, and health insurance coverage are the most relevant observable characteristics that explain differences in USC differences among three Asian American subgroups. We also found family type, poverty status, employment status, U.S. citizenship status, and foreign-born nativity status are important predictors of USC among selected Asian American subgroups. Health systems must be poised to address the current and future needs of reducing the gender-based health disparities of a growing population of Asian Americans. Healthy People 2030 identified the goals of reducing disparity in having a USC and understanding how and why ethnic-specific disparities in health care access have been evolving in response to the fast-growing ethnic populations in the United States (Office of Disease Prevention and Health Promotion, 2020). Our results also demonstrate a need for the development of a public health strategy that targets specifically to Asian American men with lower USC. Asian Americans have higher insurance coverage that could not improve USC disparities among Asian Americans. Our study shows that U.S. citizenship status is related to more frequent USC among Chinese Americans and that this advantage extends to better health outcomes. It is important to examine the moderation effect of gender on the association between

citizenship status and USC because our study demonstrates a wide gender gap in having a USC in the Asian American population. Similarly, foreign-born nativity status is related to lower USC among Filipino Americans and that this disadvantage extends to poor health outcomes. Thus, it is crucial to examine the interactive effect of gender on the association between nativity status and USC because our study shows a wide gender gap in USC across Asian American subgroups. To adequately address this issue, it will require joint efforts of policymakers, health care providers, and health practitioners to create more culturally sensitive health education materials about available health services, diseases, and modes of access. More importantly, there is an urgent need for more culturally sensitive health services that are acceptable to the Asian community, probably requiring a collaborating approach of integrating input and guidance from this particular community and patient population. Indeed, having a usual source of care is associated with positive health outcomes, including lower levels of disability, decreased health care costs, and improved control of chronic conditions.

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CONCLUSION

Each of the studies in this dissertation examined the different health conditions of the three most populous subgroups of Asian Americans. We used the same Sample Adult Component of the National Health Interview Survey for our three essays. Study 1 describes various social determinants of health-related to psychological distress among three Asian American subgroups. In Study 2, we analyze different factors associated with current cigarette smoking and alcohol consumption behaviors in the same Asian sample. Study 3 examines how various elements of Andersen's health behavior model predict health care access in three Asian American subgroups. The three studies indicate the importance of disaggregation of Asian Americans into subsamples when assessing their important health conditions.

Study 1 extends the use of social determinants of health framework in the examination of psychological distress among Asian American subgroups. All Asian women are at higher risk of being psychologically distressed than their male counterparts implicating a gendered-pattern disparity on psychological distress in the three Asian American subgroups. Asian Americans have a distinctive set of values and behaviors when it comes to marriage because they place a higher priority on marriage. Among women, Asian Indian American women are more likely to experience psychological distress related to being not in a marital relationship. Traditionally, arranged marriage has been a significant cultural value held by the Asian Indians in the United States (Inman & Tewari, 2003). Many Asian Indian parents feel that girls tend to be more vulnerable to physical sex; therefore, parents do not allow exposing their children to premarital intimacy through dating (Dasgupta, 1998). Along the same line of thought, marriage

outside of the Indian community is seen as reflecting a lack of pride in their own culture (Inman et al., 2011; Dasgupta, 1998). It appears that attitudes on traditional marriage are changing amongst the young Asian Indians who have been gradually shifted towards a more Western, egalitarian view of marriage (Singh & Bhayana, 2015). Those who change their cultural values experience significant stress, and they may not fit well into their families and communities as well (Dasgupta, 1998). Thus, never married Asian Indian American women may be experiencing difficulties in balancing multiple identities between the old traditional views and the new perspective of marriage created in the United States with more of an egalitarian consciousness and awareness of one's rights (Singh & Bhayana, 2015). Consequently, their internal ways of thinking toward their marital life may be conflicted. On the other hand, many of them will never seek counseling. This study is inspired by a concern that Asian Indian Americans have adhered to their traditional cultural values and women's roles in their communities. Therefore, educational and therapeutic interventions are necessary for young Asian Indian Americans contemplating marriage and marriages in distress mainly during the early stage of their contemplation. Interestingly, decisions for marriage are often based on social status and employment status among Asian Indian Americans. Education, employment, food security, and citizenship status constitute a fundamental dimension of structural inequality and important markers of immigrant integration (National Academies of Sciences, Engineering, and Medicine, 2017). These markers define an individual social position which may contribute to a sense of relative deprivation, status insecurity, shame, and anxiety. Consistent with this view, Filipino Americans who have higher educational status are less likely to suffer from psychological distress. Their

higher educational statuses lead to enhance psychosocial resources. Similarly, noncitizens are ineligible to many federal and state government programs. However, U.S. citizens enjoy rights and privileges that are often limited to noncitizens (Gee et al., 2016). Additionally, citizenship constitutes a dimension of social identity which is perhaps especially salient for immigrants (Andreouli & Howarth, 2013). Consistent with this view, the effect of citizenship status is salient for Chinese- and Asian Indian Americans. However, Filipino Americans who have U.S. citizenship status are less likely to suffer from psychological distress. The social identity of being a U.S. citizen may facilitate positive comparisons to a standard of moving forward on the social status, which then reduces negative emotions such as psychological distress (Gee et al., 2016). We did not have a direct measure of social identity. However, and it would be important to measure social identity directly in future research. Our study extends these ideas further by suggesting that the SDH framework provides a comprehensive perspective for understanding psychological distress considering various social structures, contexts, circumstances, and dynamics (Lee & Choi, 2018).

Study 2 provides an answer to our most important research question around the prevalence of smoking and alcohol consumption by Asian American subgroups. Our results provide evidence for the diversity of smoking and alcohol consumption across Asian American subgroups. Among Asian Americans, Filipino Americans have the highest and Asian Indian Americans have the lowest prevalence of smoking and alcohol consumption. Numerous factors help determine the smoking and alcohol consumption, including their age, gender, SES, and citizenship status as well as nativity status. These factors differ substantially among, and even within, ethnic groups. Asian American

women are less likely to smoke and consume alcohol reflecting Asian cultural norms that likely pose more restricted expectations for women's smoking and alcohol consumption (Yeramaneni & Sharma, 2009). Asian Indian American smoking culture seems to be stricter on gendered-patterned whereas Chinese smoking culture tends to be permissible for both men and women. Various SES characteristics partly explain the observed differences in smoking and alcohol consumption. Similarly, U.S. citizenship status and nativity status partly capture the heterogeneity of smoking and alcohol consumption behavior in selected Asian American subgroups. Thus, these lifestyle-related health behaviors appear to be more likely to reflect the predominant attitude of U.S. culture than the Asian heritage cultural attitudes. The important and unexplored area for continued research is related to the Asian cultural norms on smoking and alcohol consumption. Hence, a multisectoral approach is needed to tackle changing healthy lifestyles among Asian Americans targeting by gender.

Study 3 examines what factors affect health care access among the three Asian American subgroups. Andersen's health behavioral model was used to inform health care access in our study. Among the three Asian American subgroups, the Asian Indian Americans report the lowest prevalence of health care access. Despite the high level of insurance coverage status, Asian Indian Americans are less likely to access health care (Huang & Carrasquillo, 2008; Shon & Townsend, 2019) because of social stigma and traditional health beliefs (Chang & Moon, 2016). Additionally, many Asian Indian Americans have a perception of the cultural insensitivity of the health care system and have a concern about the lack of cultural understanding of Asians by service providers (Shon & Townsend, 2019). This may reflect the importance of the effects of Asian

culture in seeking health care services, but NHIS data do not provide enough information to fully investigate this possibility. Females have better health care access among the three Asian American subgroups. The observed gender differences in health care access may be related to reproductive biology and having children in a family (Manuel, 2018; Merzel, 2000; Ye et al., 2012). In addition to gender differences, significant citizenship status and nativity effects are generally found in predicting health care access among the three Asian American subgroups in aggregated data. In the aggregated analysis of all Asians together, U.S. citizenship status has a strong positive impact on obtaining health care access. However, foreign-born Asian Americans have poor access to health care services. Many non-U.S. citizens have a lack of familiarity with the U.S. health care system (Shon & Townsend, 2019). The persistence of this disparity in health care access is often linked to health disadvantages. Racial/ethnic and gender-related health care disparities represent two of five significant dimensions that Healthy People 2020 intends to track (Manuel, 2018; Office of Disease Prevention and Health Promotion, 2010). To fully address this issue, it will require collaborative efforts of policymakers, health care providers, and health educators. In addition to this, it is important to create more culturally sensitive health care services that are acceptable to the specific Asian American subgroups. Future studies, public health policy, and funding resources should consider especially among vulnerable racial/ethnic and gender groups, to determine whether existing efforts under health care reform reduce long-standing disparities.

In closing, the present study provides preliminary evidence of disparities in psychological distress, smoking and alcohol consumption behaviors, and health care access by race and ethnicity among a nationally representative sample of Asian

Americans. Some of these disparities may be related to Asian culture, ethnic identity, and perceived discrimination. Immigration is not a new phenomenon, and the United States has been a nation of immigrants throughout its history. However, until recently, the impact of disaggregated Asian Americans on health conditions received less attention than the aggregated Asian Americans. While the Asian American population is diversifying and increasing, the aggregate data may hide their differences in various health conditions and health care access. With so much focus in the literature on the aggregated Asian Americans' health conditions, disaggregated Asian Americans' health conditions are overlooked by researchers and in policy debates. The National Health Interview Survey allows us to generalize the findings to Asian Americans living in the United States, thereby providing nationally relevant information that may provide benefits to Asian Americans.

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APPENDIX

1. NHIS QUESTIONNAIRE

1. What race or races do you/does consider yourself/himself/herself to be? Please select one or more of these categories.

Enter all that apply, separate with commas.

- 01 White
- 02 Black/African American
- 03 Indian (American)
- 04 Alaska Native
- 05 Native Hawaiian
- 06 Guamanian
- 07 Samoan
- 08 Other Pacific Islander
- 09 Asian Indian
- 10 Chinese
- 11 Filipino
- 12 Japanese
- 13 Korean
- 14 Vietnamese
- 15 Other Asian
- 16 Some other race
- 97 Refused
- 99 Don't know

2. What is your age?

Enter the number for age. AGE reports the individual's age, in years since last birthday. Age is not coded as "unknown" for any persons included in the IPUMS NHIS data.

3. Sex indicates whether the person was male or female.

Are you male or female?

If you don't know or refused to enter your best guess.

- 1 Male
- 2 Female

4. Current marital status:

Are you now married, widowed, divorced, separated, never married, or living with a partner?

- 1 Married
- 2 Widowed
- 3 Divorced
- 4 Separated

- 5 Never Married
- 6 Living with a partner
- 7 Refused
- 9 Don't know

5. Family type, as reported on family record: Possible family types are one adult and no children, multiple adults and no children, one adult and one or more children, and multiple adults and one or more children.

6. Region of residence in the U.S. reports the region of the U.S. where the housing unit containing survey participants was located.

The four regions--Northeast, North Central/Midwest, South, and West--correspond to the U.S. regions recognized by the Census Bureau. Divisions and states included in the four regions are as follows:

Northeast: New England Division (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut) and Middle Atlantic Division (New York, New Jersey, and Pennsylvania)

North Central/Midwest: East North Central Division (Michigan, Ohio, Indiana, Illinois, Wisconsin) and West North Central Division (Minnesota, Iowa, Missouri, North Dakota, South Dakota, Kansas, and Nebraska)

South: South Atlantic Division (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, and Florida), East South Central Division (Kentucky, Tennessee, Mississippi, and Alabama), and West South Central Division (Texas, Arkansas, Oklahoma, and Louisiana)

West: Pacific Division (Washington, Alaska, Oregon, California, and Hawaii) and Mountain Division (Montana, Idaho, Wyoming, Colorado, New Mexico, Arizona, Utah, and Nevada).

7. What is the highest level of school you have completed or the highest degree you have/ has received?

[Note: EDUC reports the highest level of schooling an individual had completed, in terms of completed grades for persons with less than a high school degree, and in terms of degrees attained for high school graduates and those with higher education.]

8. Employment status in the past 1 to 2 weeks (All persons 18 years of age or older)

Which of the following: were you/was doing last week?

Read the answer categories.

- 1 Working for pay at a job or business
- 2 With a job or business but not at work
- 3 Looking for work
- 4 Working, but not for pay, at a family-owned job or business
- 5 Not working at a job or business and not looking for work

- 7 Refused
- 9 Don't know

9. Family-level food security status on the 30-day food security scale

This variable indicates a family's food security status based on their raw score in a 30-day food security scale. Food security statuses include:

- 1 High food security,
- 2 Marginal food security,
- 3 Low food security, and
- 4 Very low food security.

10. Above or below poverty threshold - Total Income and Earnings

This variable indicates whether family income was above or below poverty level. The poverty status of a family group is assigned to each member of the family, thus making POORYN a person-level variable. Poverty status is also calculated for adults who live alone or with persons they are not related to; in such cases, POORYN is calculated based on the individual's income. To determine poverty status, the reported total family income was compared to the U.S. Census Bureau's poverty thresholds for the year in question. These thresholds are based not only on income but also on family size and the number of children under age 18. If the reported family income figure was the same or higher than the poverty threshold for families of that size and age composition, the individual (and all members of the family) was considered "above poverty" and received a code of 1 in POORYN. If the reported family income figure was less than the Census Bureau's poverty cut-off for families of that size and age composition, the individual (and all other members of the family) was classified as "poor" and received a code of 2 in POORYN. Poverty data in IPUMS NHIS and in U.S. government statistics generally are based on a definition established by the Social Security Administration in 1964 and subsequently modified by Federal interagency committees in 1969 and 1980. The Office of Management and Budget's (OMB) Directive 14 prescribes this definition as the official poverty measure for federal agencies to use in their statistical work.

11. General health status of an individual's general health (as self-reported by the person in question or evaluated by a family member) on a five-point (1982 forward).

Would you say health, in general, is excellent, very good, good, fair, or poor?

- 1 Excellent
- 2 Very good
- 3 Good
- 4 Fair
- 5 Poor
- 7 Refused
- 9 Don't know

12. Health Insurance coverage status indicates whether the person currently lacks health insurance coverage.

13. Are you a citizen of the United States:

- 1 Yes, born in one of the 50 United States or the District of Columbia
- 2 Yes, born in Puerto Rico, Guam, American Virgin Islands, or other U.S. territory
- 3 Yes, born abroad to American parent(s)
- 4 Yes, U.S. citizen by naturalization
- 5 No, not a citizen of the United States
- 7 Refused
- 9 Don't know

14. In what country were you/was born?

This variable indicates whether the respondent was born in the United States (i.e., in one of the 50 states or in the District of Columbia). To collect this information, interviewers asked.

15. All persons not born in the United States were asked: About how long have you/has been in the United States?

Study one: Psychological distress

16.1 During the PAST 30 DAYS, how often did you feel...That everything was an effort?

- 1 ALL of the time
- 2 MOST of the time
- 3 SOME of the time
- 4 A LITTLE of the time
- 5 NONE of the time
- 7 Refused
- 9 Don't know

15.2 During the PAST 30 DAYS, how often did you feel ...Nervous?

- 1 ALL of the time
- 2 MOST of the time
- 3 SOME of the time
- 4 A LITTLE of the time
- 5 NONE of the time
- 7 Refused
- 9 Don't know

15.3 During the PAST 30 DAYS, how often did you feel ...Hopeless?

- 1 ALL of the time
- 2 MOST of the time
- 3 SOME of the time
- 4 A LITTLE of the time
- 5 NONE of the time
- 7 Refused
- 9 Don't know

15.4 During the PAST 30 DAYS, how often did you feel...Restless?

- 1 ALL of the time
- 2 MOST of the time
- 3 SOME of the time
- 4 A LITTLE of the time
- 5 NONE of the time
- 7 Refused
- 9 Don't know

15.5 During the PAST 30 DAYS, how often did you feel ...Sad?

- 1 ALL of the time
- 2 MOST of the time
- 3 SOME of the time
- 4 A LITTLE of the time
- 5 NONE of the time
- 7 Refused
- 9 Don't know

15.6 During the PAST 30 DAYS, how often did you feel ...Worthless?

- 1 ALL of the time
- 2 MOST of the time
- 3 SOME of the time
- 4 A LITTLE of the time
- 5 NONE of the time
- 7 Refused
- 9 Don't know

Kessler recommends scoring the scale by assigning 0 to 4 points for each of the six questions, based on the reported frequency of the feelings (i.e., 0 for "none of the time"; 1 for "a little of the time"; 2 for "some of the time"; 3 for "most of the

time"; and 4 for "all of the time"). The range for summed responses on the K6 Scale is thus 0 to 24, with 0 suggesting the lowest level of nonspecific psychological distress, and 24 suggesting the highest level of nonspecific psychological distress. According to the scoring criteria proposed by Kessler, persons with a score of 13 or greater are likely to be experiencing severe mental illness.

To assist researchers who intend to sum responses to the variables included in the K6 Scale, IPUMS NHIS assigns codes that are consistent with Kessler's advised scoring system (i.e., with "none of the time" coded as 0 and "all of the time" coded as 4). To produce valid results, users must exclude not in universe cases (persons other than sample adults, code 6 in IPUMS NHIS) and unknown cases (codes 7, 8, and 9 in IPUMS NHIS) before summing the responses.

Study 2: Current Smoking and Alcohol Consumption

17.1 Current Cigarette Smoking (For sample adults 18+)

Have you smoked at least 100 cigarettes during your entire life?

If yes, do you now smoke cigarettes every day, some days, or not at all?

[Note: Use of both sets of questions allowed for estimation of the impact of the question change on population prevalence. The revised current smoking status question was estimated to have resulted in an increase in smoking prevalence of about 1 percent-- a result occurring mainly from capturing smoking among persons who would otherwise have been classified as nonsmokers with the original question.]

SMOKESTATUS2: Cigarette smoking recode variable: Current detailed/former/never

For sample adults 18 and over, this is a recoded variable indicating the respondent's *current* smoking status in categories of the current smoker, every day current smoker, someday current smoker, current smoker--unknown frequency of smoking, and also indicates former smoker, never smoked and "has smoked, current smoking status unknown." In this variable, current smokers were divided into "every day" smokers or "some days" smokers. This version of the question was used from 1992 forward.

17.2 Alcohol drinking status: For sample adults 18+

The alcohol consumption consists of a series of items asked the sample adults in the NHIS.

ALCLIFE: In your entire life, have you had at least 12 drinks of any type of alcoholic beverage?

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

ALCSTAT1: Alcohol drinking status

In ANY ONE YEAR, have you had at least 12 drinks of any type of alcoholic beverage?

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

ALCAMT: Average number of drinks on days drank among those who have had at least 1 drink in the past year.

In the PAST YEAR, on those days that you drank alcoholic beverages, on the average how many drinks did you have?

Enter '1' if less than 1 drink.

Enter '95' if 95 or more drinks.

01-94 1-94 drinks

95 95+ drinks

97 Refused

99 Don't know

ALCDAYSWK: Frequency drank alcohol in the past year: Days per week
ALCDAYSWK reports the number of days per week during the past year that the sample adult drank alcoholic beverages.

In the PAST YEAR, how often did you drink any type of alcoholic beverage?

How many days per week, per month or per year did you drink?

Enter the number for how often alcoholic beverages were consumed in the past year.

Enter '0' for Never.

000 Never

001-365 1-365 days

997 Refused

999 Don't know

The *Field Representative's Manual* defines alcohol to "include as alcohol all types of beer (including stout, ale, malt liquor, or light beer, but does not include alcohol-free beer), wine (including port, sherry, sangria wine coolers, and champagne), and liquor (including brandy, liqueurs, scotch, whiskeys, tequila and gin)."

Study 3: Access to Health Care

18. Is there a place that you usually go to when you are sick or need advice about your health?

1 Yes

2 There is NO place

3 There is MORE THAN ONE place

7 Refused

9 Don't know

VITA

Hari Poudel, Ph.D., entered the Truman School of Public Affairs doctoral program in 2015 with the Truman School graduate assistantship. His research interests include social policy, health disparities, and social determinants of health. He is also interested in immigrants' mental health, health-risk behaviors, and health care access. Poudel has three master's degrees in public health (United States), Agricultural Economics (Germany), and Rural Sociology (Nepal). Before the doctoral work, Poudel worked for different government and non-governmental organizations in Nepal and the United States. Now, he has been working as a Data Manager with Office of Epidemiology, Missouri Department of Health and Senior Services.